SECTION 1

HEATING AND AIR CONDITIONING

CONTENTS

NOTES

SECTION 1A

HEATER AND VENTILATION

***CAUTION:** On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.*

***NOTICE:** Always use the correct fastener in the correct location. Use the correct fastener part number to replace a fastener. If the correct fastener part number is not available, a fastener of equal size and strength may be used. Do not use a fastener that is stronger when the correct fastener part number is not available in the following applications:*

- *Some bolts are designed to permanently stretch, and if a stronger fastener is used, the part will not be tightened correctly. These permanently stretching bolts will be called out. The correct part number fasteners must be used to replace this type of fastener because there is no available equivalent.*
- *Other bolts are designed to break if over tightened to prevent part damage. If a stronger fastener is used part damage may occur.*

Fasteners that need to be replaced when removed will be called out. Fasteners that require thread lockers or thread sealant will be called out. The correct tightening specification and sequence must be used when installing fasteners. Part or system damage may occur if the above instructions are not followed.

CONTENTS

CONTENTS (cont'd)

GENERAL DESCRIPTION

HEATER SYSTEM

The heater system 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 routes 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.

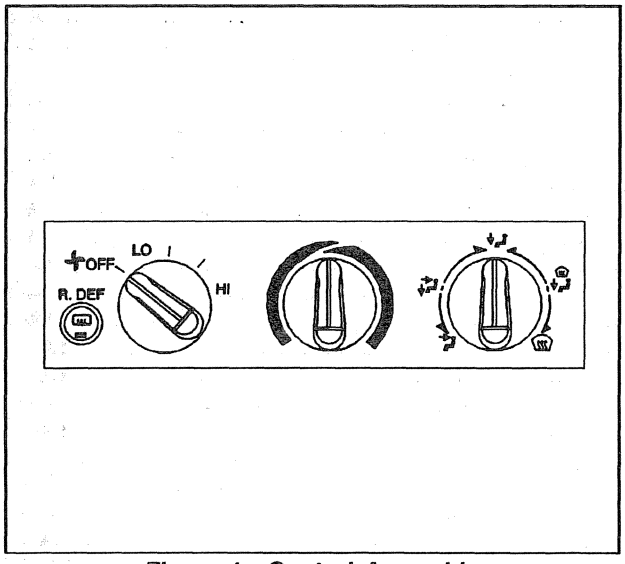


Figure 1—Control Assembly

CONTROLS

The control assembly in the instrument panel contains three rotary control knobs for; blower speed, mode selection, and temperature adjustment (figure 1). Brightness of the dial illumination is controlled by the instrument panel dimmer control.

TEMPERATURE ROTARY KNOB

the temperature valve. When the temperature rotary knob is in the full "Cold," or counter clockwise position, all of the air delivered by the ventilation system is unheated. When the temperature rotary control is in the full "Hot," or clockwise position, all of the air passing through the heater module is heated before it is discharged. Intermediate positions of the temperature rotary knob result in a mixture of heated and unheated air to provide more moderate air temperatures.

MODE ROTARY KNOB

The mode rotary knob operates the defrost control cable that goes to the left end of the heater module. This cable operates a crank lever and shaft that controls the position of an air valve in the heater module. There are detents at 0°, 90°, and 180° to indicate Vent, Floor, and Defrost mode positions. Air delivery may be blended by placing the rotary control anywhere in between the two desired modes.

BLOWER SPEED CONTROL

The blower switch provides a choice of four blower speeds and off. It receives power through the HTR-A/C FUSE 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 "High" 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 sheet metal ground wire that connects to a ground terminal on the cowl.

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 airflow through various sections of the heater module to provide the proper airflow for the selected operating mode. Each air valve is actuated by a control cable from the heater control assembly.

TEMPERATURE VALVE AND HEATER CORE

The temperature of the air coming from the air distribution duct 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. The valve defaults to full cold with no cable attached.

When the temperature rotary knob in the control assembly is in 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 air distribution duct.

As the temperature rotary knob moves 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 air temperature discharged through the heater ducts and defroster.

When the temperature rotary knob reaches the full "Hot" position, 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 rotary knob is in the "Vent" position, 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 rotary knob is in the "Heater" position, the defroster valve remains closed. As a result, air from the blower fan is heated 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 rotary knob is in the "Defrost" position, 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 maximum airflow to the defroster, with only a small amount of airflow coming out of the heater duct.

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 heater core and blower 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 OF THE HEATER

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 rotary knob and the temperature rotary knob should be evaluated. If a problem is found during any intermediate step of the functional test, complete the test before repair is started.

1. Cycle the temperature rotary knob to the extreme ends of travel on the control assembly dial to ensure that the cable is properly adjusted.
2. Move the mode rotary knob to the "Vent" position.
   - Air should come from the instrument panel outlets at nearly the same temperature as the outside air.
   - Air should not come from the floor outlets, the defroster nozzles, or the side window defogger outlets.
3. Move the mode rotary knob 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 rotary knob 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 rotary knob back to the full "Cold" position and make sure the air temperature drops back to nearly the temperature of the outside air once again.
6. Slowly turn the blower switch toward off, 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, full "Hot" temperature and High 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. Use an accurate thermometer 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)

T2550

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 moving the mode rotary knob, check the attachment of the affected control cable at the heater module. Make sure the cable loop is connected to the actuator and the cable sheath is retained. This action can be observed by removing the instrument panel storage compartment for access.

If the cause of the problem is not discovered, disconnect the control cable at the valve 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 rotary knob. 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.

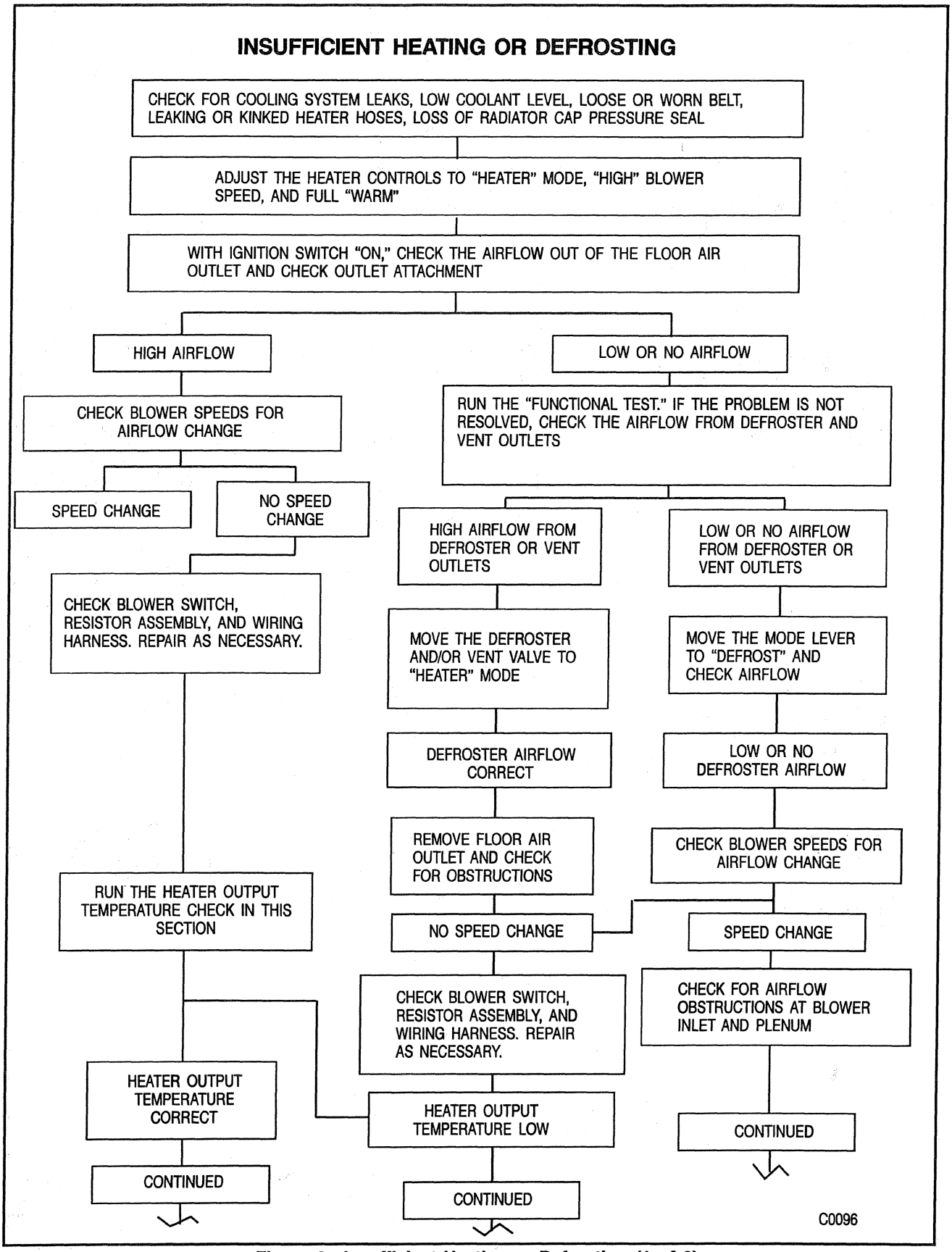


Figure 2—Insufficient Heating or Defrosting (1 of 2)

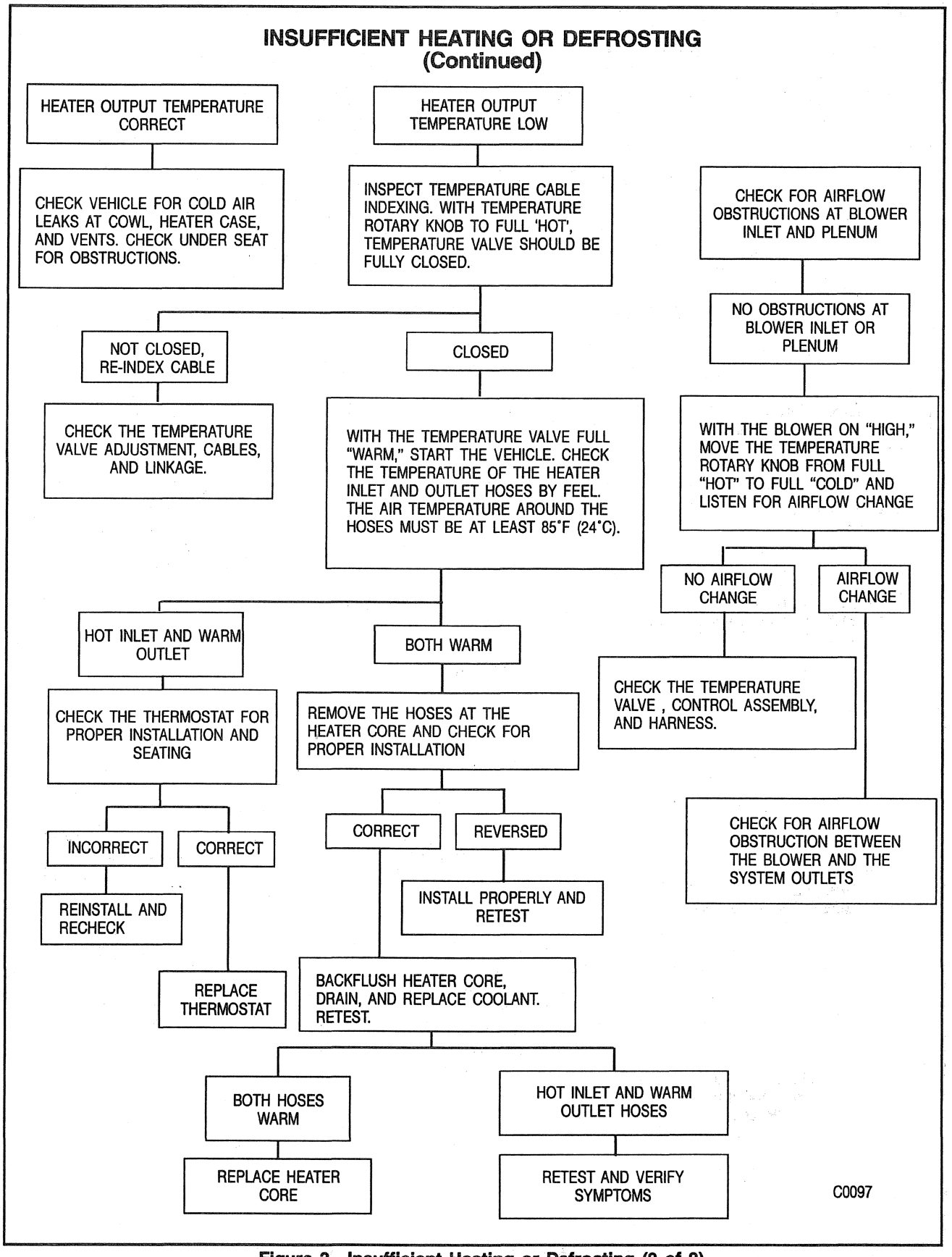


Figure 3—Insufficient Heating or Defrosting (2 of 2)

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 rotary knob 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 improperly indexed 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.

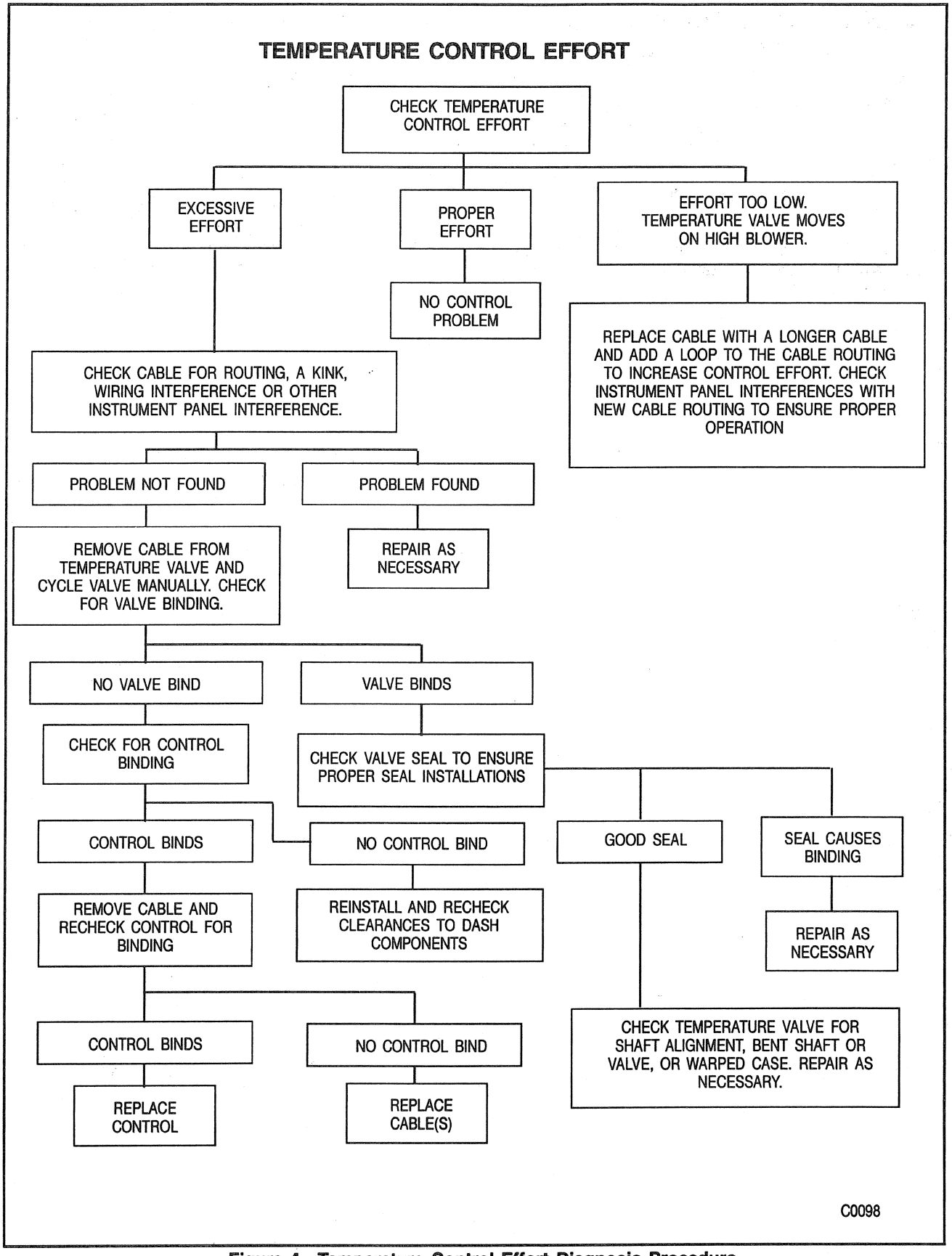


Figure 4—Temperature Control Effort Diagnosis Procedure

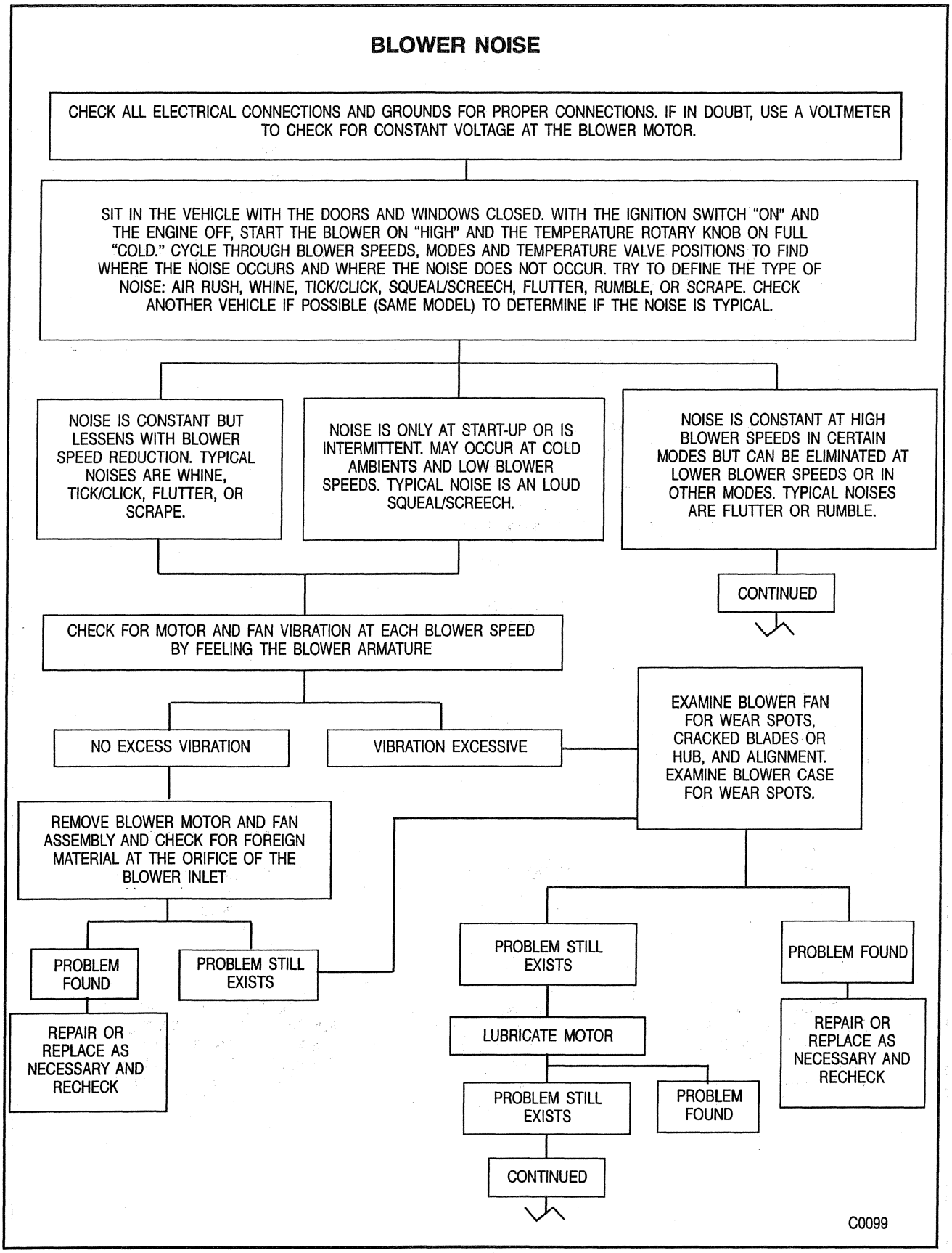


Figure 5—Blower Noise Diagnosis Procedure (1 of 2)

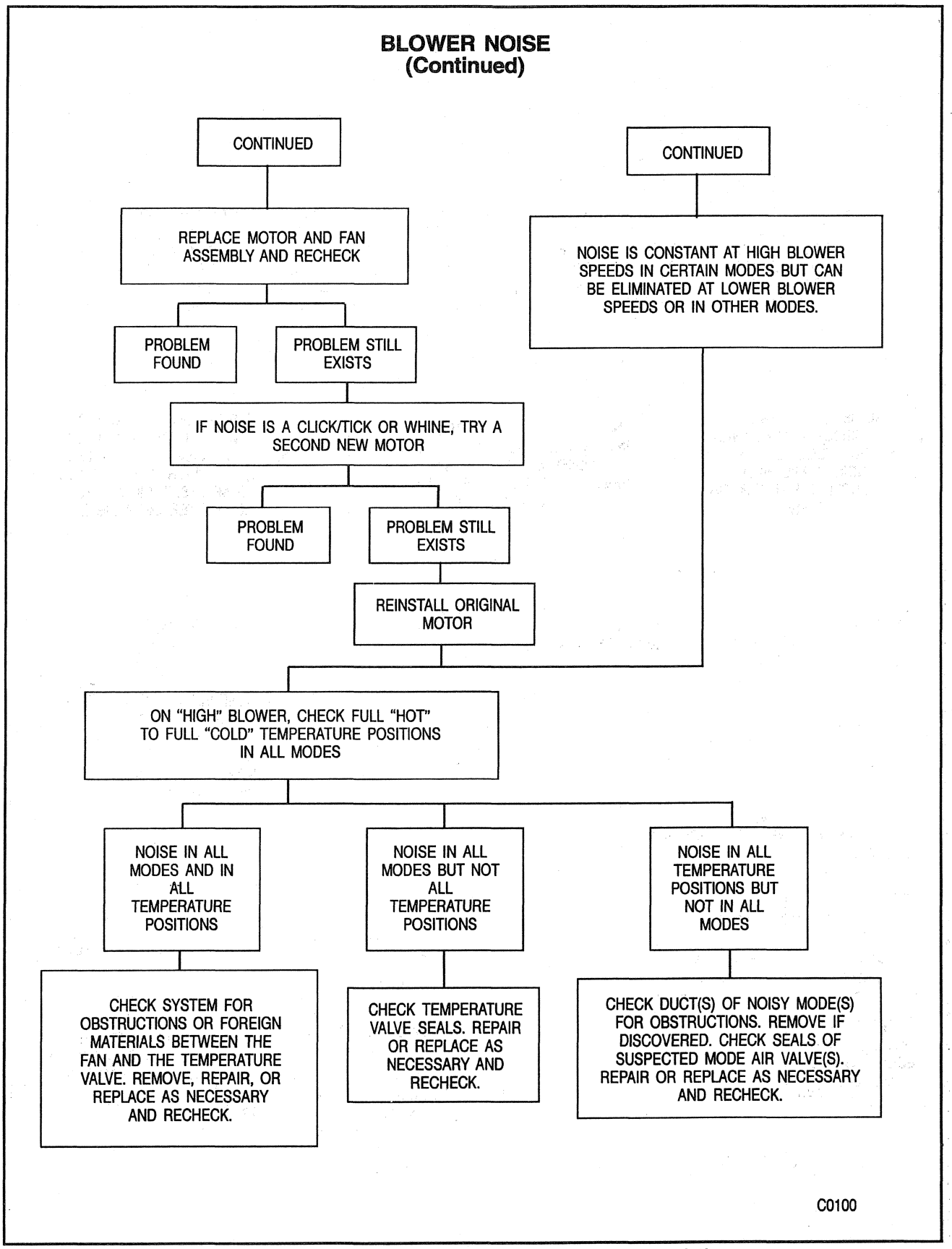


Figure 6—Blower Noise Diagnosis Procedure (2 of 2)

ON-VEHICLE SERVICE

CONTROL ASSEMBLY AND BLOWER SWITCH

Remove or Disconnect (Figure 7)

1. Instrument cluster trim plate. Refer to SECTION 10A4.
2. Control assembly by releasing the snap-fit retainers with a small screwdriver.
3. Electrical connection.
4. Cables from the control assembly by releasing retainers.
5. Blower switch.
   - Remove the blower switch rotary knob and the retaining clip from the shaft of the blower switch.

Install or Connect (Figure 7)

1. Blower switch.
   A. Hold the blower switch in position and install the retaining clip.
   B. Install the blower switch rotary knob.
2. Cables to the control assembly. Refer to "Temperature Control Cable" and "Defrost Control Cable."
3. Electrical connection.
4. Control assembly to the instrument panel by snapping in.
5. Instrument cluster trim plate. Refer to SECTION 10A4.
   - Check circuit operation.

CONTROL ASSEMBLY LAMP BULB

Remove or Disconnect

1. 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. Control assembly. Refer to "Control Assembly and Blower Switch."
   - Check circuit operation.

TEMPERATURE CONTROL CABLE

Remove or Disconnect (Figure 8)

1. Instrument cluster trim plate. Refer to SECTION 10A4.
2. Control assembly. Refer to "Control Assembly and Blower Switch."
3. Electrical connector.
4. Temperature cable from the heater control assembly.

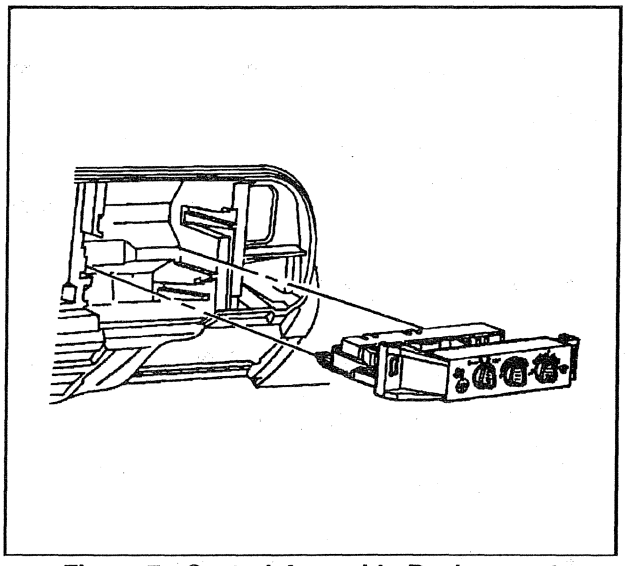


Figure 7—Control Assembly Replacement

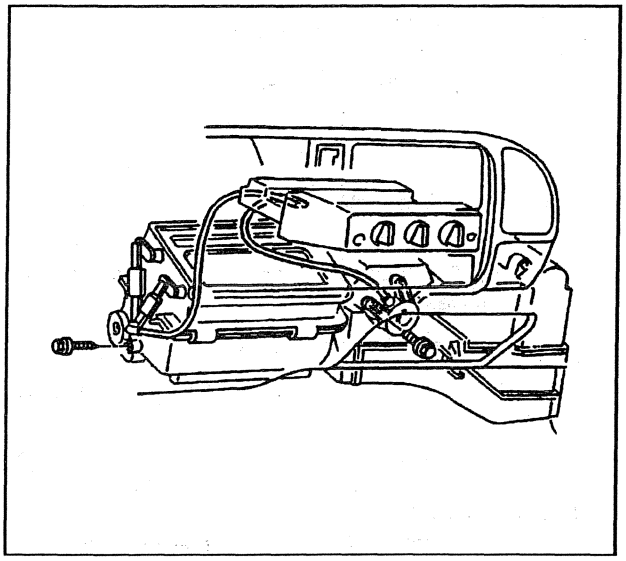


Figure 8—Temperature and Defrost Control Cable

5. Instrument panel storage compartment. Refer to SECTION 10A4.
6. Temperature cable from the temperature valve.
   A. Release cable from the temperature valve by squeezing retainer.
   B. Squeeze post and lift cable end to remove.

Install or Connect (Figure 8)

1. Index the cable before installing.
   A. Cycle the temperature rotary knob to full "cold."
   B. Make sure the temperature door is closed.
2. Cable to the temperature valve.
   A. Snap the cable onto the valve.
   B. Secure the cable by snapping it into the heater case.
3. Temperature cable to the control assembly.
   • Route the cable in the same location as removed.
4. Instrument panel storage compartment. Refer to SECTION 10A4.
5. Electrical connector.
6. Control assembly. Refer to "Control Assembly and Blower Switch."
7. Instrument cluster trim plate. Refer to SECTION 10A4.

DEFROST CONTROL CABLE

Remove or Disconnect (Figure 8)

1. Instrument cluster trim plate. Refer to SECTION 10A4.
2. Control assembly. Refer to "Control Assembly and Blower Switch."
3. Electrical connector.
4. Defrost cable from the control assembly.
5. Defrost cable from the defroster valve.

Install or Connect (Figure 8)

1. Index the cable before installing.
   A. Cycle the mode rotary knob to "Heater."
   B. Make sure the defrost door is closed.
2. Cable to the defrost valve.
   A. Snap the cable onto the valve.
   B. Secure the cable by snapping the cable into the heater case.
3. Defrost cable to the control assembly.
   • Route the cable in the same location as removed.
4. Electrical connector.
5. Control assembly. Refer to "Control Assembly and Blower Switch."
6. Instrument cluster trim plate. Refer to SECTION 10A4.

BLOWER MOTOR RESISTOR

Remove or Disconnect (Figure 9)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel storage compartment. Refer to SECTION 10A4.
   • Remove the compartment through the instrument panel opening. The resistor is installed on top the heater case.
3. Electrical connector.
4. Screws.
5. Resistor.

Install or Connect (Figure 9)

NOTICE: When installing resistor to the heater case, do not let the resistor coils contact each other. Improper system operation or vehicle damage could result.

1. Resistor.

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

2. Screws.

Tighten

   • Screws to 1.9 N·m (17 lbs. in.).

3. Electrical connector.
4. Instrument panel storage compartment. Refer to SECTION 10A4.
5. Negative battery cable.
   • Check circuit operation.

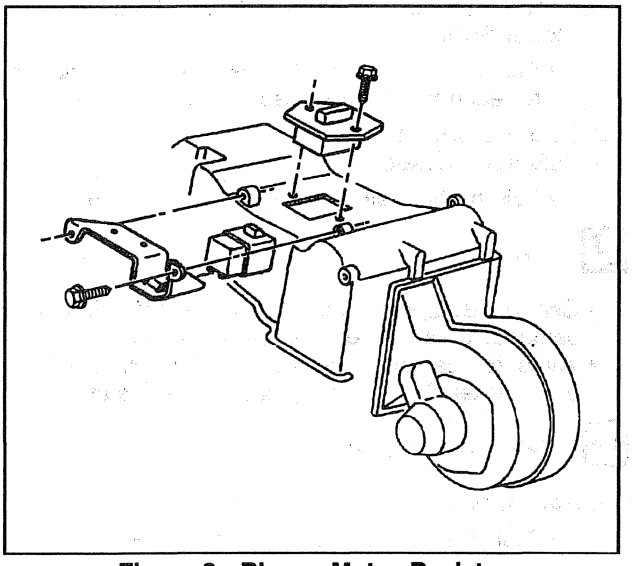


Figure 9—Blower Motor Resistor

BLOWER MOTOR AND FAN

Remove or Disconnect (Figures 10 and 11)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel storage 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 blower motor, as necessary.
6. Courtesy lamp (if equipped).
7. Bolt from right lower I/P support.
8. Blower motor cover.
9. Blower motor cooling tube.
10. Blower motor flange screws.
11. Blower motor.
    - Pull the blower motor forward carefully to avoid distorting the blower fan.

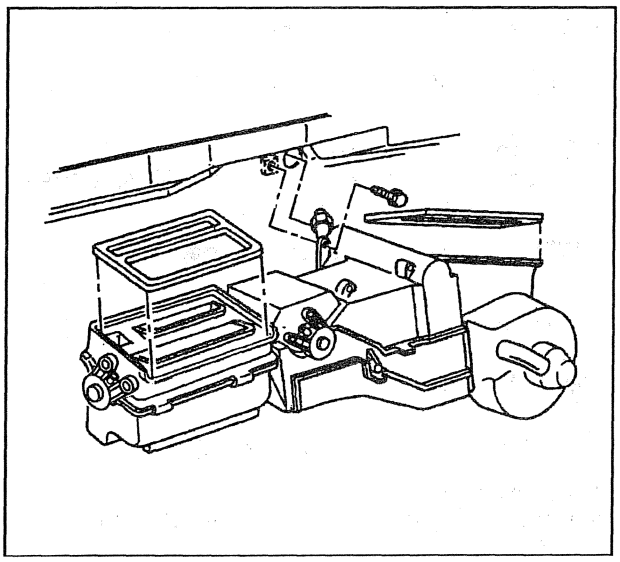


Figure 10—Heater Case (1 of 2)

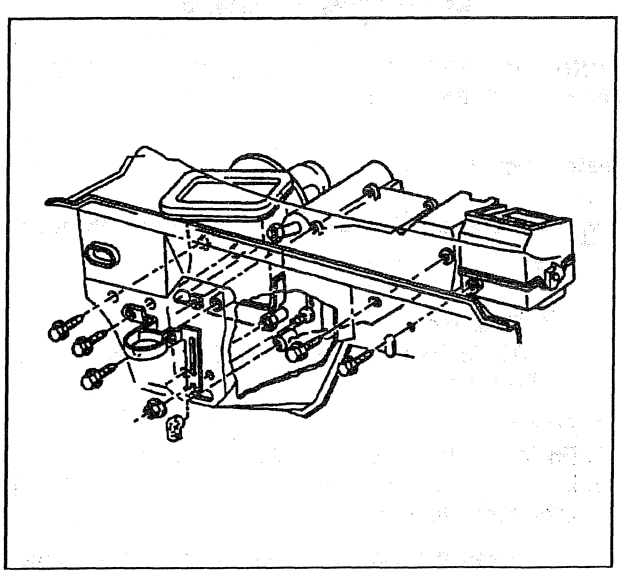


Figure 11—Heater Case (2 of 2)

- 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 as necessary.
- Flange of the blower motor for damage or distortion that could cause an air leak. Repair as necessary.
- Blower fan for damage and distortion.

Install or Connect (Figures 10 and 11)

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

NOTICE: See "Notice" on page 1A-1.

2. Blower motor flange screws.

Tighten

- Blower motor flange screws to 1.4 N·m (12 lbs. in.).

3. Blower motor cooling tube.
4. Blower motor cover.
5. Bolt to right lower I/P support.
6. Courtesy lamp (if equipped).
7. Electrical connectors to blower motor, as necessary.
8. Right hinge pillar trim panel. Refer to SECTION 10A4.
9. Front screw into front door sill plate.
10. Instrument panel storage compartment. Refer to SECTION 10A4.
11. Negative battery cable.
    - Check circuit operation.

HEATER CORE

Remove or Disconnect (Figures 10 and 11)

1. Engine coolant. Refer to SECTION 6B1.
2. Instrument panel storage compartment. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Center floor air distribution duct.
5. Hinge pillar trim panels. Refer to SECTION 10A4.
6. Blower motor cover.
7. Blower motor. Refer to "Blower Motor and Fan."

CAUTION: Refer to "SIR Caution" on page 1A-1.

8. Steering column. Refer to SECTION 3F.
9. Tilt back instrument panel. Refer to SECTION 10A4.
10. Coolant recovery reservoir. Refer to SECTION 6B1.
11. Heater hoses. Refer to "Heater Hoses."
12. Screw on interior side of cowl, near the evaporator pipe (if equipped) while holding heater case to the cowl (figure 10).

13. Four screws on the engine side of the cowl holding the heater case to the cowl (figure 11).
14. Two nuts on the engine side of the cowl holding the heater case to the cowl (figure 11).
15. Heater case.
    - It may be necessary to have an assistant when removing heater case.
16. Heater cover.
    - Remove seven screws that hold cover to the heater case.
17. Heater core from retainer.

Install or Connect (Figures 10 and 11)

1. Heater core into retainer.
    - Install seven screws that hold heater cover to heater case.
2. Heater cover.
    - Make sure heater cover is properly sealed.
3. Heater case.
    - May be necessary to have an assistant when installing heater case.
4. Nuts.
5. Screws.

NOTICE: See "Notice" on page 1A-1.

6. Screw.

Tighten

- Screws on engine side of the cowl to 1.9 N·m (17 lbs. in.).
- Nuts to 2.8 N·m (25 lbs. in.).
- Screw on interior side of the cowl 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.

CAUTION: Refer to "SIR Caution" on page 1A-1.

10. Steering column. Refer to SECTION 3F.
11. Blower motor. Refer to "Blower Motor and Fan."
12. Blower motor cover.
13. Hinge pillar trim panels. Refer to SECTION 10A4.
14. Center floor air distribution duct.
15. Electrical connectors, as necessary.
16. Instrument panel storage compartment. Refer to SECTION 10A4.
17. Engine coolant. Refer to SECTION 6B1.
    - Check the system for leaks.

AIR DISTRIBUTOR DUCT

Remove or Disconnect (Figure 12)

1. Instrument cluster trim plate. Refer to SECTION 10A4.
2. Defroster grille.
3. Three duct mounting screws.
4. Tilt back instrument panel assembly. Refer to SECTION 10A4.
5. Duct from instrument panel by squeezing to release retainers in three places.

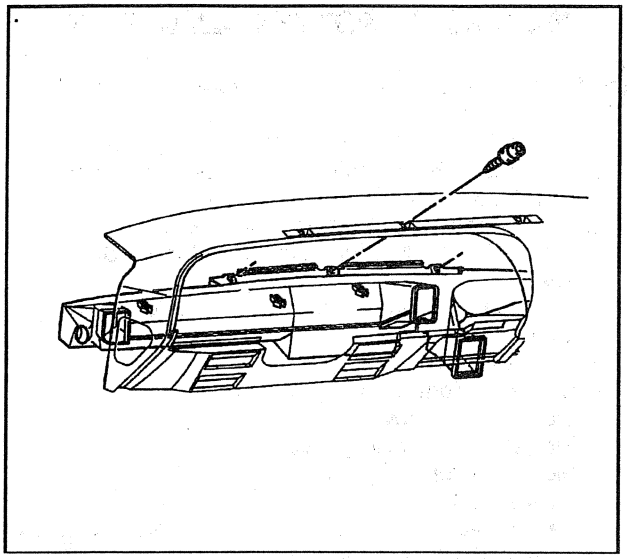


Figure 12—Air Distributor Duct

6. Duct from the instrument panel.

Install or Connect (Figure 12)

1. Duct to instrument panel.
2. Tilt up instrument panel. Refer to SECTION 10A4.

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

3. Duct mounting screws.

Tighten

- Screws to 1.9 N·m (17 lbs. in.).

4. Defroster grille.
5. Instrument cluster trim plate. Refer to SECTION 10A4.

HEATER HOSES

PICKUP AND EXTENDED CAB MODELS WITH 4.3L, 5.0, and 5.7L ENGINES

Heater Inlet Hose

Remove or Disconnect (Figures 13 through 17)

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.
4. Inlet hose clamp at heater core.
    - Loosen the clamp enough to slide the clamp away from the fitting on the inlet hose.

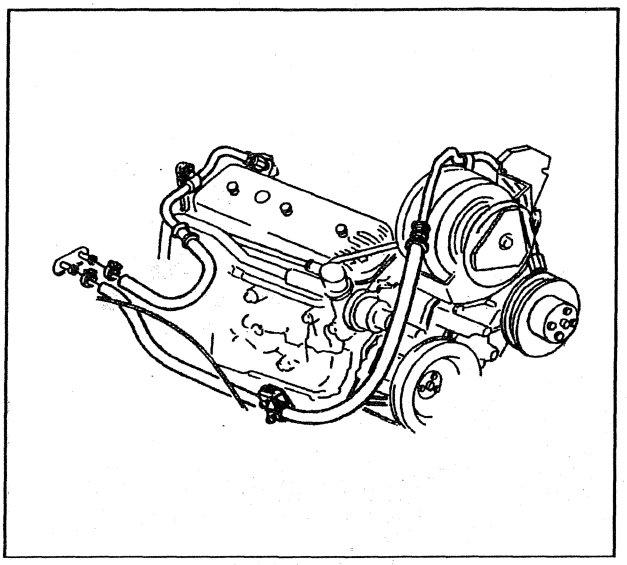


Figure 13—Heater Hose Routing - Pickup Models (4.3L, 5.0L, and 5.7L Engines) (1 of 2)

5. Inlet hose from heater core.
6. Push inlet hose into connector and insert J 38723 or equivalent into connector to release locking tabs.
7. Pull retainer and hose from heater inlet connector.

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 13 through 17)

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

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

4. Inlet hose mounting screw.

Tighten

- Screw to 1.4 N·m (12 lbs. in.).

5. Engine coolant. Refer to SECTION 6B1.
6. Air cleaner.
   - Check the system for leaks.

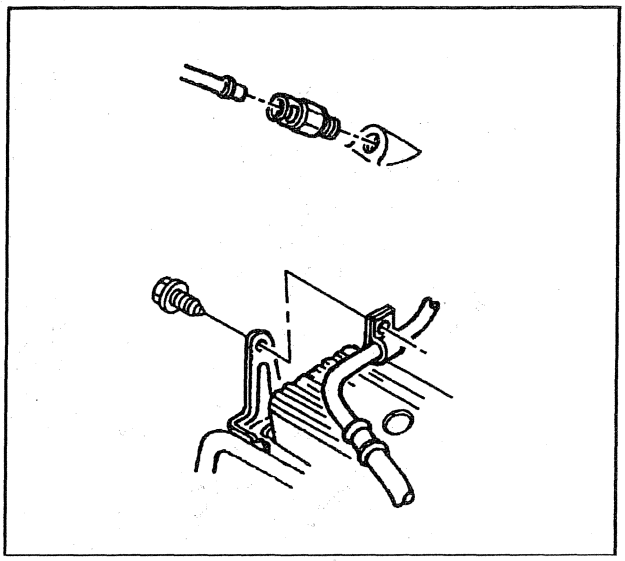


Figure 14—Heater Hose Routing - Pickup Models (4.3L, 5.0L, and 5.7L Engines) (2 of 2)

Heater Outlet Hose

Remove or Disconnect (Figures 13 through 17)

1. Engine coolant. Refer to SECTION 6B1.
2. Hose clamps.
3. Outlet hose clip.
4. Outlet hose from heater core.
5. Outlet hose from radiator.

Install or Connect (Figures 13 through 17)

1. Outlet hose to radiator.
2. Outlet hose to heater core.
3. Outlet hose clip.
4. Hose clamps).
5. Engine coolant. Refer to SECTION 6B1.
   - Check the system for leaks.

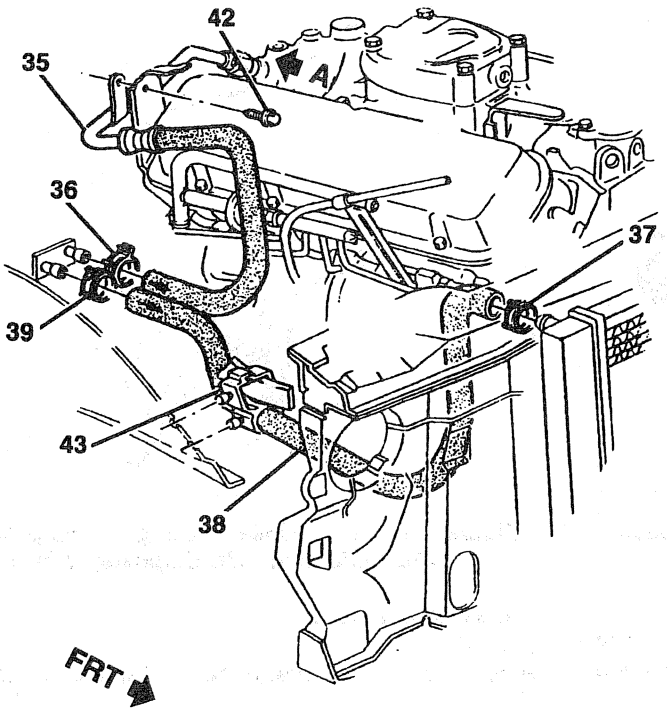
6.5L DIESEL ENGINES

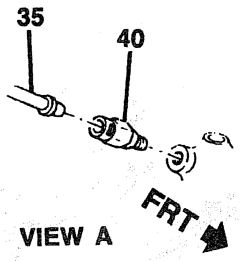
Remove or Disconnect (Figure 16)

1. Engine coolant. Refer to SECTION 6B1.
2. Hose clamps.
3. Inlet hose.
4. Outlet hose clip.
5. Outlet hose.

Install or Connect (Figure 16)

1. Outlet hose.
2. Outlet hose clip.
3. Inlet hose.
4. Hose clamps.
5. Engine coolant.
   - Check the system for leaks.

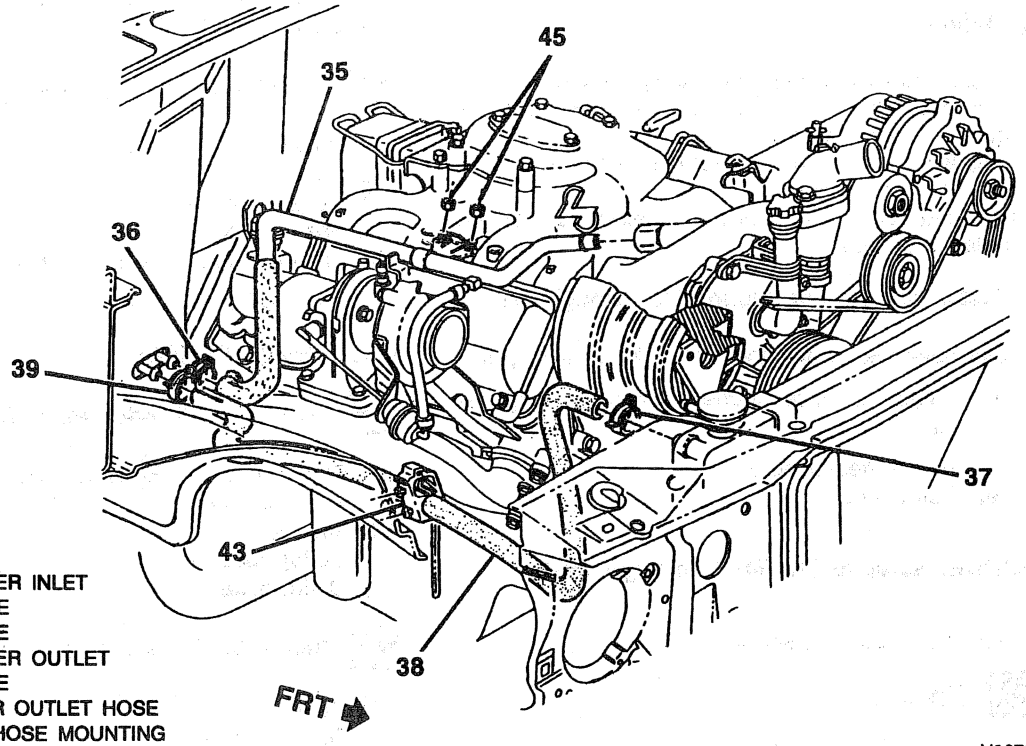




35. HOSE, HEATER INLET
36. CLAMP, HOSE
37. CLAMP, HOSE
38. HOSE, HEATER OUTLET
39. CLAMP, HOSE
40. CONNECTOR, HEATER INLET HOSE
42. SCREW, INLET HOSE MOUNTING
43. CLIP, HEATER OUTLET HOSE

V3591

Figure 15—Heater Hose Routing (7.4L Engines)



35. HOSE, HEATER INLET
36. CLAMP, HOSE
37. CLAMP, HOSE
38. HOSE, HEATER OUTLET
39. CLAMP, HOSE
43. CLIP, HEATER OUTLET HOSE
45. NUT, INLET HOSE MOUNTING

V2675

Figure 16—Heater Hose Routing (6.5L Diesel Engines)

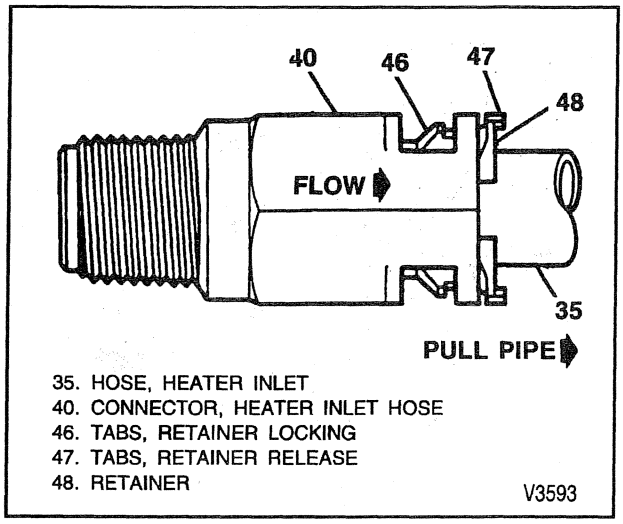


Figure 17—Quick Connect Heater Inlet Connector

ON-VEHICLE SERVICE—AUXILIARY HEATER (SUBURBAN)

CONTROL SWITCH

Remove or Disconnect (Figure 18)

1. Instrument cluster trim. Refer to SECTION 10A4.
2. Electrical connectors.
3. Control switch from instrument cluster trim.

Install or Connect (Figure 18)

1. Control switch to instrument cluster trim.
2. Electrical connectors.
3. Instrument cluster trim. Refer to SECTION 10A4.

- Check circuit operation.

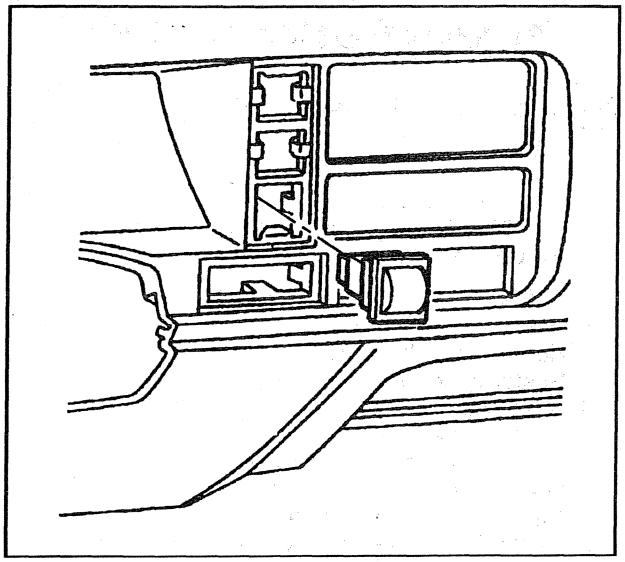


Figure 18—Auxiliary Heater Control Switch

FRONT OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 19)

1. Overhead console. Refer to SECTION 10A4.
2. Electrical connectors.
3. Control assembly from overhead console.

Install or Connect (Figure 19)

1. Control assembly to overhead console.
2. Electrical connector.
3. Overhead console. Refer to SECTION 10A4.

- Check circuit operation.

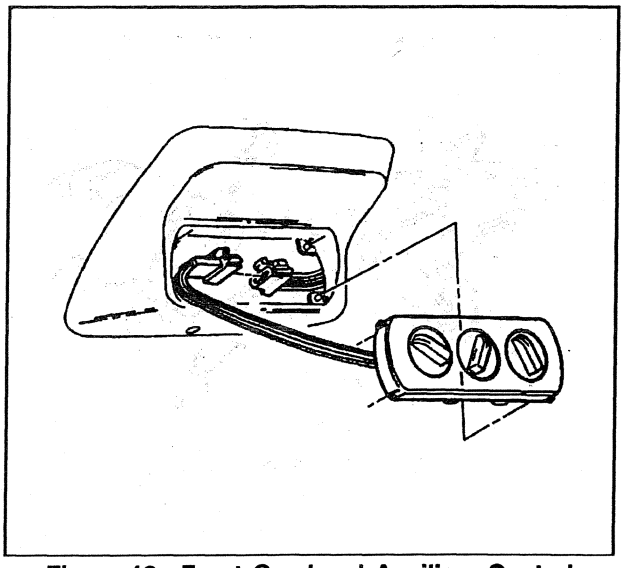


Figure 19—Front Overhead Auxiliary Control Switch

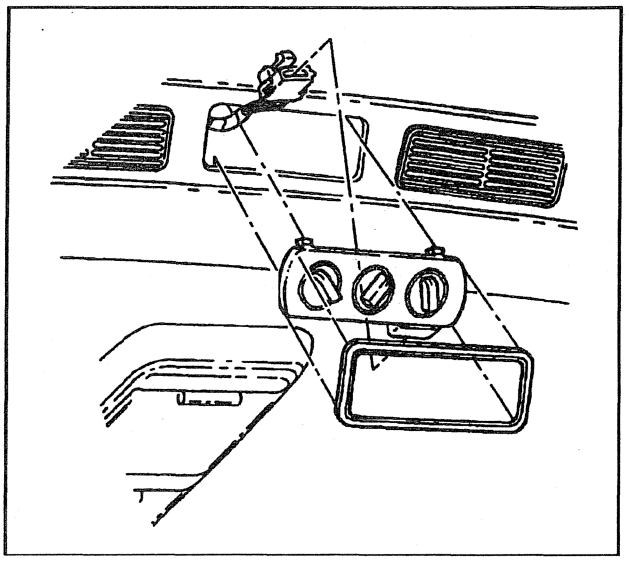


Figure 20—Center Overhead Auxiliary Control Switch

CENTER OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 20)

1. Bezel.
2. Control assembly from roof panel.
3. Electrical connectors.

Install or Connect (Figure 20)

1. Electrical connectors.
2. Control assembly to roof panel.
3. Bezel.

• Check circuit operation.

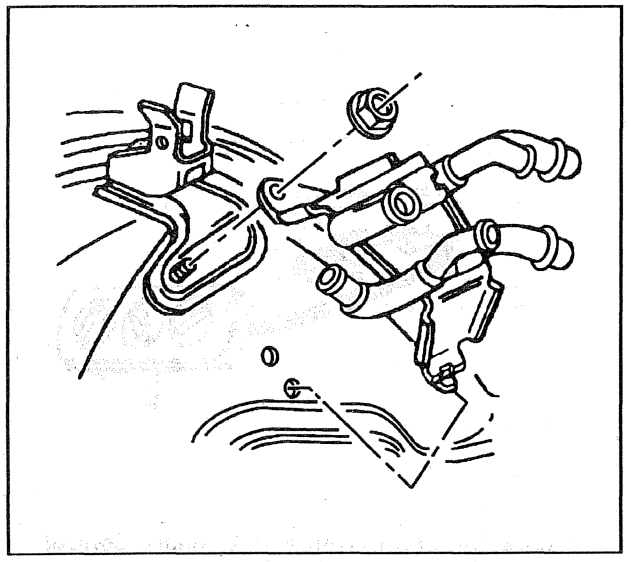


Figure 21—Auxiliary Heater Pipe

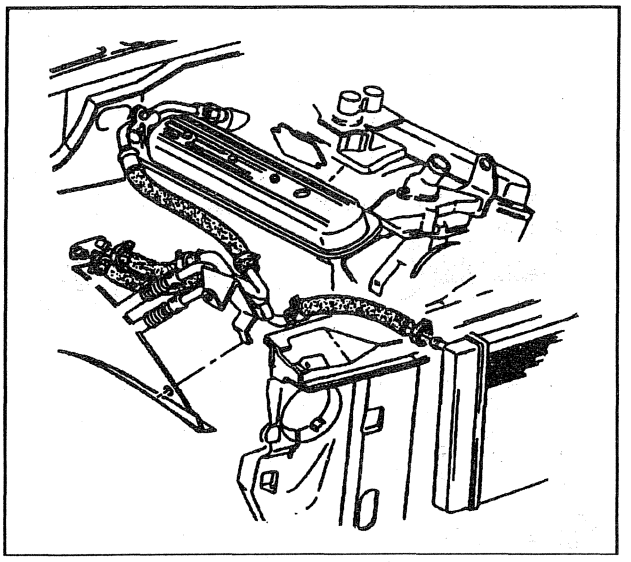


Figure 22—Auxiliary Heater Hose Routing

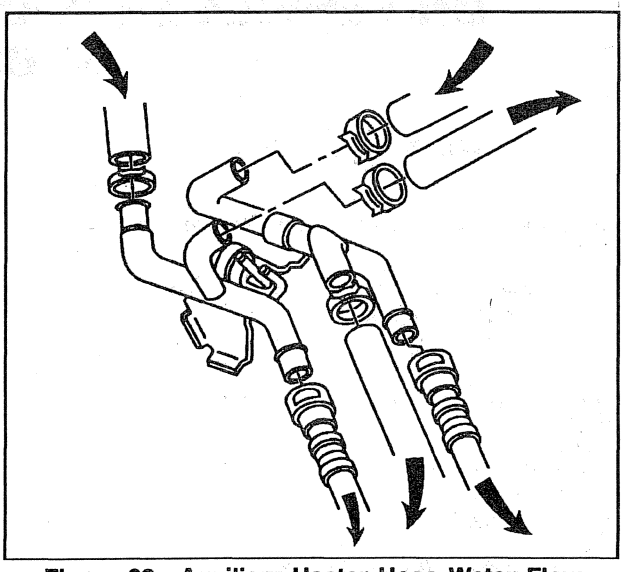


Figure 23—Auxiliary Heater Hose Water Flow

AUXILIARY HEATER PIPE

Remove or Disconnect (Figures 21, 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 from radiator.
4. Heater outlet hose from auxiliary heater pipe.
5. Hose clamps.
6. Heater outlet hose from heater core.
7. Heater outlet hose from auxiliary heater pipe.
8. Hose clamps.
9. Heater inlet hose from heater core.
10. Heater inlet hose from auxiliary heater pipe.
11. Hose clamp.

12. Heater inlet hose from auxiliary heater pipe.
13. Push auxiliary inlet hose or outlet hose into auxiliary heater pipe and insert J 38723 or equivalent into hose to release locking tabs.
14. Nut (figure 21).
15. Auxiliary heater pipe.

Install or Connect (Figures 21, 22, and 23)

1. Auxiliary heater pipe (figure 21).

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

2. Nut.

Tighten

- Nut to 15 N·m (11 lbs. ft.).

3. Push hose(s) into auxiliary heater pipe until retainer tabs lock.
   - Pull back on hose(s) to check for proper engagement.
4. Heater inlet hose to auxiliary heater pipe.
5. Hose clamp.
6. Heater inlet hose to auxiliary heater pipe.
7. Heater inlet hose to heater core.
8. Hose clamps.
9. Heater outlet hose to auxiliary pipe.
10. Heater outlet hose to heater core.
11. Hose clamps.

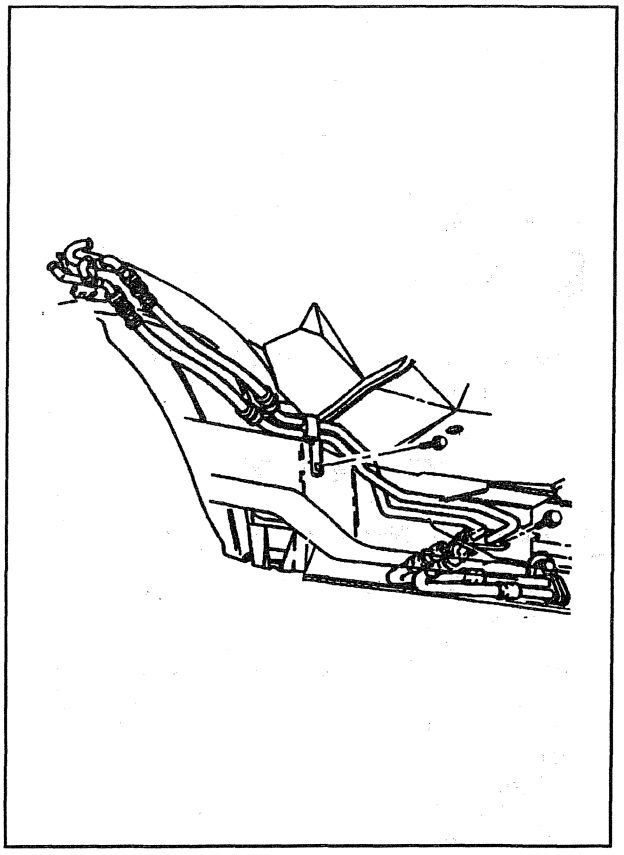


Figure 24—Auxiliary Heater Hose Assembly Routing (Front) (Gas Engine)

12. Heater outlet hose to auxiliary heater pipe.
13. Heater outlet hose to radiator.
14. Hose clamps.
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.
4. Front hose assembly from auxiliary heater pipe.
   - Push front hose assembly into auxiliary heater pipe and insert J 38723 or equivalent into hose to release locking tabs.
5. Front hose assembly from rear hose assembly.
   - Push auxiliary hose assembly into rear hose assembly and insert J 38723 or equivalent into hose to release locking tabs.

Install or Connect (Figure 24)

1. Front hose assembly to auxiliary heater pipe.
   - Push hose assembly into auxiliary heater pipe until retainer tabs lock.
2. Front hose assembly to rear hose assembly.
   - Push hose assembly into rear hose assembly until retainer tabs lock.

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

3. Bolts.

Tighten

- Bolts 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.

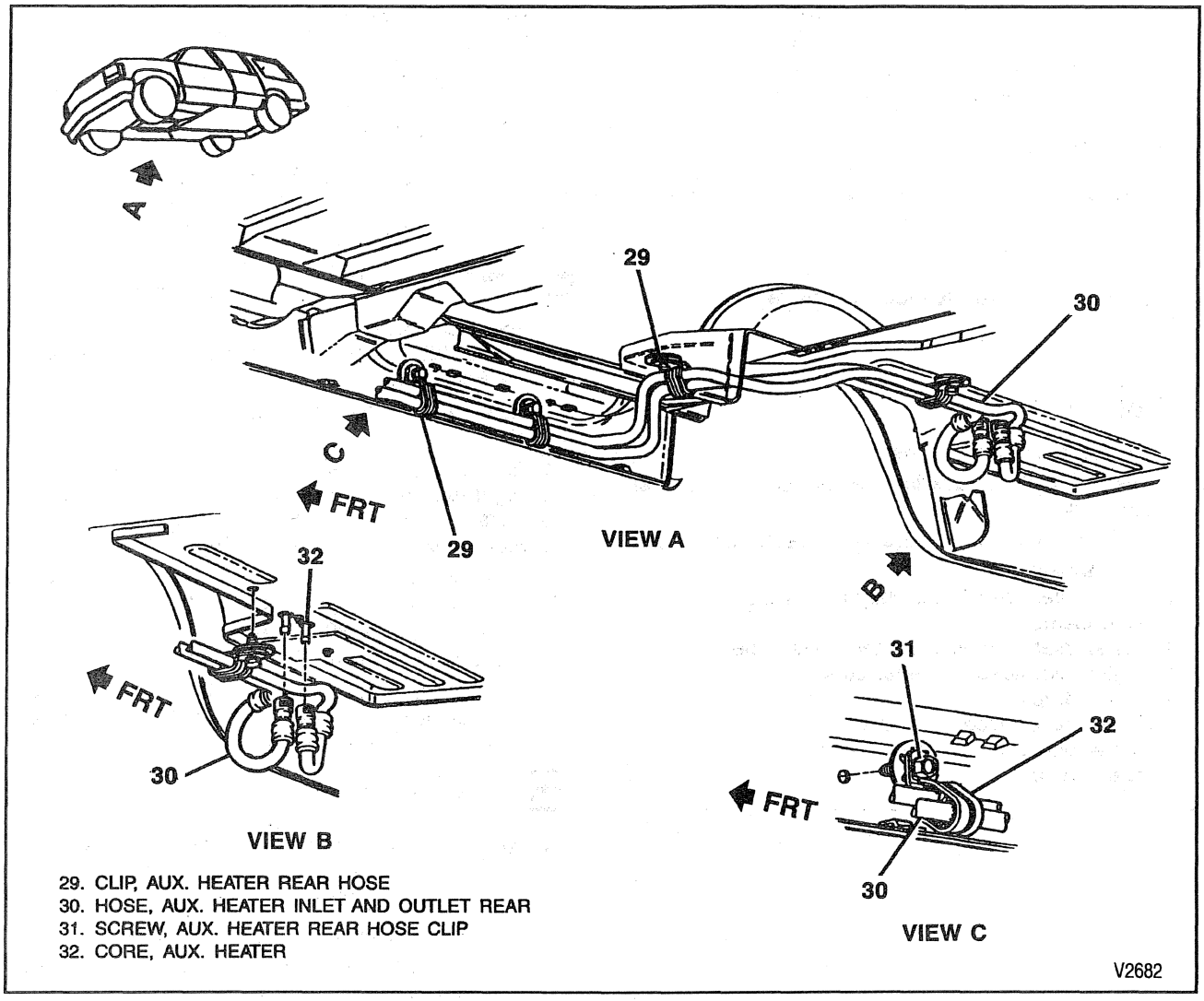
REAR AUXILIARY HOSE ASSEMBLY

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.

1. Engine coolant. Refer to SECTION 6B1.
2. Bolts.



29. CLIP, AUX. HEATER REAR HOSE
30. HOSE, AUX. HEATER INLET AND OUTLET REAR
31. SCREW, AUX. HEATER REAR HOSE CLIP
32. CORE, AUX. HEATER

Figure 25—Auxiliary Heater Hose Assembly Routing (Rear)

3. Rear hose assembly from front hose assembly (figure 24).
   - Push rear hose assembly into front hose assembly and insert J 38723 or equivalent into hose to release locking tabs.
4. Rear hose assembly from auxiliary heater core.
   - Push rear hose assembly into auxiliary heater core and insert J 38723 or equivalent into hose to release locking tabs.

Install or Connect (Figures 24 and 25)

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

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

3. Bolts.

Tighten

- Bolts 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."
6. Electrical connectors, as necessary.
7. Drain valve.
8. Bolts.
9. Nuts.

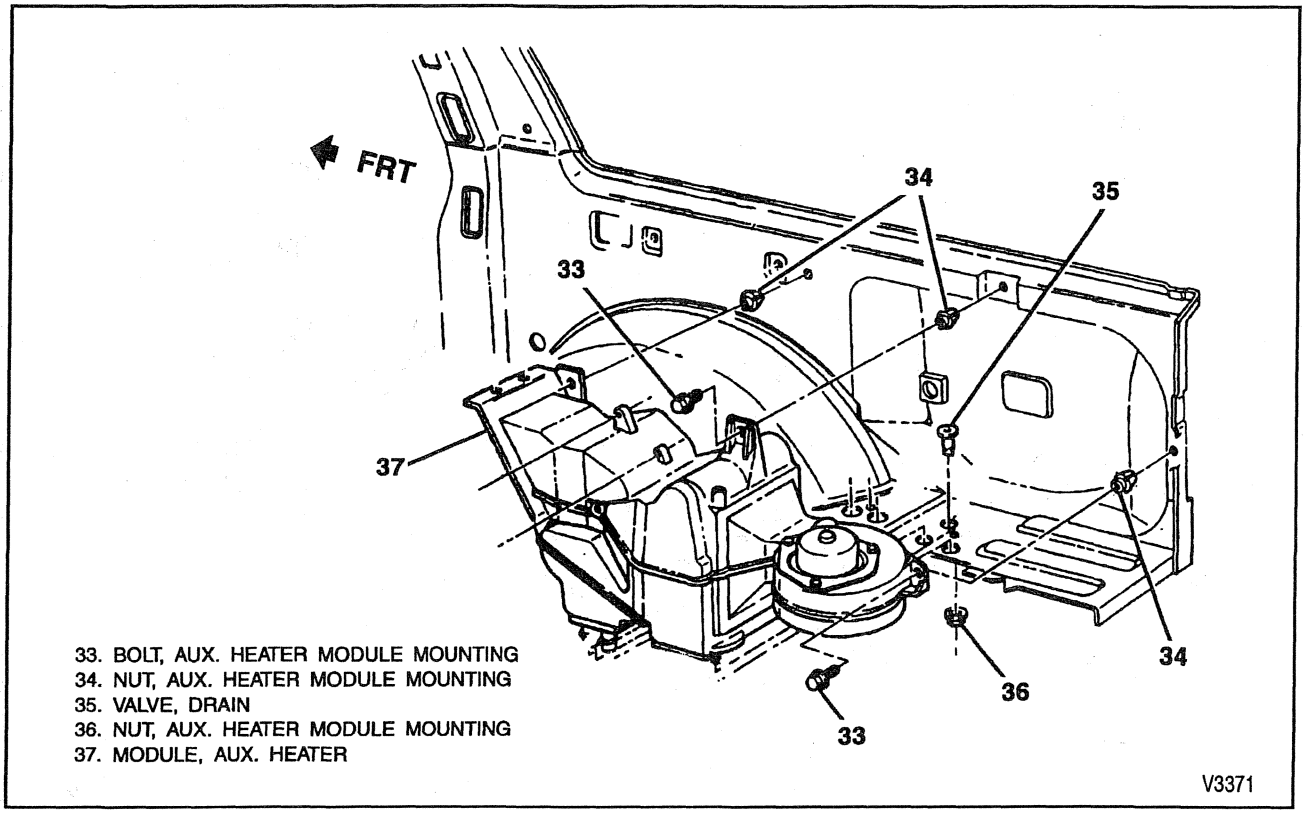


Figure 26—Auxiliary Heater Module

10. Heater module.
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.

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

5. Nuts.
6. Bolts.

Tighten

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

7. Drain valve.
8. Electrical connectors, as necessary.
9. Auxiliary heater hoses to heater core. Refer to "Heater Hoses."
10. Right rear wheelhouse. Refer to SECTION 2B.
11. Right rear quarter trim panel. Refer to SECTION 10A4.
12. 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.
   - Position blower motor in order to remove blower motor fan.
5. Blower motor fan retaining nut.
6. Blower motor fan.
7. Blower motor.

Install or Connect (Figure 27)

1. Blower motor.
2. Blower motor fan.
3. Blower motor fan retaining nut.

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

4. Screws.

Tighten

- Screws to 1.4 N·m (12 lbs. in.).

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

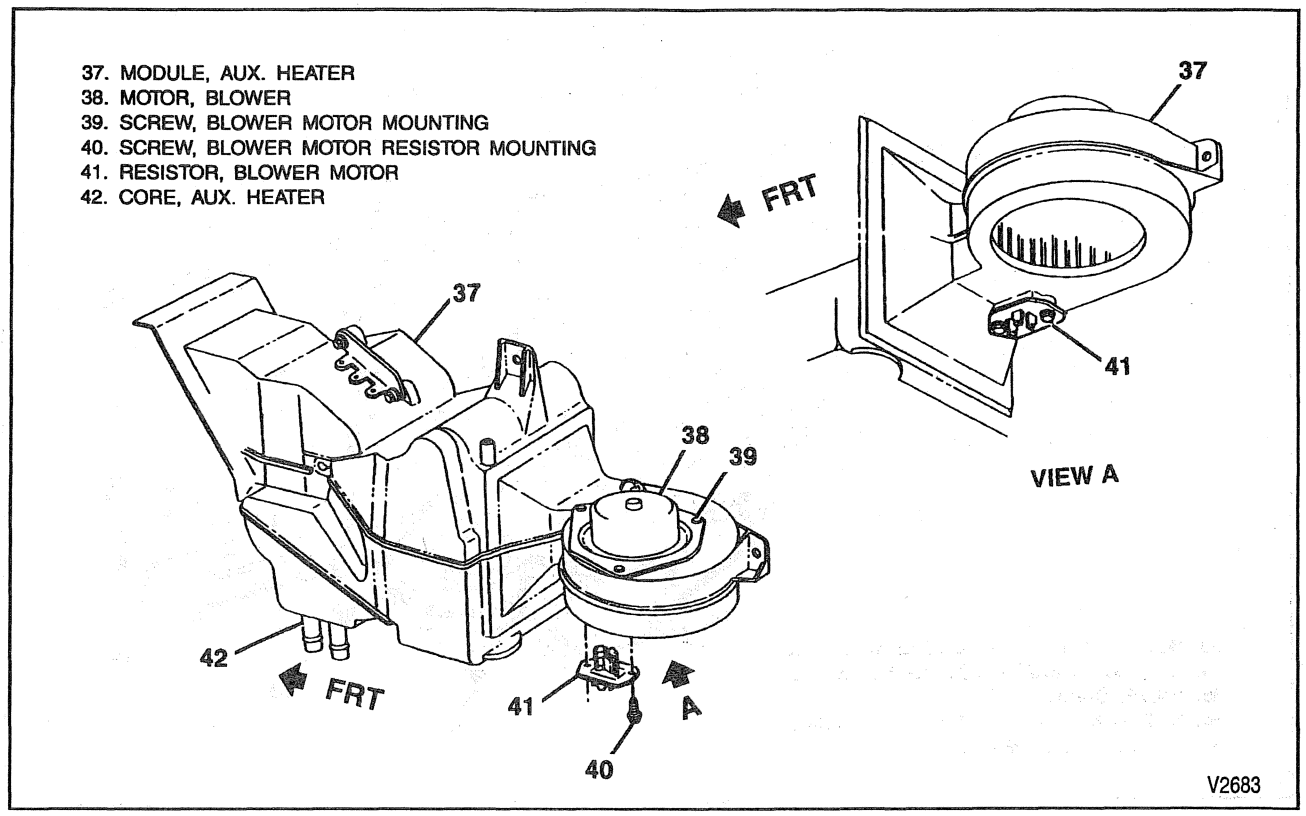


Figure 27—Auxiliary Blower Motor/Resistor

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.
5. Blower motor resistor.

Install or Connect (Figure 27)

1. Blower motor resistor.

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

2. Screws.

Tighten

- Screws 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

CAUTION: On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

NOTICE: Always use the correct fastener in the correct location. Use the correct fastener part number to replace a fastener. If the correct fastener part number is not available, a fastener of equal size and strength may be used. Do not use a fastener that is stronger when the correct fastener part number is not available in the following applications:

- *Some bolts are designed to permanently stretch, and if a stronger fastener is used, the part will not be tightened correctly. These permanently stretching bolts will be called out. The correct part number fasteners must be used to replace this type of fastener because there is no available equivalent.*
- *Other bolts are designed to break if over tightened to prevent part damage. If a stronger fastener is used part damage may occur.*

Fasteners that need to be replaced when removed will be called out. Fasteners that require thread lockers or thread sealant will be called out. The correct tightening specification and sequence must be used when installing fasteners. Part or system damage may occur if the above instructions are not followed.

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 control assembly.

Control of the refrigeration cycle (on and off operation of the compressor) is done with a switch that 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. Refer to figure 1 for an overview of system components.

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 opens, 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. 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.

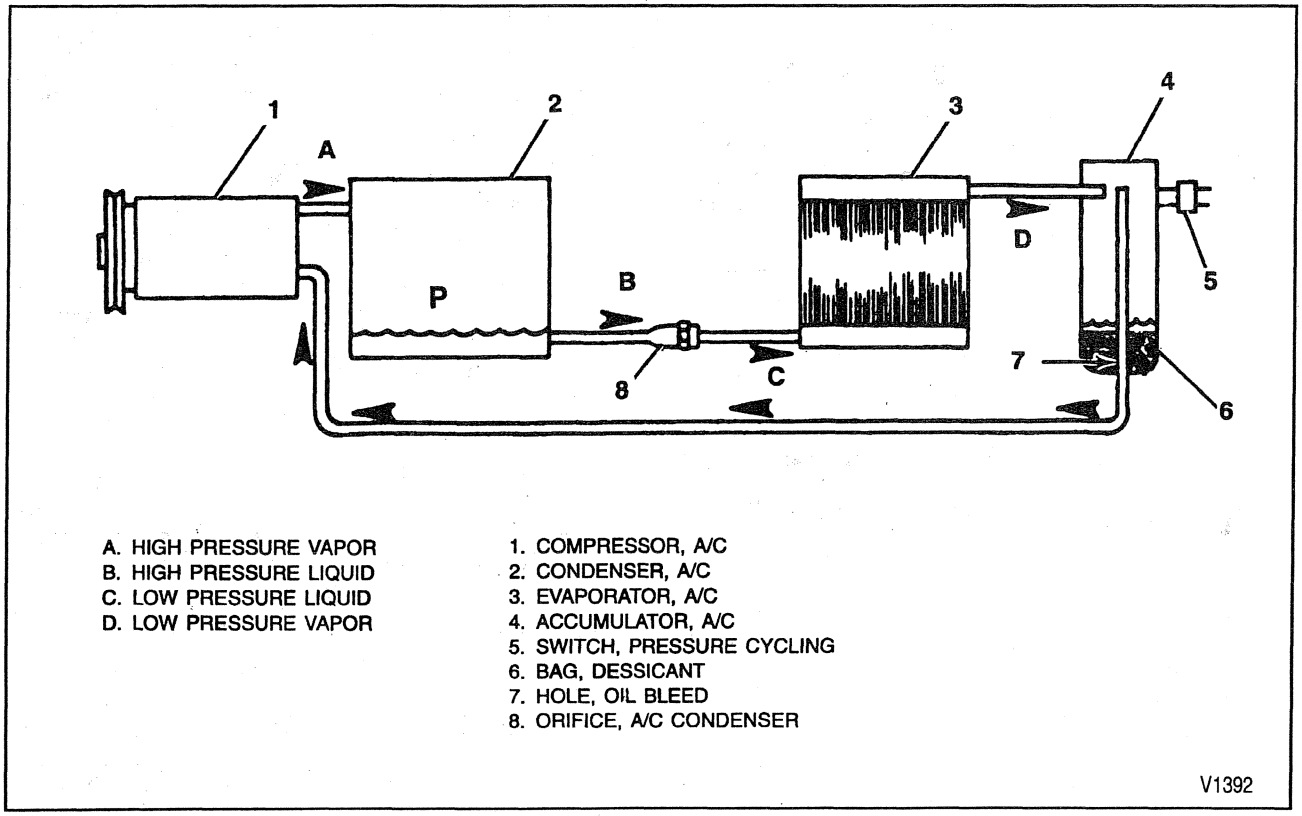


Figure 1—System Components

CONTROLS

The air conditioning system on C/K models is electronically controlled. Three backlit, rotary knobs provide full control of the system. These rotary knobs control blower speed, air temperature, and mode of operation. Two push-to-latch buttons select recirculation mode for maximum cooling and control over the air conditioning compressor.

The blower speed rotary control has four fan speeds and an off position. When the blower fan is turned off, all HVAC operations turn off also. The air inlet door is automatically placed in the recirculation position by the recirculation actuator.

The temperature rotary control has 180° of travel. A detent at the full cold-end of travel engages recirculation. Operating the system with the temperature control placed in this detent will result in maximum cooling. All air inside the passenger compartment will be recirculated through the blower case. No outside air will be present. Recirculation can also be manually selected by pushing the "Recirc" button.

The mode rotary control has three major detents to indicate Vent, Floor, and Defrost mode positions. Placing the control anywhere in between the major detents results in air output blending between the two modes. The recirculation mode is not available anytime Defrost is selected, or while air is being blended out the defrost outlets.

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

Airflow control through the HVAC module is regulated by electronic-actuated doors. At various positions of the rotary knobs on the control assembly, mode doors mix and direct cooled, heated, and outside air through the air distribution duct.

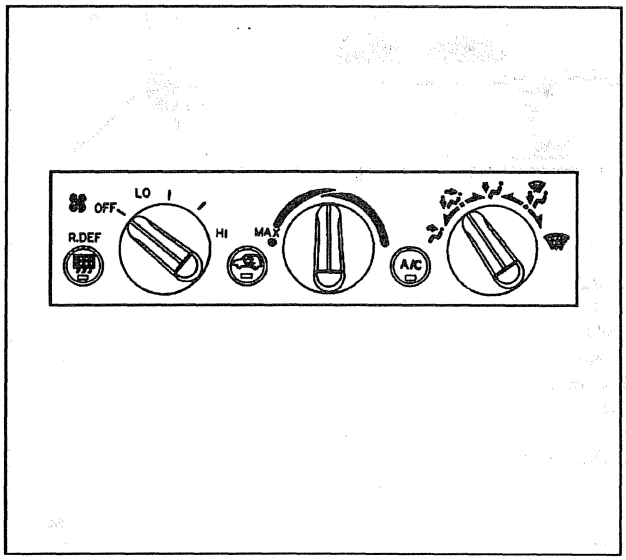


Figure 2—Control Assembly

DUCTS AND OUTLETS

A one-piece air distrubtor duct directs air to the passenger compartment. It attaches to the instrument panel with snap-in style retainers and three screws.

In case of poor air output, check the air distributor duct for obstructions such as leaves, dirt, or objects that may have fallen into it from the passenger compartment.

REFRIGERATION SYSTEM

ACCUMULATOR

The sealed accumulator assembly connects 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 flow to the compressor.

At the bottom of the accumulator is 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.

COMPRESSOR

The Harrison HR110-MD compressor is belt driven by 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. When replacing compressors, drain the oil from the old compressor into an approved container, and note the amount drained. You must also drain the oil from the new compressor, then fill the new compressor with new oil in the same amount that was drained from the old compressor.

CONDENSER

The condenser assembly in front of the radiator consists of coils that carry the refrigerant, and cooling fins, that provide rapid transfer of heat. 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 in all models except Suburbans with rear air conditioning (RPO C69). Suburbans equipped with rear air conditioning use a Y-shaped junction block in the tube between the condenser and the front evaporator. The junction block is located near the right side of the radiator sup-

port. The expansion tube is located in between the junction block and the front evaporator. Refer to "Evaporator Tube" under "On-Vehicle Service—Rear A/C System (Suburban)" for more information and component locator views.

The orifice tube 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. 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 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 heats the cool, dehumidified air to achieve the desired temperature. The position of the control assembly temperature rotary knob determines how much heat is added to the incoming air.

HIGH PRESSURE RELIEF VALVE

The compressor is equipped with a pressure relief valve as a safety factor. Under certain conditions, the refrigerant on the discharge side may exceed the designed operating pressure. Exceeding this pressure limit may cause refrigerant loss. To prevent refrigerant loss or compressor damage, the valve opens automatically at approximately 3036 kPa (440 psi). When the valve opens, current to the compressor clutch is interrupted. Any condition that causes the valve to open will keep the compressor from operating.

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 the work area before resuming service. Additional health and safety information may be obtained from the 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, some automotive air conditioning systems use a type called Refrigerant-12 (R-12).

This vehicle uses 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 called polyalkaline glycol (PAG) refrigerant oil. GM (PAG) refrigerant oil has a slight blue tint. The oil is hydroscopic (absorbs water from the atmosphere). Store it in closed containers.

HEATER SYSTEM

The air conditioning system operates on the reheat principle in that 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 air flowing past the fins. The position of the air temperature 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 CONTROLS

Battery voltage is supplied at all times to the No. 1 blower relay through the HTR A/C fuse and the RED wire. When the control assembly is OFF, all blower relays are de-energized. In this state there is no voltage path through the relay contacts to the blower motor. The blower motor does not run.

With low blower speed selected, current flows through No. 1 relay, to the top of the resistor board (A) and both resistors.

With medium #1 blower speed selected, current flows through the No. 1 relay, to the No. 2 relay, to the center of the resistor board (A) and one resistor to the motor.

With medium #2 blower speed selected, current flow is the same as in medium #1, PLUS a parallel current path through resistor (B) and No. 3 blower relay to the blower motor. This provides a parallel path with a value less than one alone, but more voltage than for Med #1 blower.

With high blower speed selected, No. 1 and No. 2 blower relays are off. Relay No. 3 is on, and provides a parallel battery feed circuit to the blower motor.

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 recirculation door to the closed 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 that 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 4.5 N·m (40 lbs. in.).

REFRIGERANT SYSTEM DIAGNOSIS

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 indicates 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 indicates a properly charged system.
3. Operation of the air conditioning control head to distribute air from the designed outlets indicates proper functioning.

PERFORMANCE TEST

Tool Required:

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

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

Important

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

8. Close doors or windows.
   - For Suburban Models with rear A/C, turn rear A/C "ON."
9. Press "A/C" button, adjust blower speed to "HI," and temperature to full "COLD."
10. Open the 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 the air conditioning system until outlet air reaches the lowest temperature (about 3 minutes).
15. Record the 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 in 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	24	165	2000	44	7	285	1965
	80	27	25	172		45	7	290	2000
	90	32	28	193		49	9	314	2165
	100	38	28	193		50	10	320	2206
30	70	21	25	172	2000	43	6	287	1979
	80	27	26	179		45	7	293	2020
	90	32	28	193		50	9	320	2206
	100	38	31	214		53	12	328	2262
40	70	21	25	172	2000	45	7	290	2000
	80	27	28	193		49	9	315	2172
	90	32	28	193		51	11	325	2241
	100	38	37	255		59	15	361	2489
50	70	21	26	179	2000	45	7	290	2000
	80	27	28	193		50	10	320	2206
	90	32	32	221		54	12	330	2275
	100	38	40	276		64	18	370	2551
60	70	21	27	186	2000	46	8	300	2069
	80	27	28	193		50	10	320	2206
	90	32	36	248		58	14	355	2448
	100	38	45	310		68	20	409	2820
70	70	21	28	193	2000	49	9	315	2172
	80	27	28	193		51	11	325	2241
	90	32	38	262		62	17	363	2503
80	70	21	28	193	2000	50	10	320	2206
	80	27	32	221		54	12	330	2275
	90	32	41	283		65	18	377	2600
									T3204

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. Make sure airflow is not blocked by dirt, leaves, or other foreign material. 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.

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 the work area before resuming service. Additional health and safety information may be obtained from the 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 that 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.

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 that operates on 12V DC and provides an audible signal that increases in frequency as R-134a is detected (figure 10). 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.

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.

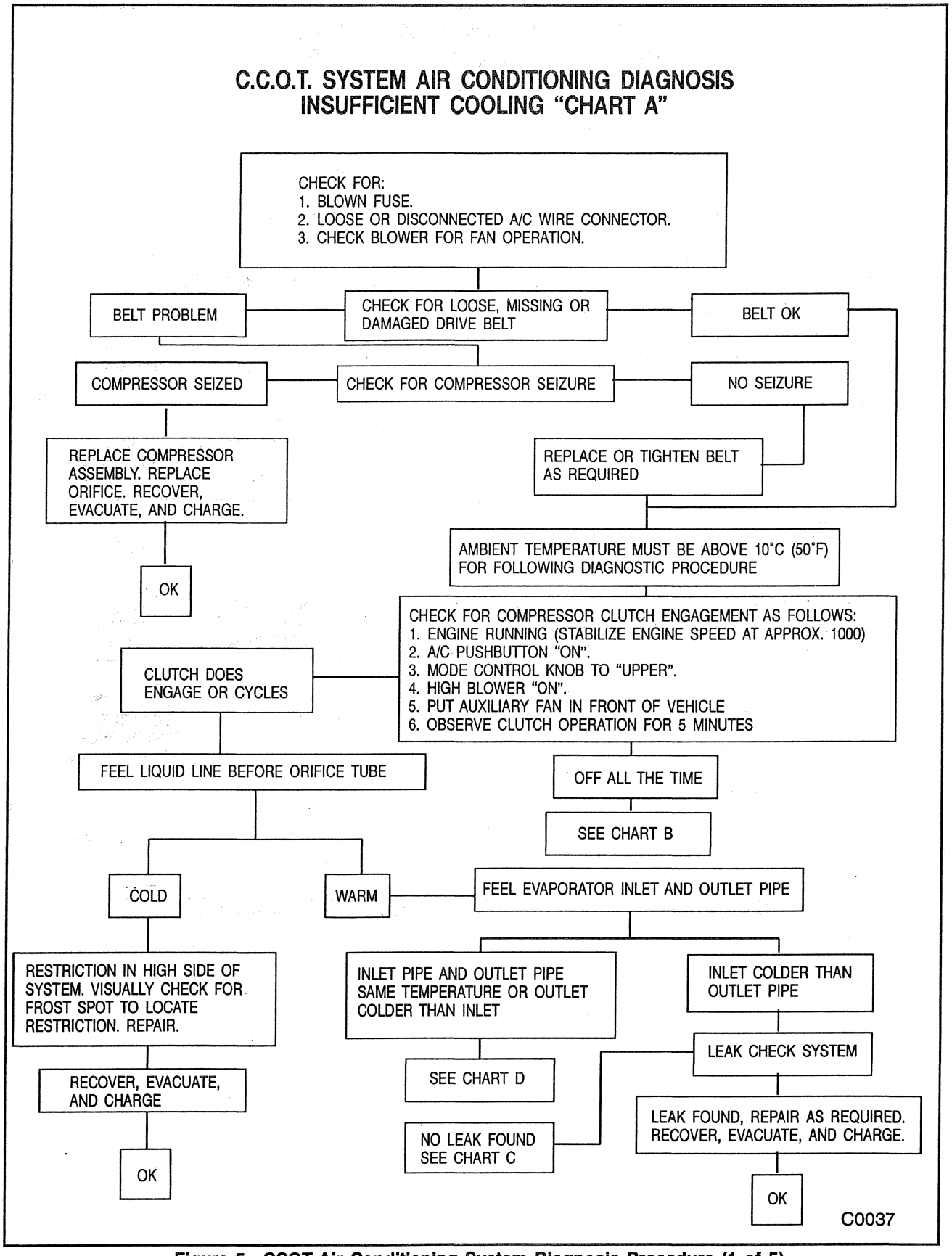


Figure 5—CCOT Air Conditioning System Diagnosis Procedure (1 of 5)

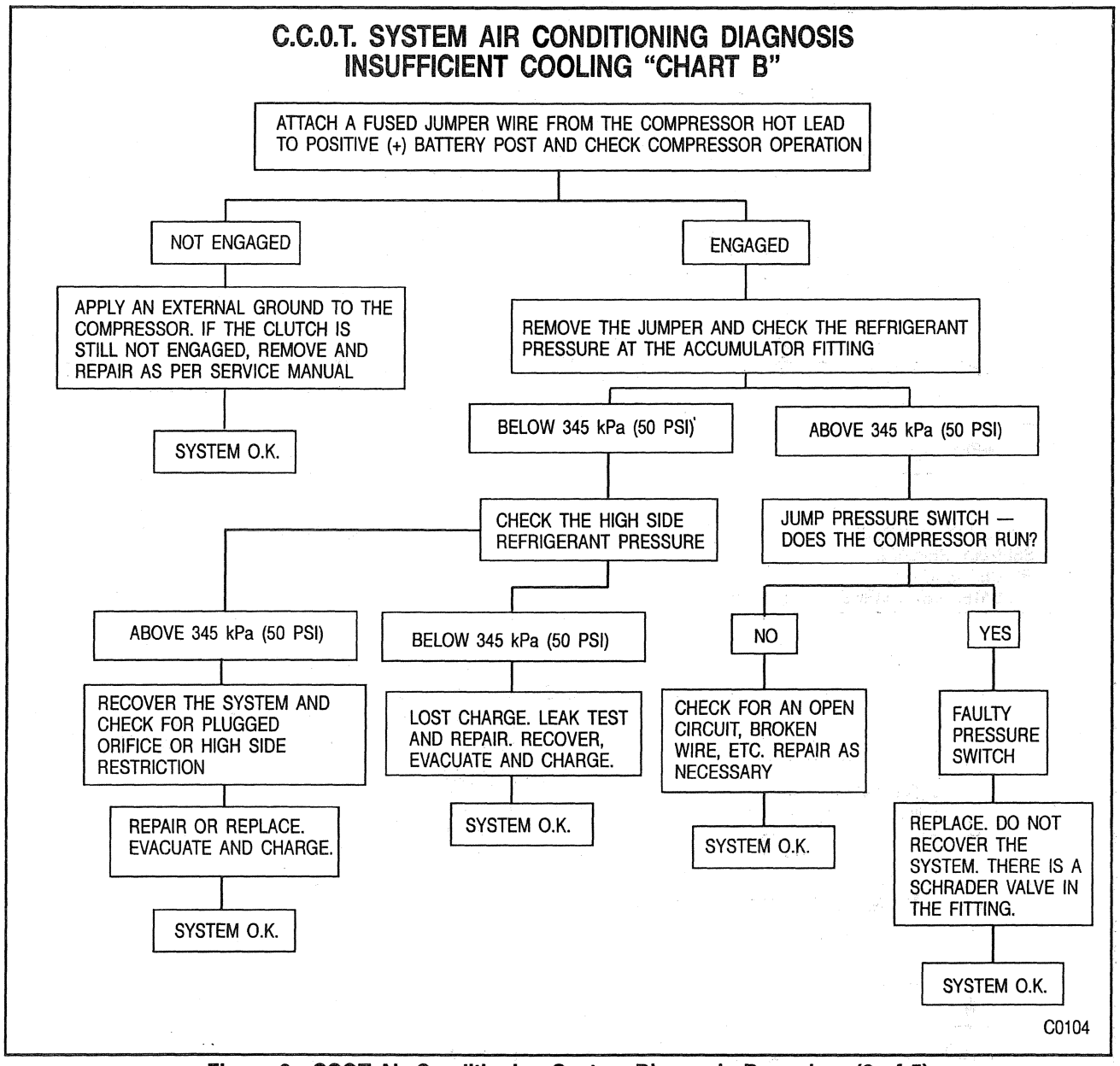


Figure 6—CCOT Air Conditioning System Diagnosis Procedure (2 of 5)

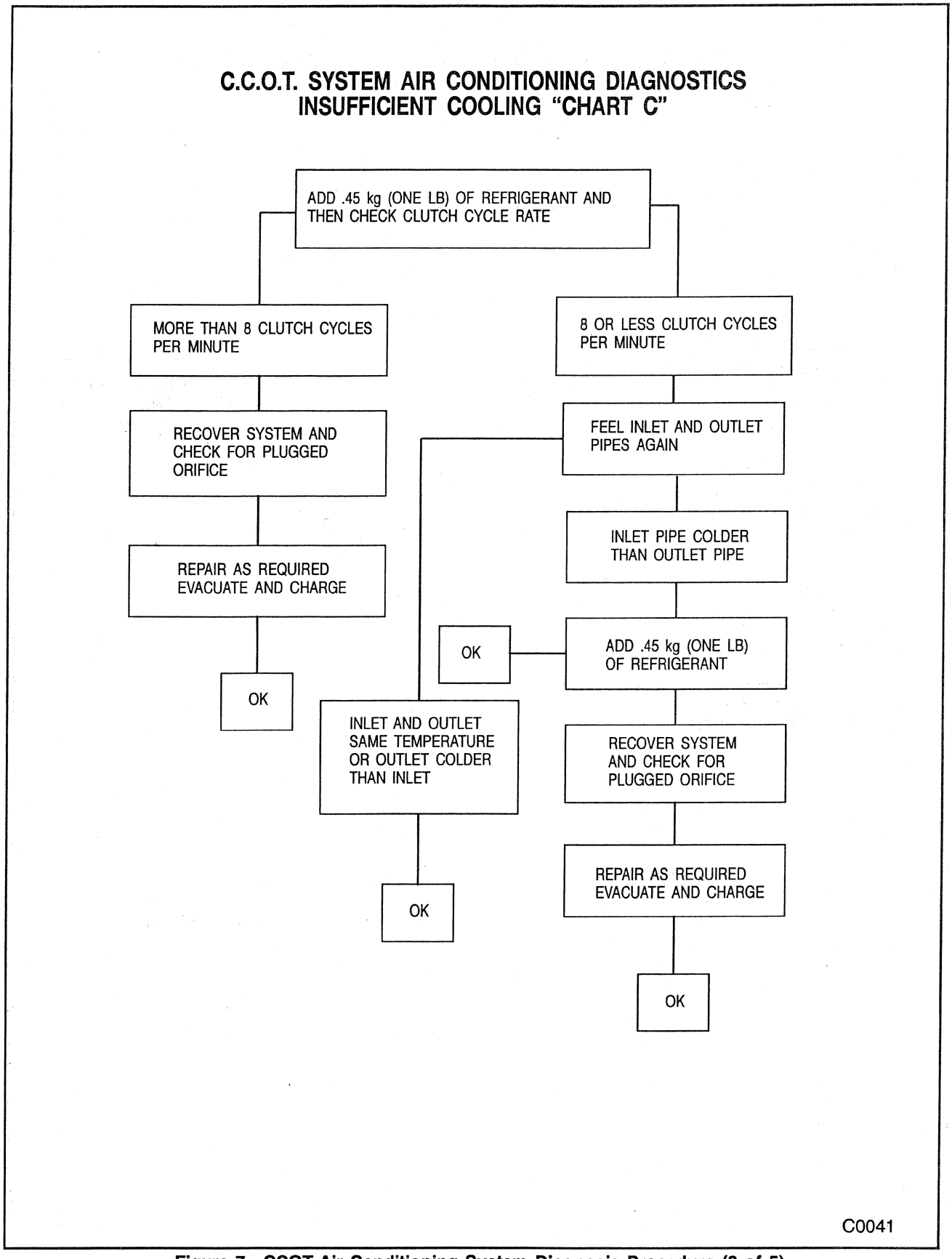


Figure 7—CCOT Air Conditioning System Diagnosis Procedure (3 of 5)

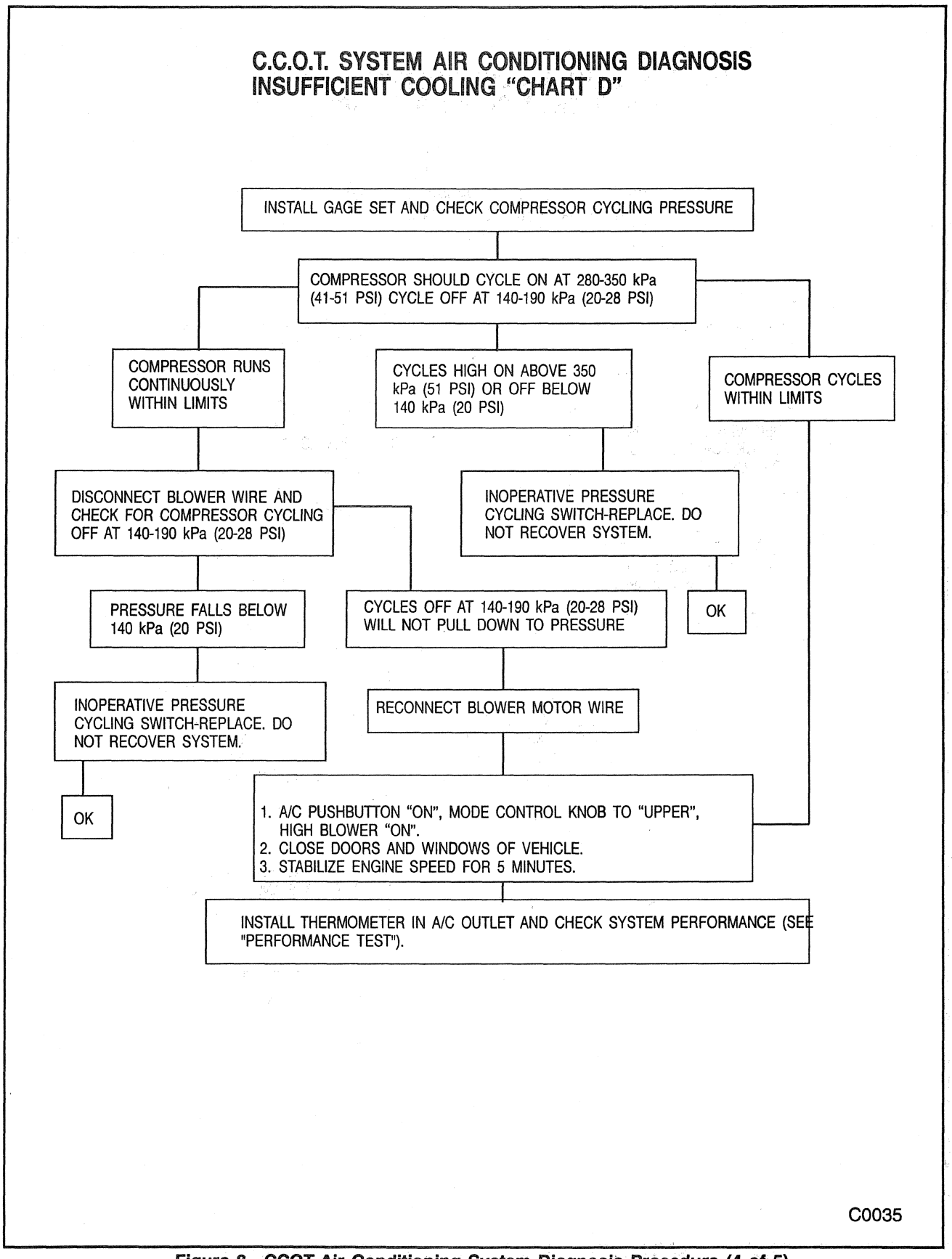


Figure 8—CCOT Air Conditioning System Diagnosis Procedure (4 of 5)

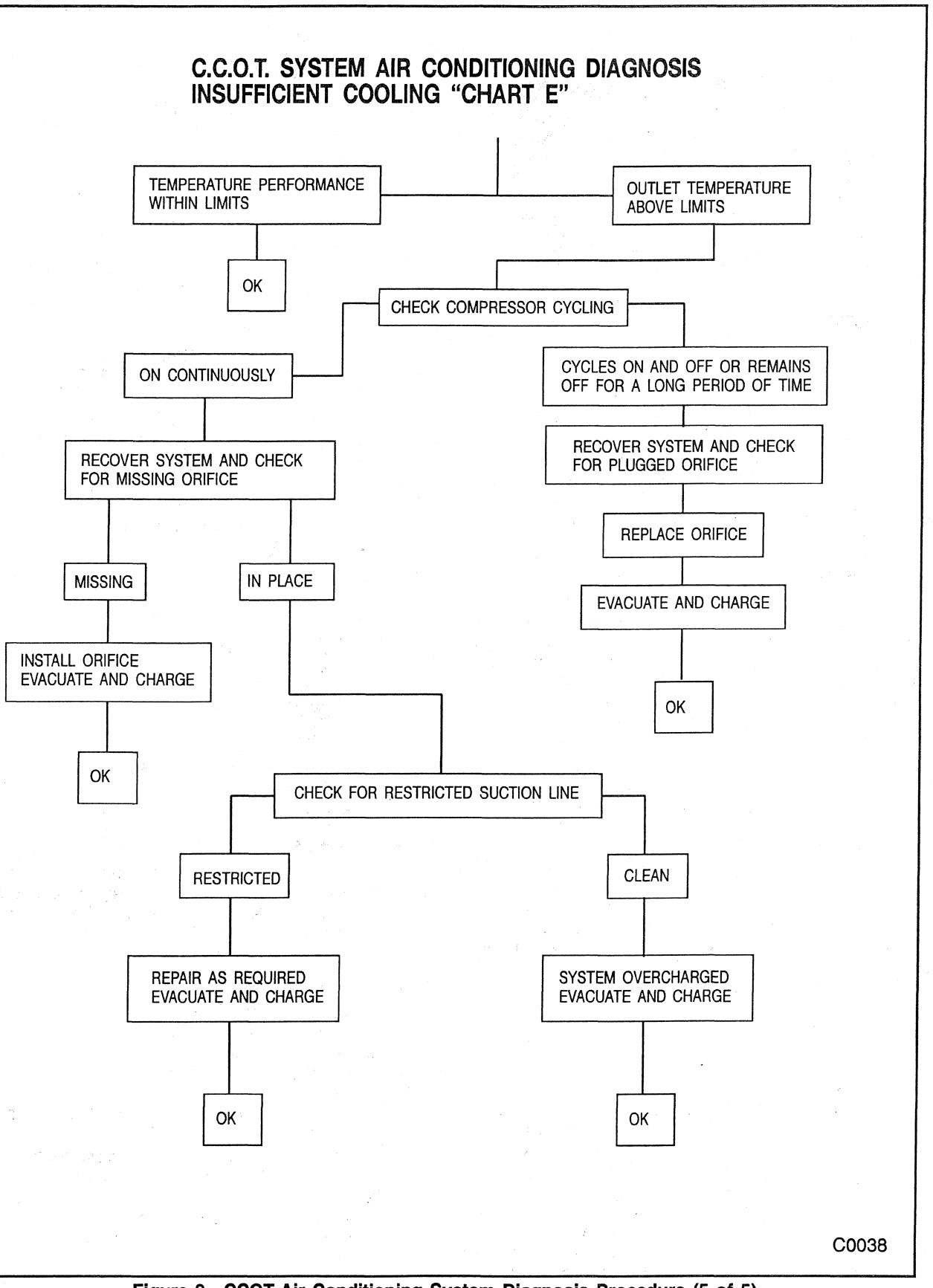


Figure 9—CCOT Air Conditioning System Diagnosis Procedure (5 of 5)

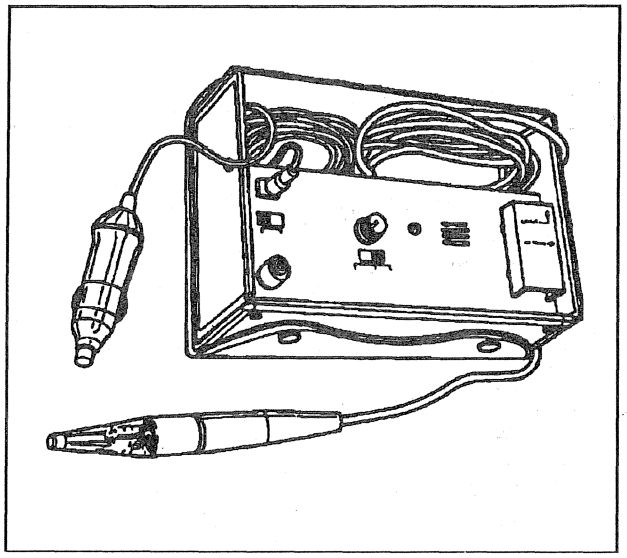


Figure 10—Electronic Leak Detector

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 (figure 11). A leak is indicated when the audible tone goes from a steady 1-2 clicks per second to a solid alarm. Adjust the balance knob frequently to maintain the 1-2 clicks per second rate.

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 that could occur when touching a hot engine while 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.

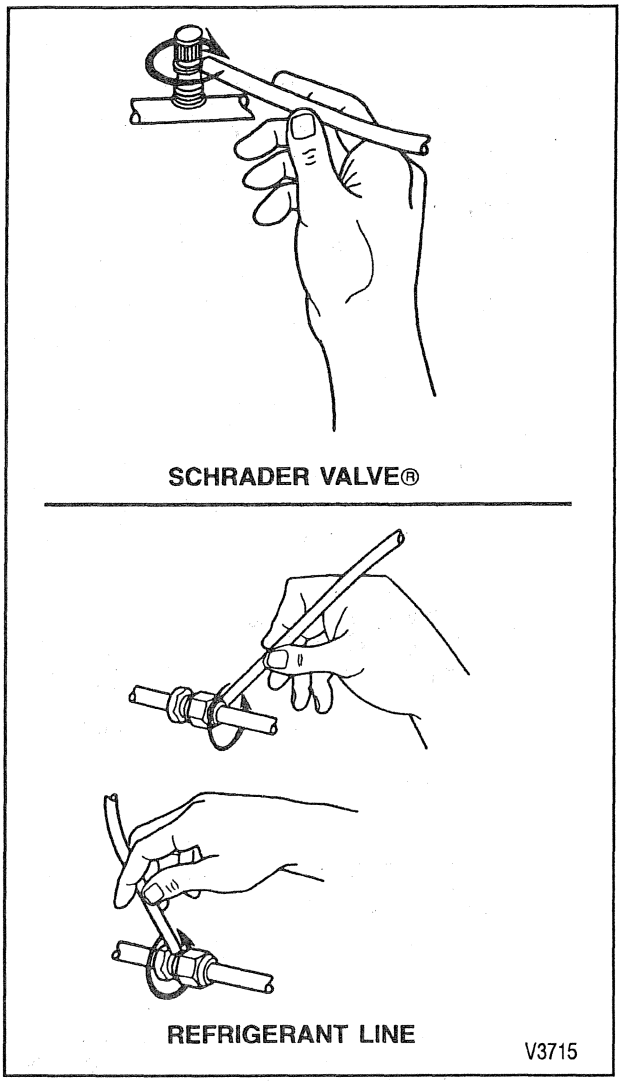


Figure 11—A/C Leak Scan Method

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 that 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."
4. Insert the leak detector probe as close to the evaporator as possible. If the detector goes to a solid 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 "HIGH" 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 mode actuator.	3. Defroster air valve operation should be checked. A faulty mode actuator 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.

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

PROBLEM	POSSIBLE CAUSE	CORRECTION
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.
Cold Drafts on Floor	1. Partially open air inlet valve.	1. The air inlet valve should close properly in all modes except recirculation 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 that requires opening the refrigerant lines or components to the atmosphere, the technician 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.

Coat air conditioning O-ring seals with 525 viscosity refrigerant oil just before installation. Slip them onto the flange tube to ensure proper locating and sealing. To prevent the possibility of swelling and a reduction in sealing effectiveness, do not soak O-ring seals 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. 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 make sure 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 REFRIGERANT LINES AND FITTINGS

Important

- Before opening the refrigeration system to the atmosphere, 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 contaminants 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. Refer to figures 12 and 13 for additional information.
- 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 (figures 14 and 15). 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.

Tighten tubing connections to the specified torque. Refer to "Specifications."

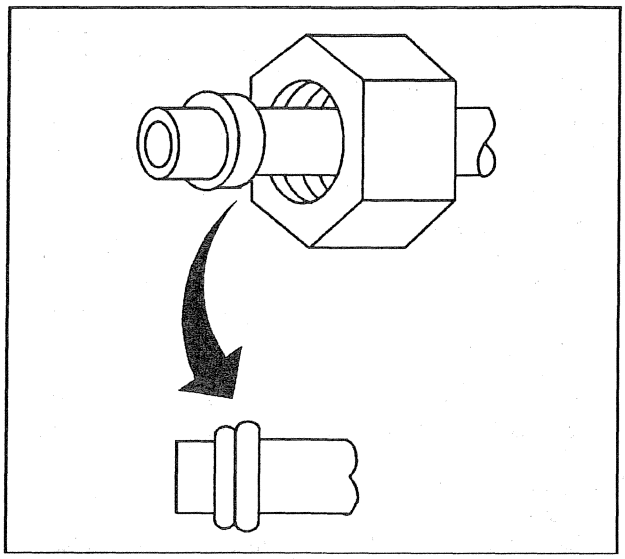


Figure 12—Proper O-Ring Installation

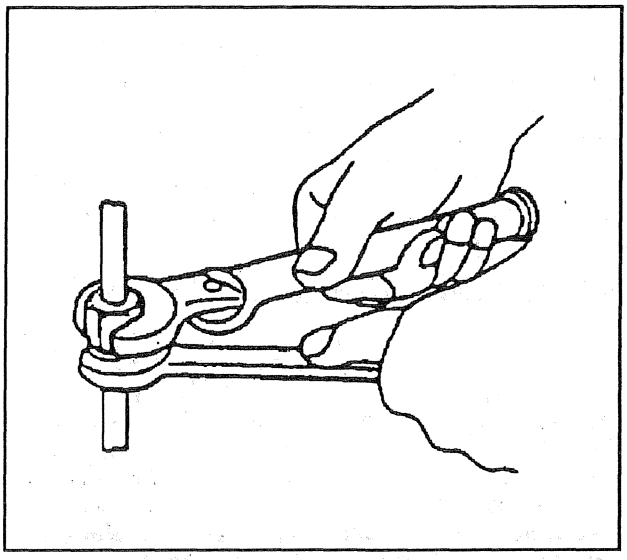


Figure 14—Using the Two-Wrench Method

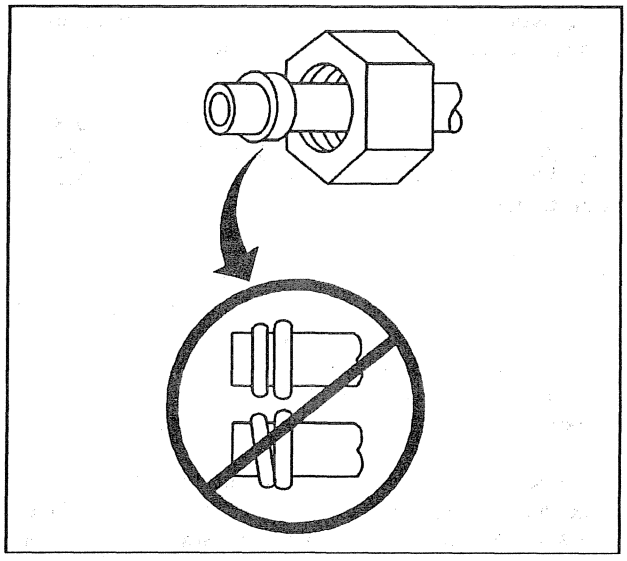


Figure 13—Improper O-Ring Installation

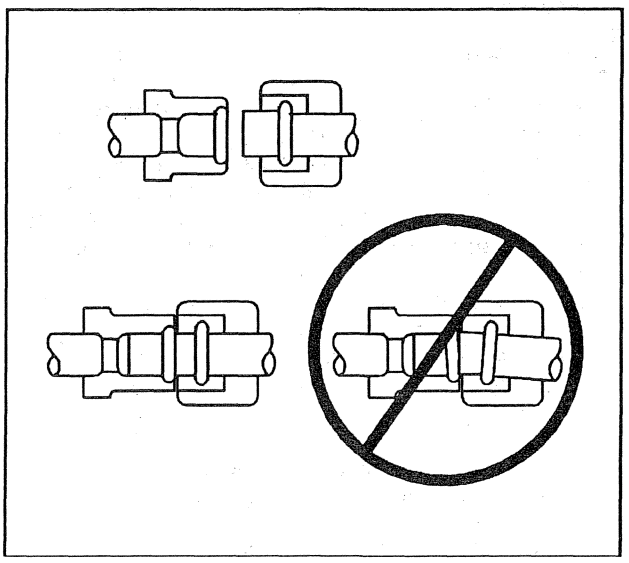


Figure 15—Refrigerant Line Installation

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.

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 16). Make 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.

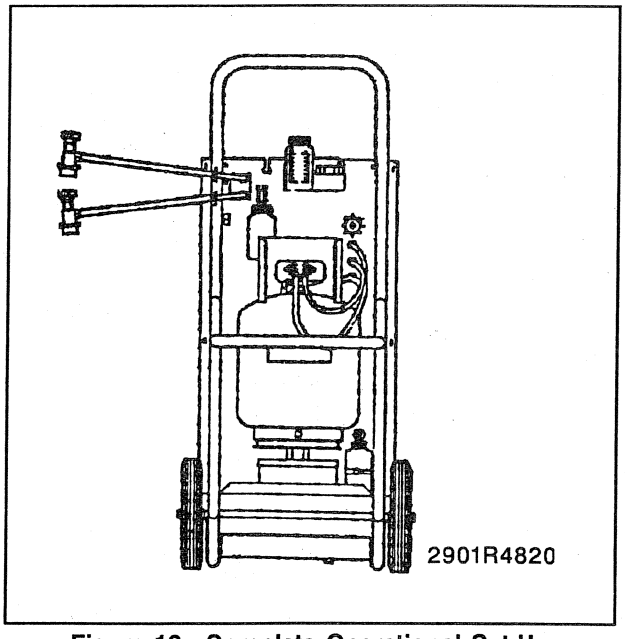


Figure 16—Complete Operational Set-Up

CONTROL PANEL FUNCTIONS

This section explains the functions of the various components of the unit's control panel (figure 17).

- **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.
- **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 18).

- **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.

REFRIGERANT RECOVERY

Important

- Use only the 23-kg (50-lb.) unit refrigerant tank (J 39500-50) designed for the ACR4. 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.

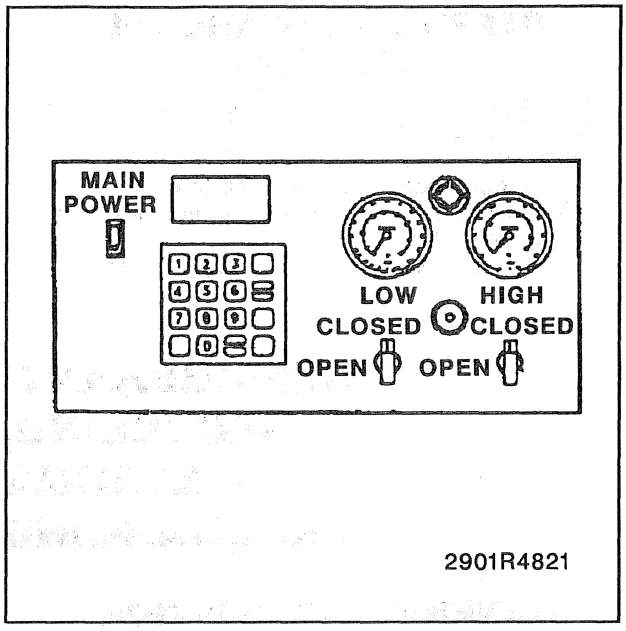


Figure 17—Control Panel

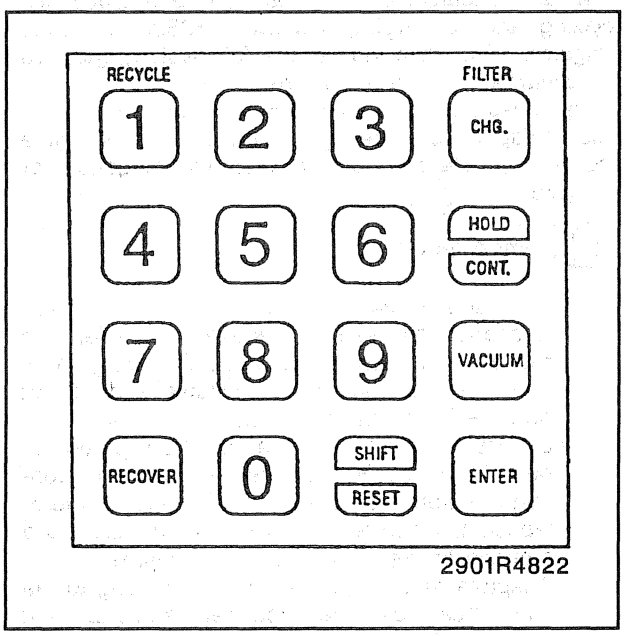


Figure 18—Keypad Functions

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 make 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 and the low side valves on the control panel.
5. Open both the red "Gas" (vapor) and the blue "Liquid" valves on the tank.
6. Slowly open the oil drain valve to see if the oil separator contains oil.
   - 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 19).
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") (figure 20).

    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.

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 and drain the oil into the calibrated oil catch bottle at the bottom of the unit.
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.

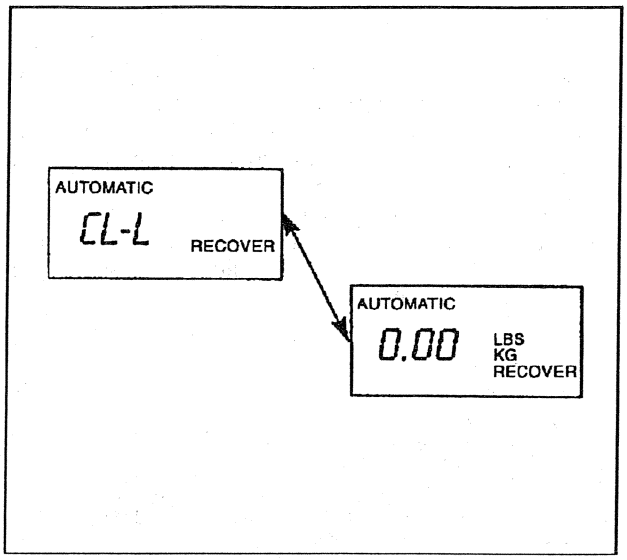


Figure 19—Refrigerant Recovery Display at Start

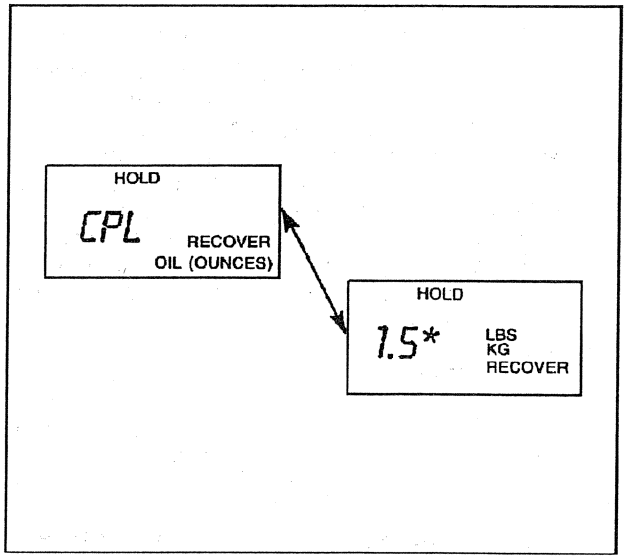


Figure 20—Refrigerant Recovery Display at End

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.
- Charging other vehicles will lower the amount of refrigerant in the unit's tank.

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 21).

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.
- 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 22).
   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.

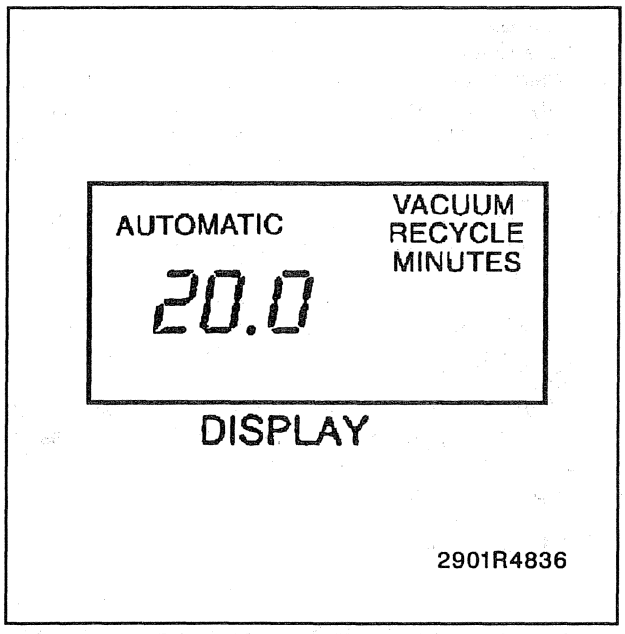


Figure 21—Press Keys to Enter Evacuation Time

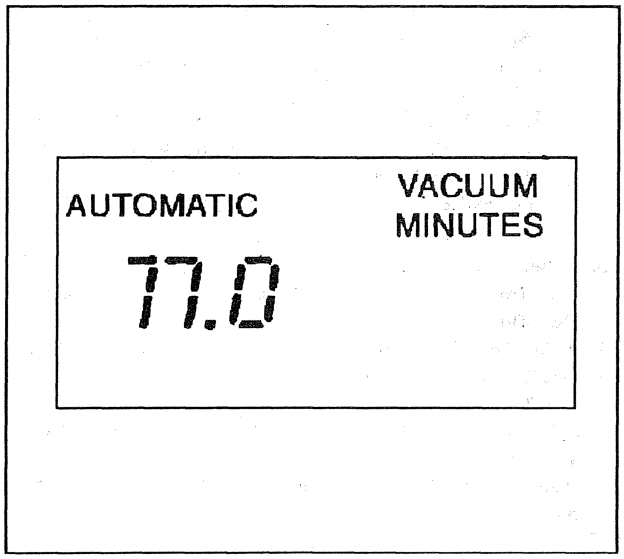


Figure 22—Stopping Evacuation at 17 Minutes

- 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.

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 that 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 make sure it is set for the desired units of weight system (operate switch with main power "Off").

1. Close the low side valve on the control panel (figure 23).
2. Open the high side valve on the control panel.
3. Press "CHG" on the keypad to make 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. Make 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.
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.

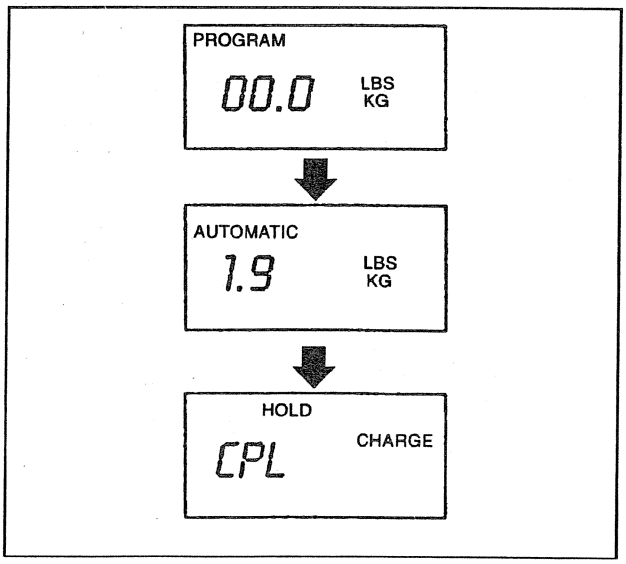


Figure 23—Display Shows Complete

- 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 make sure the A/C system is operating to system specifications.
4. With the A/C system running, close the high side coupler valve and disconnect the high side (Red) hose 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 (figure 24).
   In this case:
   A. Close the high side valve.
   B. Open the low side valve.
   C. Start the vehicle A/C system, and press "HOLD/CONT" on the keyboard.

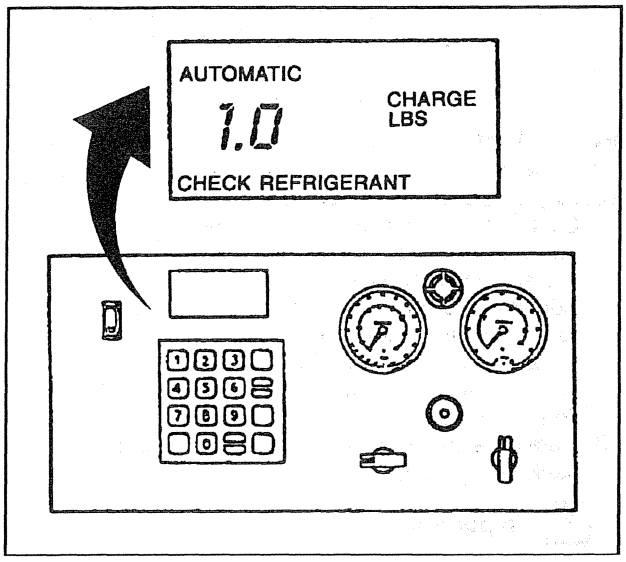


Figure 24—Unsuccessful Charging

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.
   A. Press "HOLD/CONT" on the keypad to interrupt the cycle.
   B. Press "RESET" to reset the unit.
   C. 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.
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 occur 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 and rinse water runoff collected in the drain pan in an approved manner.

ON-VEHICLE SERVICE

COMPRESSOR

4.3L, 5.0L and 5.7L ENGINES

Remove or Disconnect (Figure 25)

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 25)

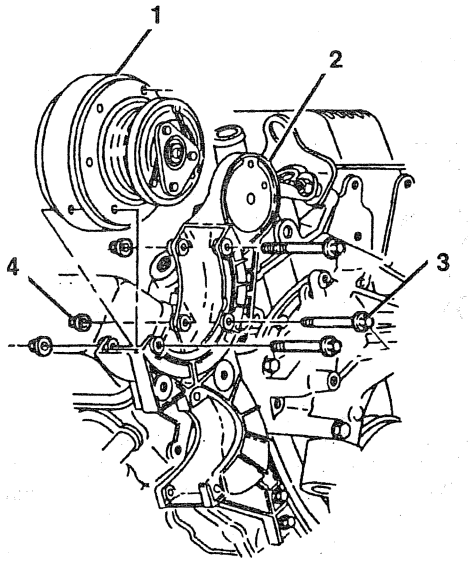
1. Compressor (1) to bracket (2). Refer to "Refrigerant Oil Distribution," if replacing compressor.

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

2. Bolts (4) and nuts (3).

Tighten

   - Bolts (4) to 33 N·m (24 lbs. ft.).
3. Electrical connectors, as necessary.



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

V3377

Figure 25—Compressor Mounting (4.3L, 5.0L, and 5.7L Engines)

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 26)

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 26)

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).

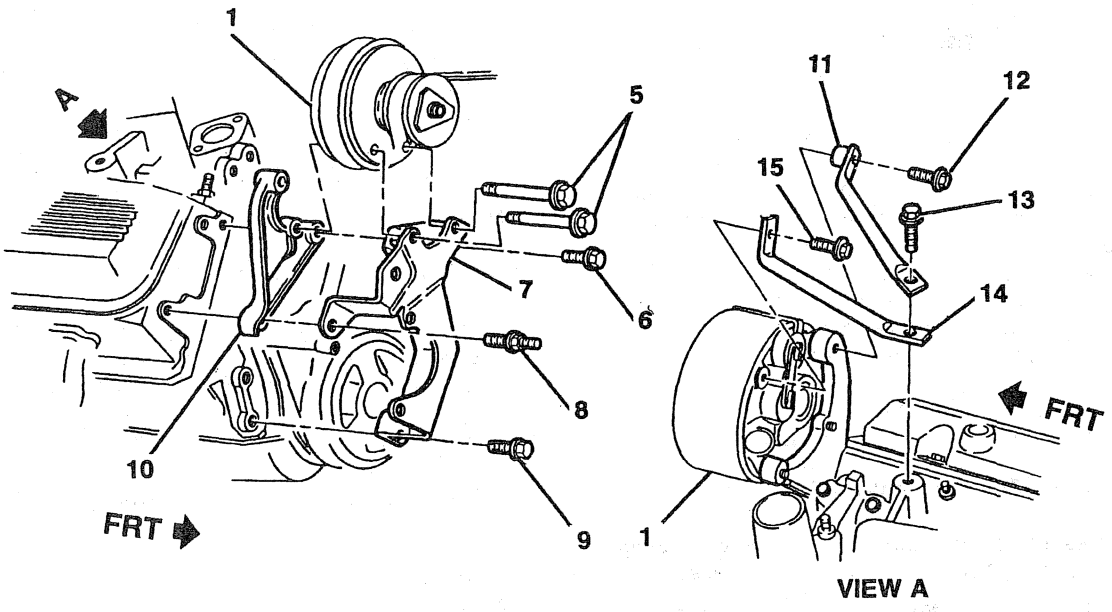
Tighten

   - 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.).
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 27)

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."



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 26—Compressor Mounting (7.4L Engines)

- 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 27)

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).

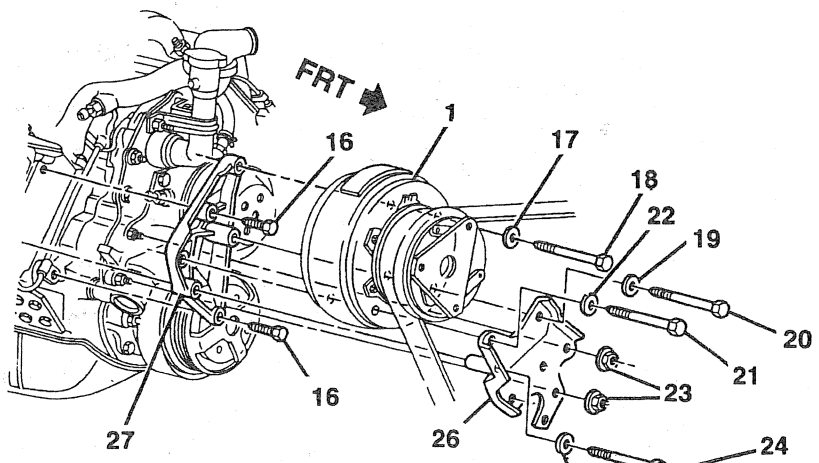
Tighten

- 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 washers.



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 27—Compressor Mounting (6.5L Diesel 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 28).
2. Install hose block to the compressor. Make sure the sealing washers are seated within the compressor machined surfaces (figure 29).

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

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

Tighten

- Bolt (30) to 34 N·m (25 lbs. ft.).

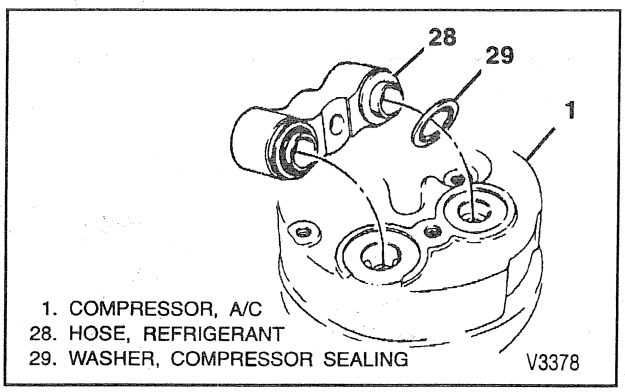
Important

- 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 30.
- All Models (6.5L Diesel Engines): refer to figure 30.
- Suburban/Crew Cab Models (7.4L Engines w/o Aux. Heater or A/C): refer to figure 30.



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

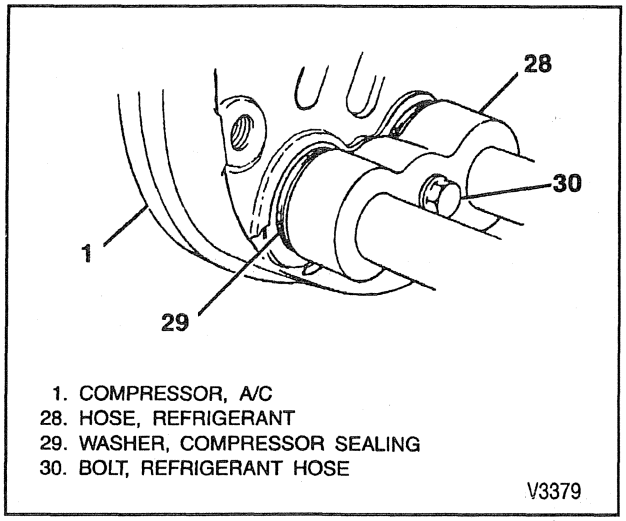
V3378

Figure 28—Sealing Washer Installation (1 of 2)

- Suburban/Utility and Crew Cab Models (5.7L Engines w/o Aux. A/C): refer to figure 31.
- Suburban Models (7.4L Engines and Aux. Heater): refer to figure 32.

Remove or Disconnect (Figures 30, 31, and 32)

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



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

Figure 29—Sealing Washer Installation (2 of 2)

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 30, 31, and 32)

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

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).

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).

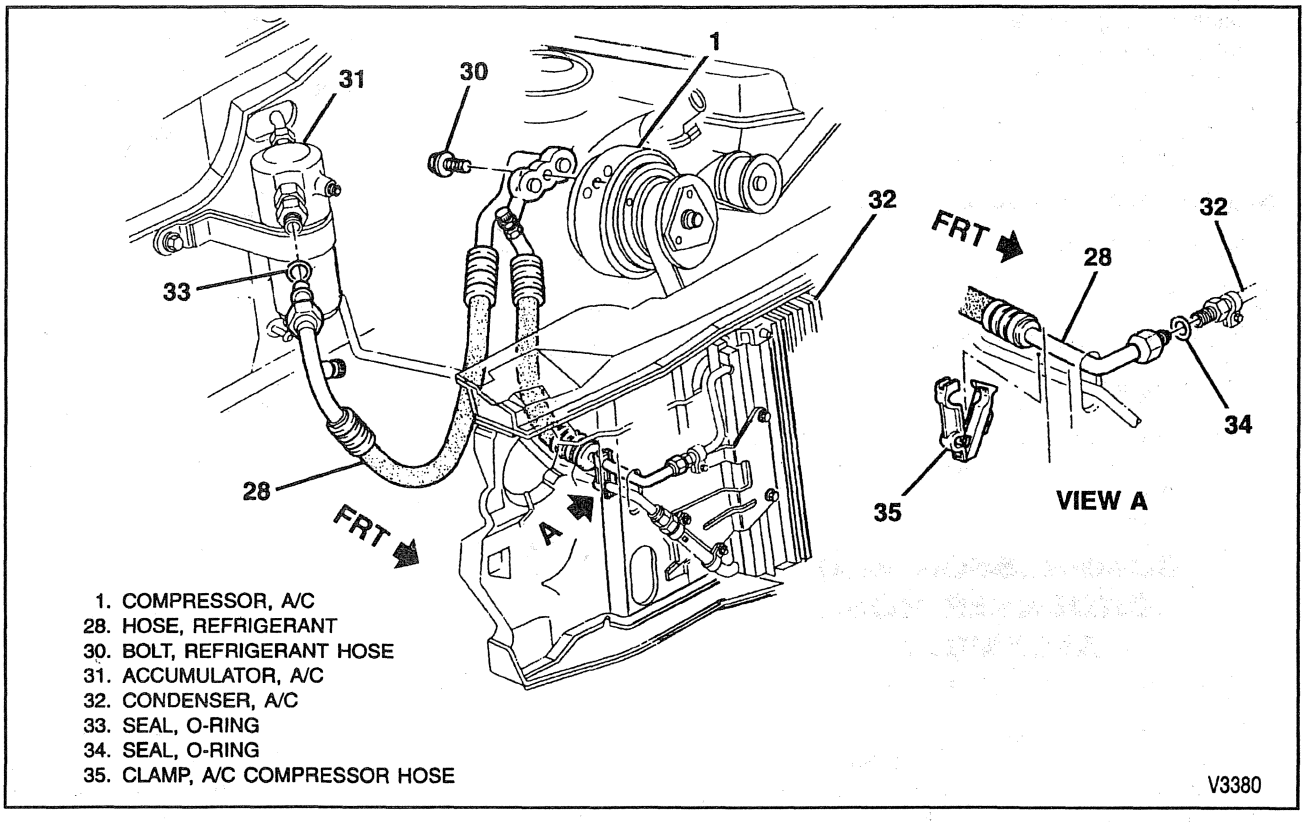
NOTICE: Refer to "Notice" on page 1B-1.

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.



1. COMPRESSOR, A/C
28. HOSE, REFRIGERANT
30. BOLT, REFRIGERANT HOSE
31. ACCUMULATOR, A/C
32. CONDENSER, A/C
33. SEAL, O-RING
34. SEAL, O-RING
35. CLAMP, A/C COMPRESSOR HOSE

Figure 30—Compressor and Condenser Hose Assembly

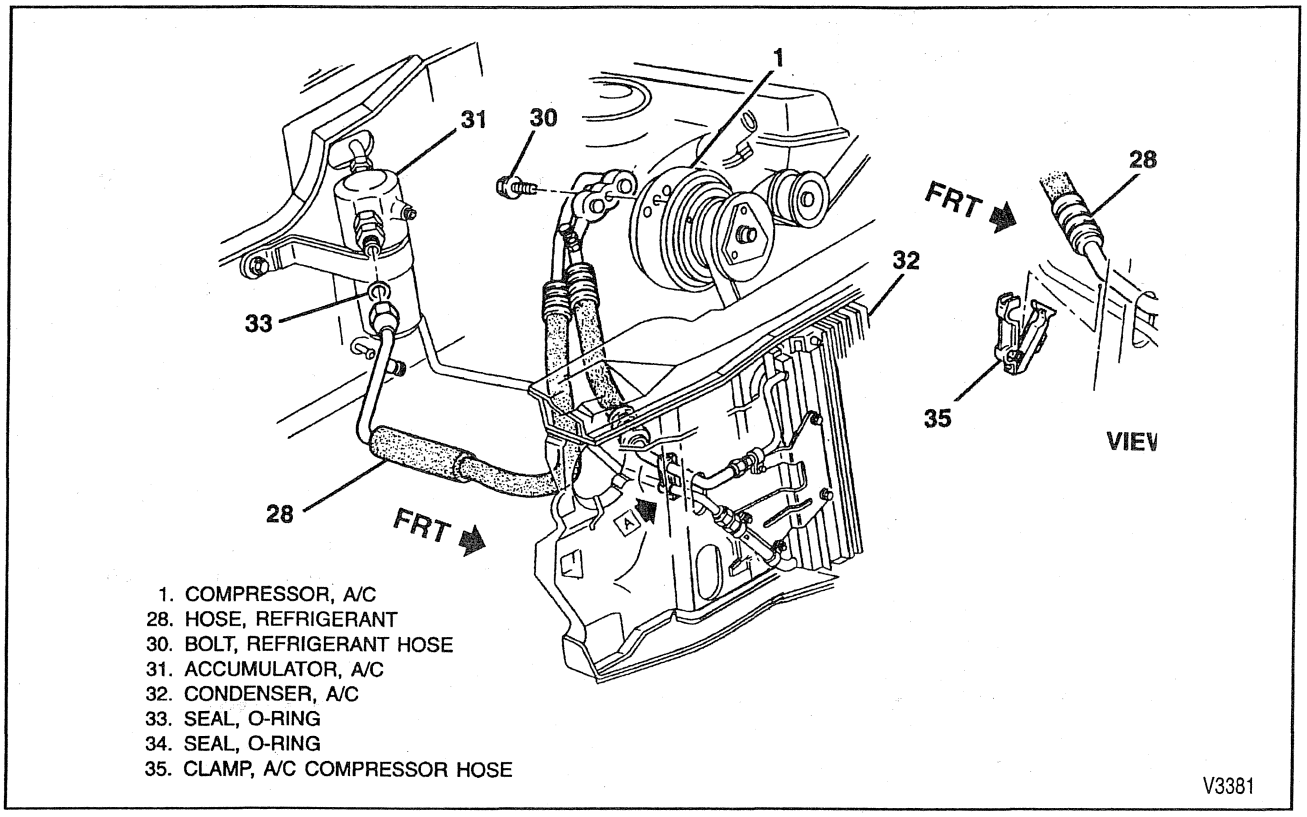


Figure 31—Compressor and Condenser Hose Assembly

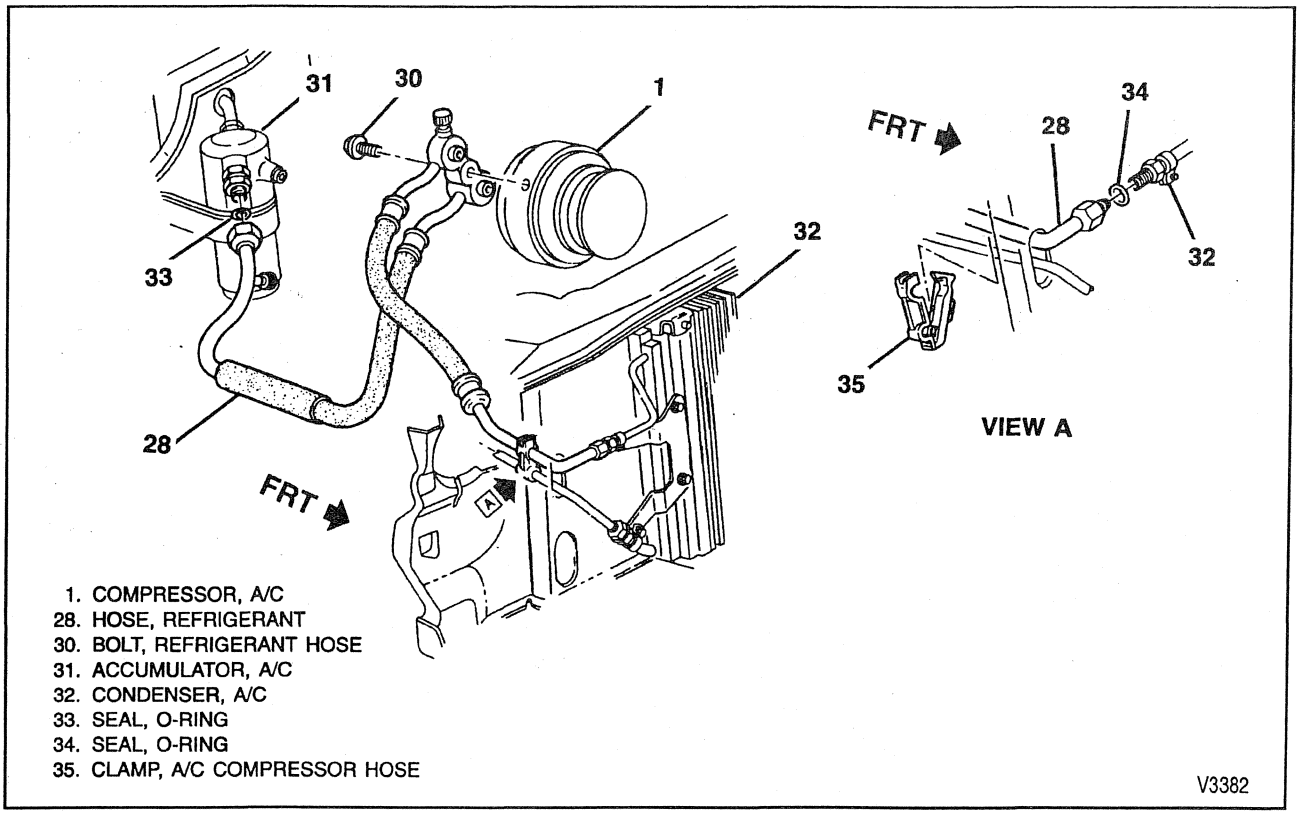


Figure 32—Compressor and Condenser Hose Assembly

COMPRESSOR PRESSURE SWITCH

Remove or Disconnect (Figure 33)

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 33)

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 34)

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).

Install or Connect (Figure 34)

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 pipe, 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 35)

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 35)

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 36)

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."
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 36)

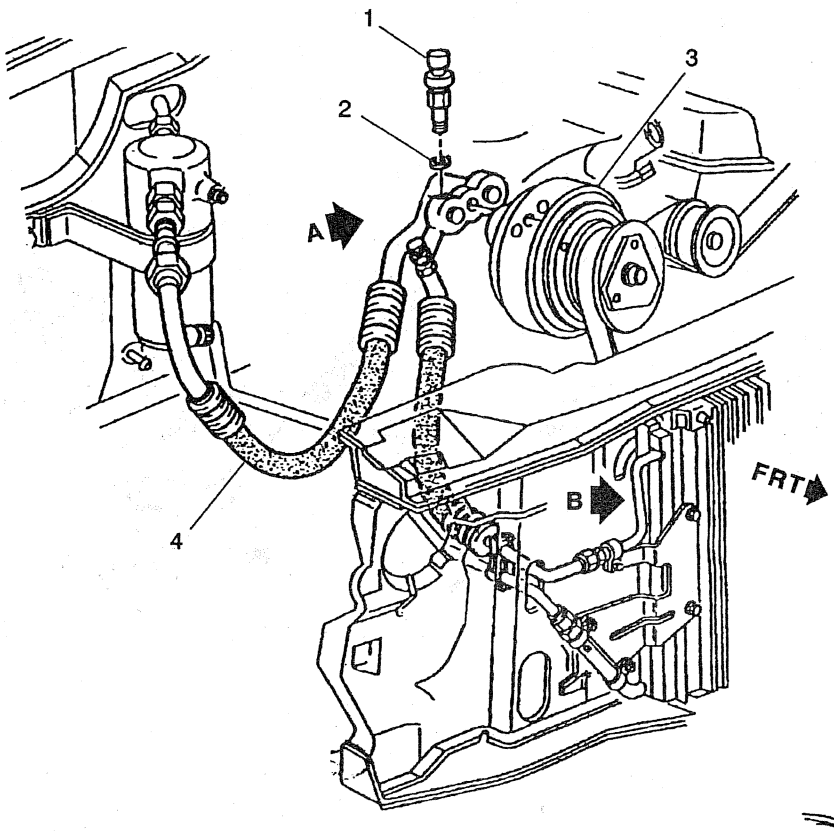
1. Lower insulators (47).
2. Condenser (32). Refer to "Refrigerant Oil Distribution," if replacing condenser.
3. Upper insulators (44).
4. Brackets (45).

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

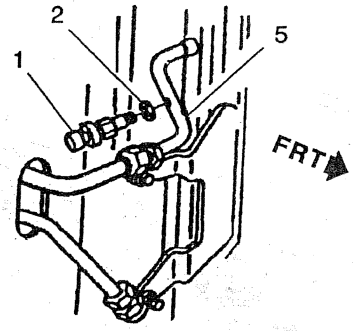
5. Bolts (46).

Tighten

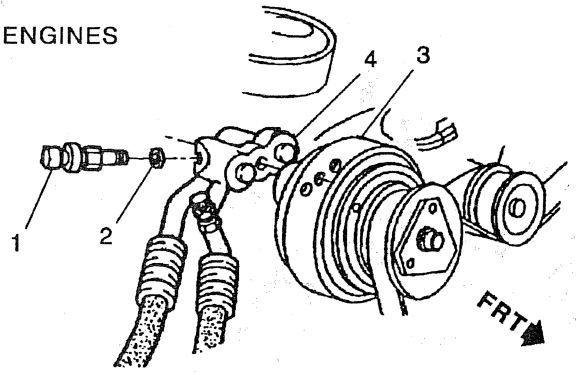
   - Bolts (46) to 4.5 N·m (40 lbs. in.).
6. Evaporator tube to condenser. Refer to "Evaporator Tube."



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

3101r5220

Figure 33—Compressor Pressure Switch

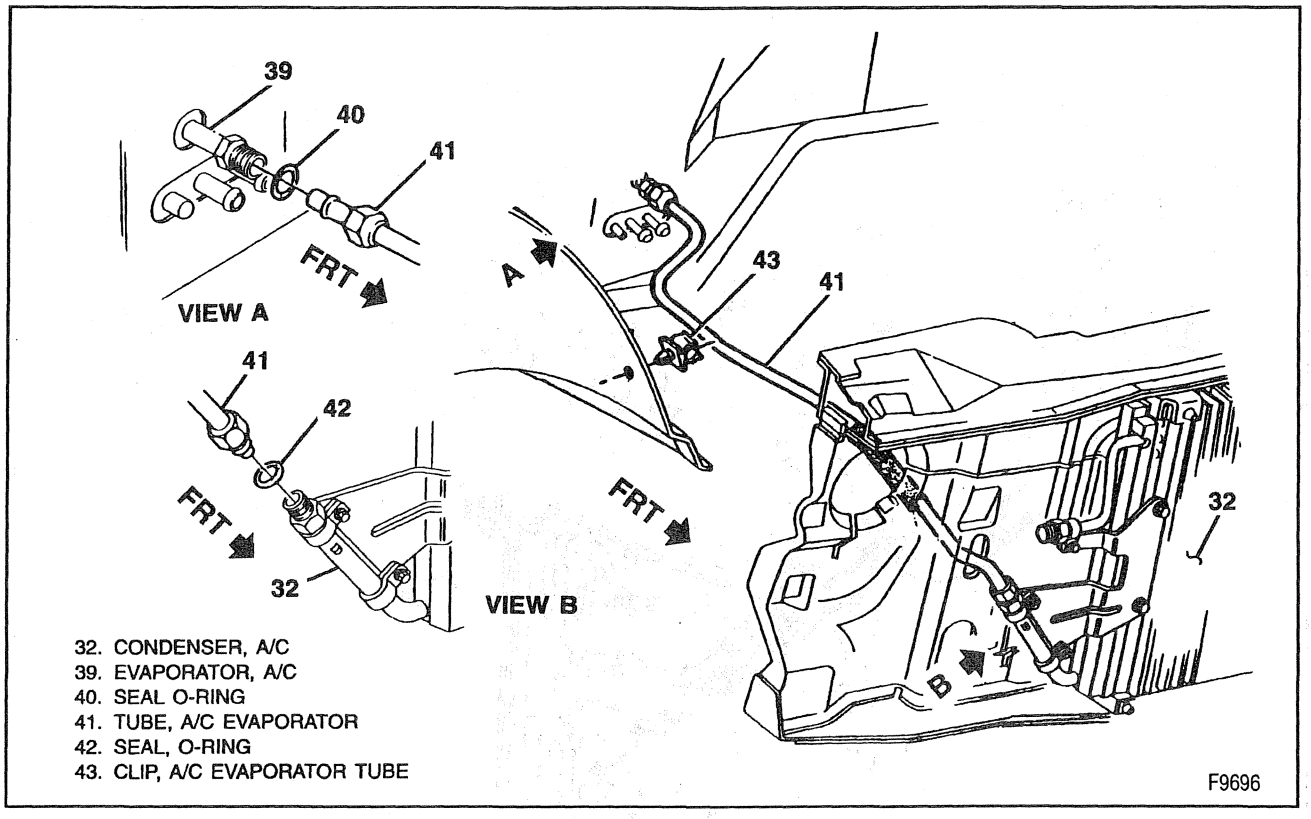


Figure 34—Evaporator Tube

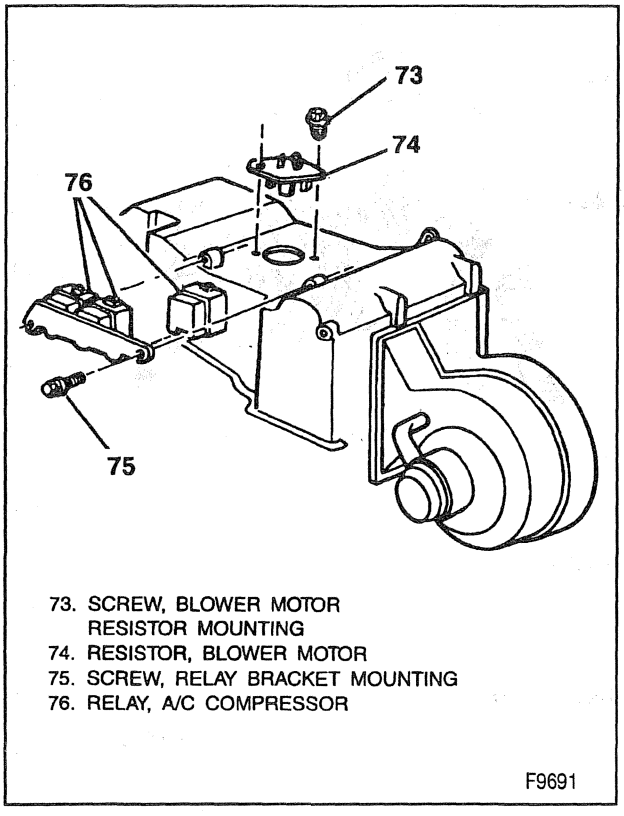


Figure 35—Blower Motor Relay/Resistor

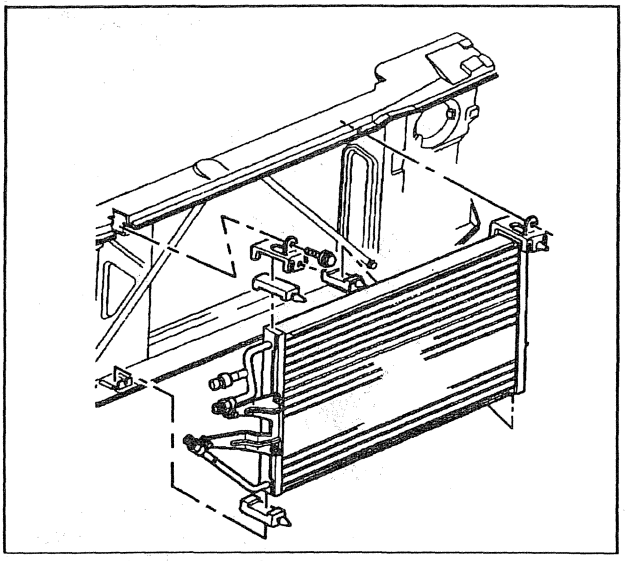


Figure 36—Condenser Assembly

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 37)

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 37)

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.

3. Accumulator bracket screw.

Tighten

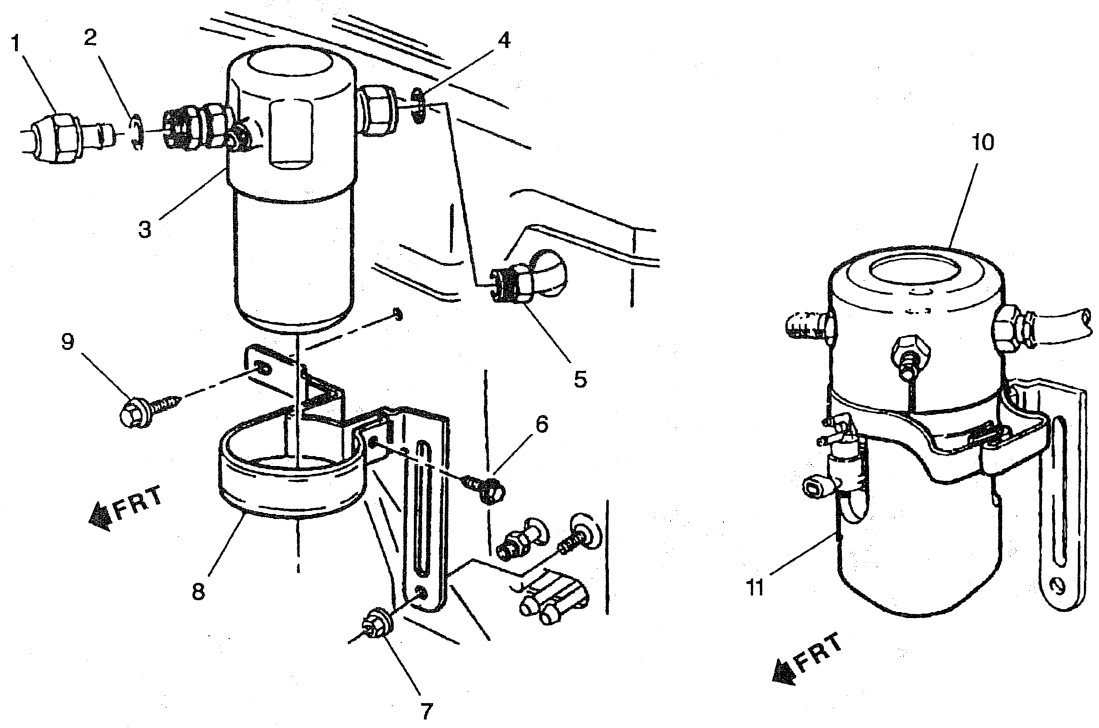
- Screw to 6 N·m (53 lbs. in.).

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.



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 37—Accumulator

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 34)

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 34)

1. Expansion tube into condenser outlet pipe, using J 26549-E or equivalent.
2. New O-ring seal (42).
    A. Coat O-ring seal with 525 viscosity refrigerant oil.
    B. 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 38)

1. Negative battery cable. Refer to SECTION 0A.
2. Engine coolant. Refer to SECTION 6B1.

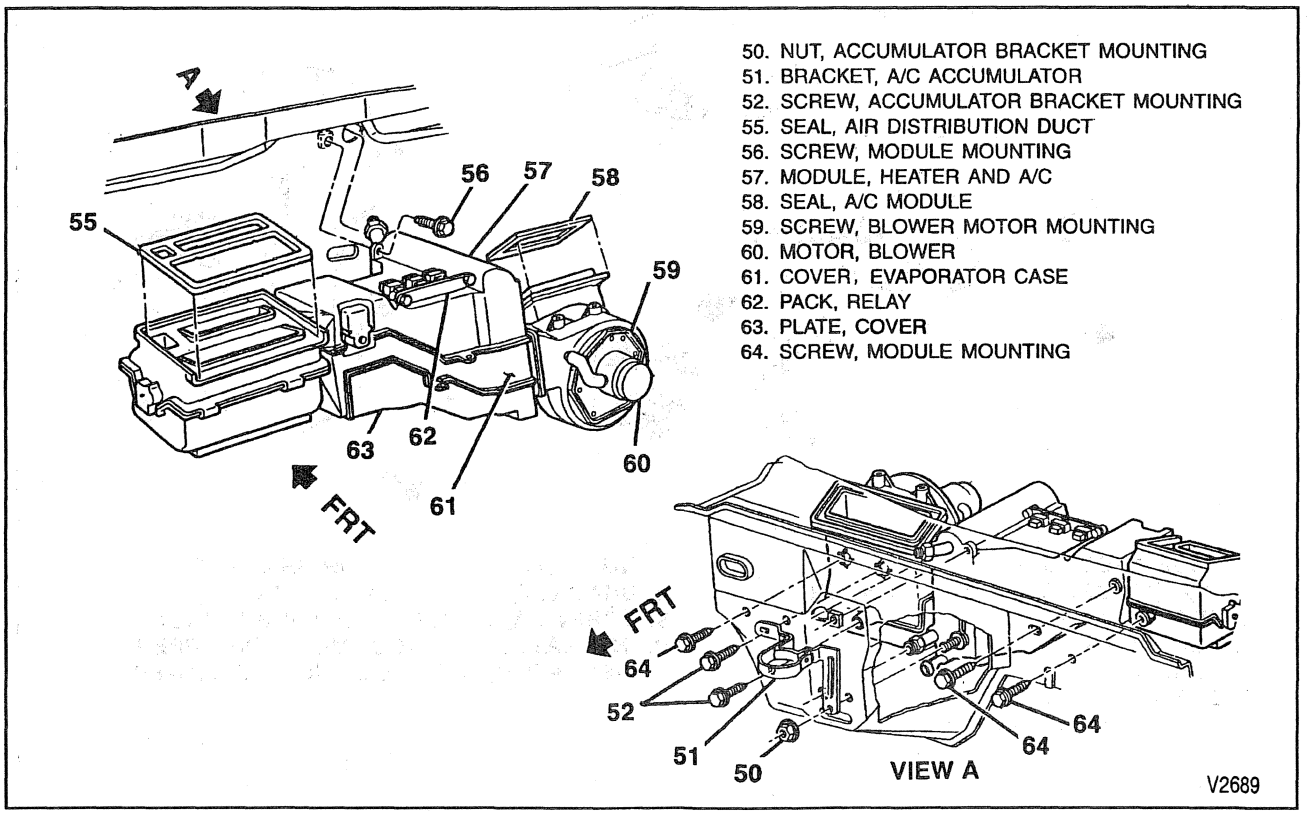


Figure 38—Evaporator/Heater Core Case

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."

CAUTION: Refer to "SIR Caution" on page 1B-1.

11. Steering column. 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.
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 38)

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 column. 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 38)

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 I/P 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 38)

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 I/P 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 35)

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 35)

1. Blower motor resistor (74).

NOTICE: Make sure the resistor coils do not contact each other. Improper operation or system damage may result.

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

2. Screws (73).

Tighten

- Screws (73) 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.

CONTROL ASSEMBLY AND BLOWER SWITCH

Remove or Disconnect (Figure 39)

1. Instrument cluster trim. Refer to SECTION 8C.
2. Control assembly (71).
    - Release the retainers using a small screwdriver, then pull the control assembly out from the instrument panel.
3. Electrical connectors, as necessary.

Install or Connect (Figure 39)

1. Electrical connectors, as necessary.
2. Control assembly (71).
    - The control assembly snap-fits to the instrument panel.

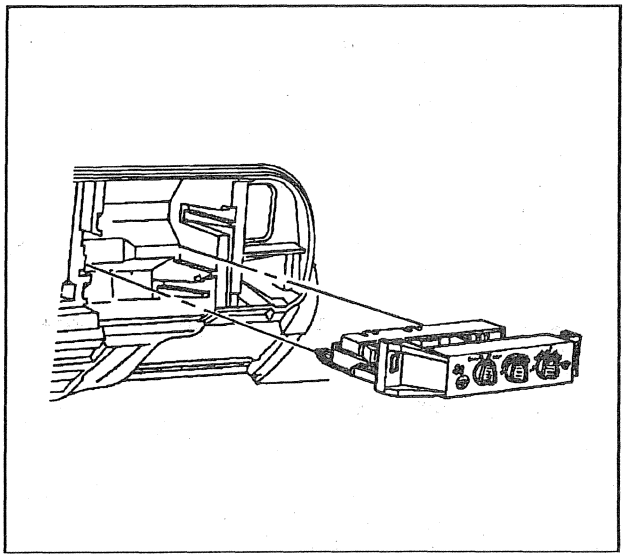


Figure 39—Control Assembly Replacement

3. Instrument cluster trim. 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 40)

1. Negative battery cable. Refer to SECTION 0A.
2. Tilt back instrument panel. Refer to SECTION 10A4.
3. Three duct mounting screws.
    - Squeeze to release the duct retainers in five places.

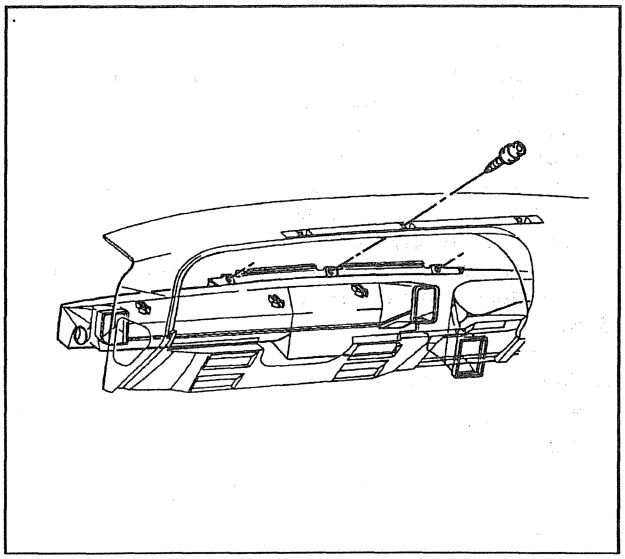


Figure 40—Air Distributor Duct

4. Duct from instrument panel.

Install or Connect (Figure 40)

1. Duct to instrument panel.

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

2. Duct mounting screws.

Tighten

- Air Distributor Duct Screws to 1.9 N·m (17 lbs. in.).

3. Instrument panel. Refer to SECTION 10A4.
4. Negative battery cable.

MODE ACTUATOR

The mode actuator is located on the left side of the air distribution case (figure 41).

Remove or Disconnect (Figure 42)

1. Negative battery cable. Refer to SECTION 0A.

CAUTION: Refer to "SIR Caution" on page 1B-1.

2. DERM for access. Refer to SECTION 9J.
3. Electrical connector.
4. Screws.
5. Adjuster links from control lever.
6. Mode actuator.

Adjust

1. Electrical connector 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.

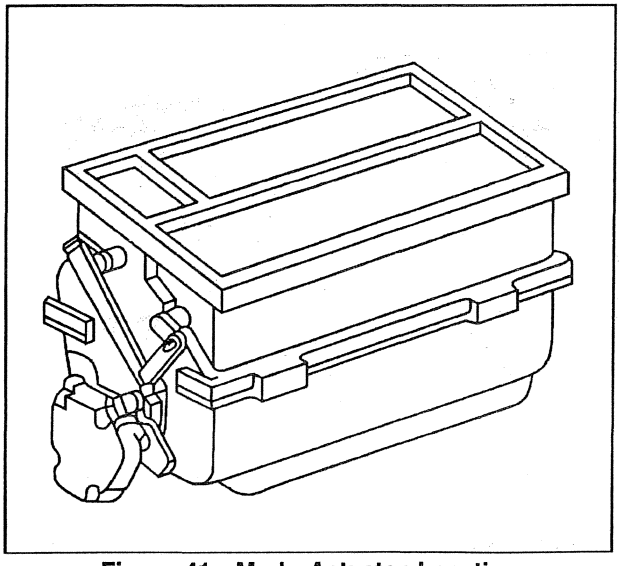


Figure 41—Mode Actuator Location

Install or Connect (Figure 42)

1. Mode actuator.
2. Screws.
3. Adjuster links to control lever.
4. Electrical connector.
5. DERM. Refer to SECTION 9J.
6. Negative battery cable.
   - Check circuit operation.

TEMPERATURE ACTUATOR

The temperature actuator is located in the passenger compartment of the vehicle, on the front of the (heater) case (figure 43).

Remove or Disconnect (Figure 44)

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

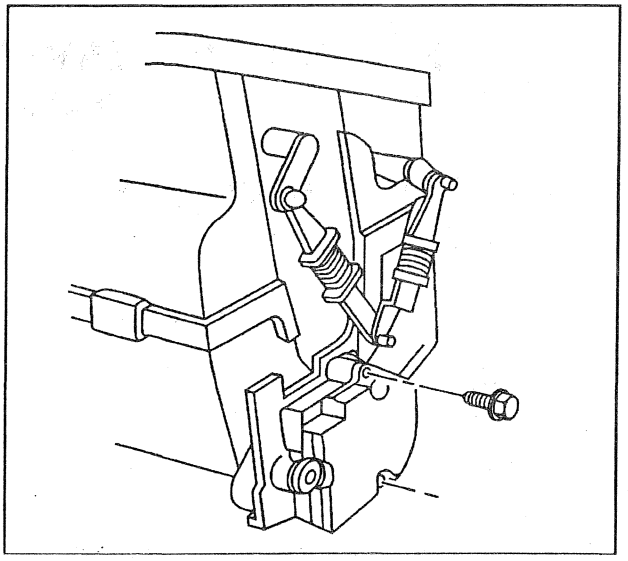


Figure 42—Mode Actuator Replacement

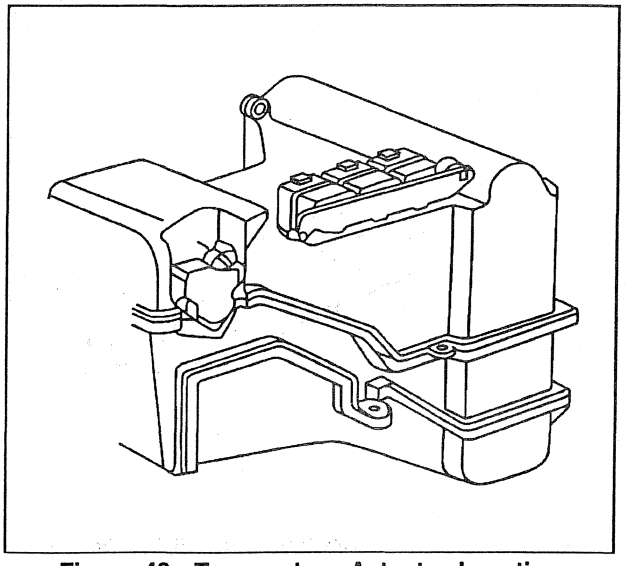


Figure 43—Temperature Actuator Location

4. Screws.
5. Actuator.

Adjust

1. Electrical connector 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 connector.

Install or Connect (Figure 44)

1. Actuator.
2. Screws.
3. Electrical connectors.
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Negative battery cable.
   - Check circuit operation.

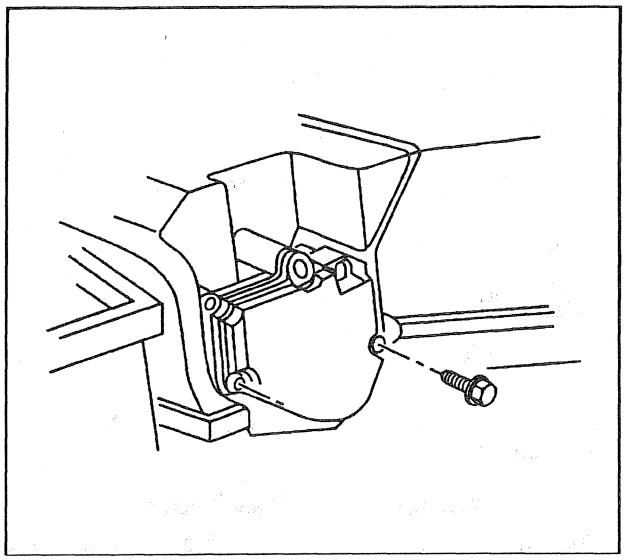


Figure 44—Temperature Actuator Replacement

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

CONTROL ASSEMBLY

FRONT OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 45)

1. Overhead console. Refer to SECTION 10A4.
2. Electrical harness from control assembly.
3. Control assembly from overhead console.

Install or Connect (Figure 45)

1. Control assembly to overhead console.
2. Electrical harness to control assembly.
3. Overhead console. Refer to SECTION 10A4.
   - Check circuit operation.

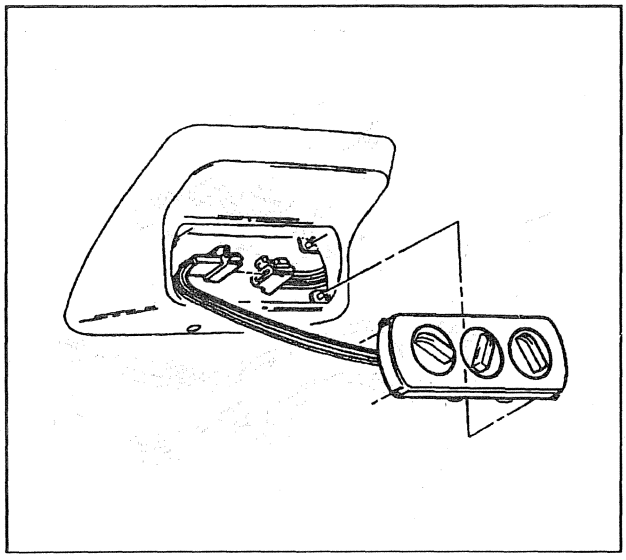


Figure 45—Front Overhead Auxiliary Control Switch

CENTER OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 46)

1. Bezel.
2. Control assembly from roof panel.
3. Electrical harness from control assembly.

Install or Connect (Figure 46)

1. Electrical harness to control assembly.
2. Control assembly to roof panel.

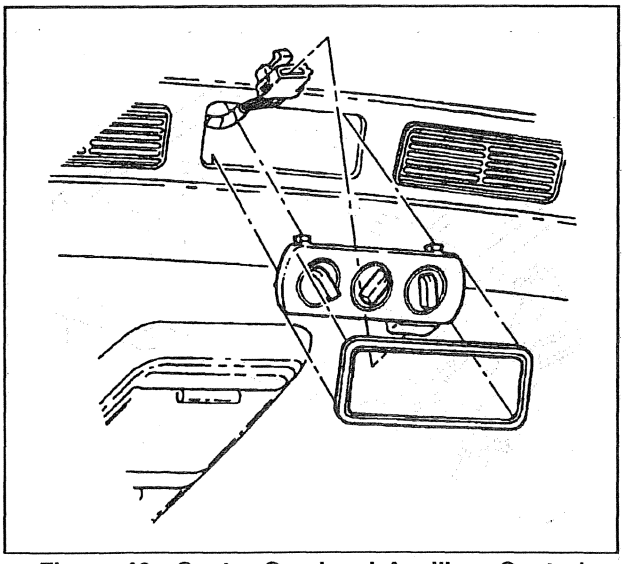


Figure 46—Center Overhead Auxiliary Control Switch

3. Bezel.
   • Check circuit operation.

EVAPORATOR TUBE

Remove or Disconnect (Figure 47)

1. Discharge and recover refrigerant from the system.
2. Evaporator tube from evaporator.
3. O-ring seal.
4. Evaporator tube from condenser.
5. O-ring seal.
6. Evaporator tube from auxiliary evaporator hose.
7. O-ring seal.
8. Evaporator tube.

Install or Connect (Figure 47)

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

1. Evaporator tube.
2. New O-ring seal.
   • Coat O-ring seal with 525 viscosity refrigerant oil.
3. Evaporator tube to auxiliary evaporator hose.

Tighten

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

4. New O-ring seal.
   • Coat O-ring seal with 525 viscosity refrigerant oil.
5. Evaporator tube to condenser.

Tighten

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

6. New O-ring seal.
   • Coat O-ring seal with 525 viscosity refrigerant oil.
7. Evaporator tube to evaporator.

Tighten

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

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

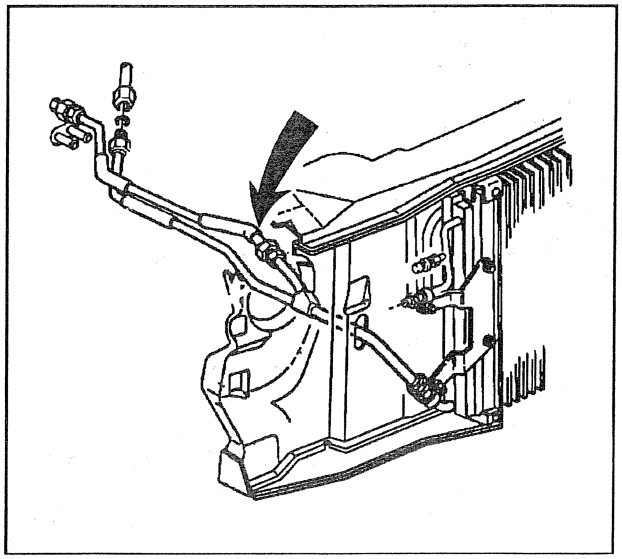


Figure 47—Auxiliary Evaporator Tube Location (Suburbans with Aux. A/C)

COMPRESSOR AND CONDENSER HOSE ASSEMBLY

Remove or Disconnect (Figures 48 through 52)

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

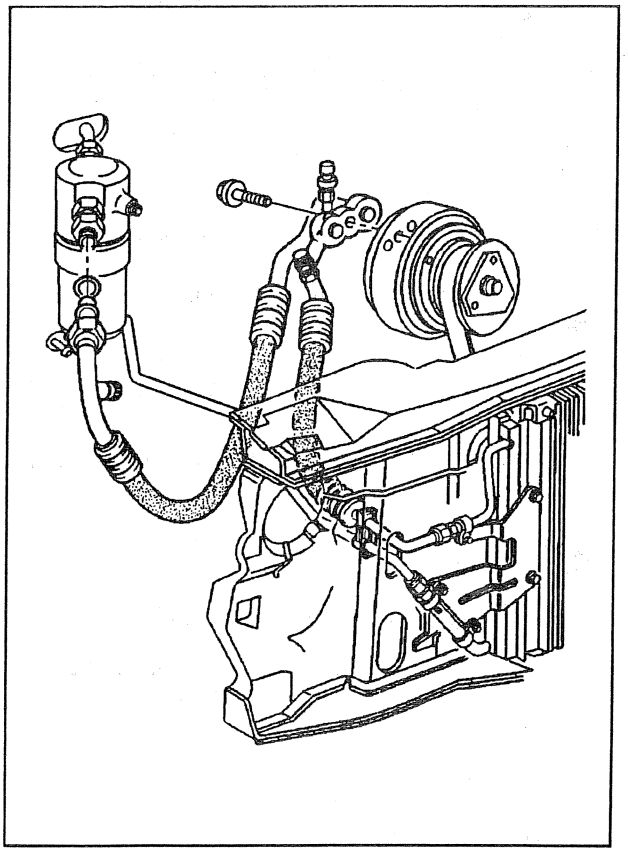


Figure 48—Compressor and Condenser Hose Assembly

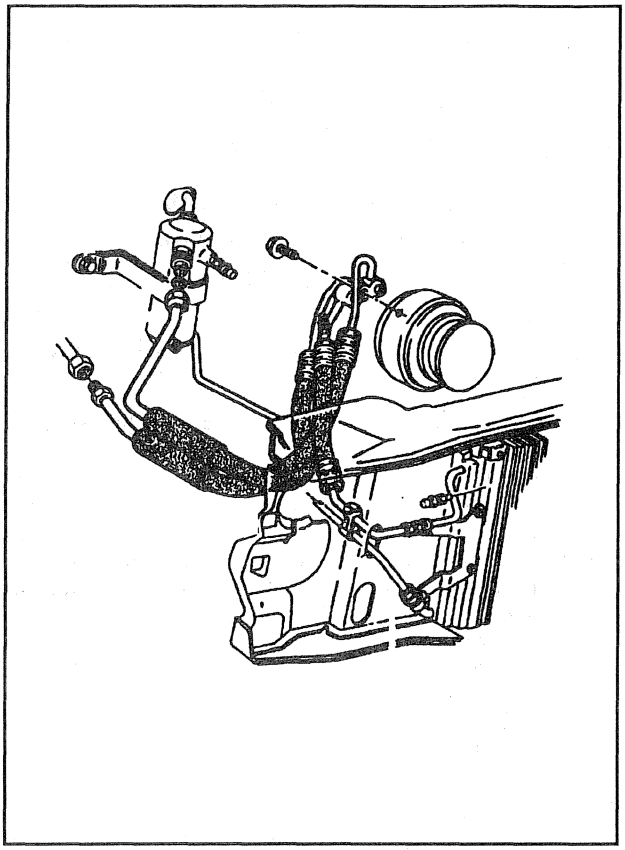


Figure 49—Compressor and Condenser Hose Assembly (Suburban with Aux. A/C)

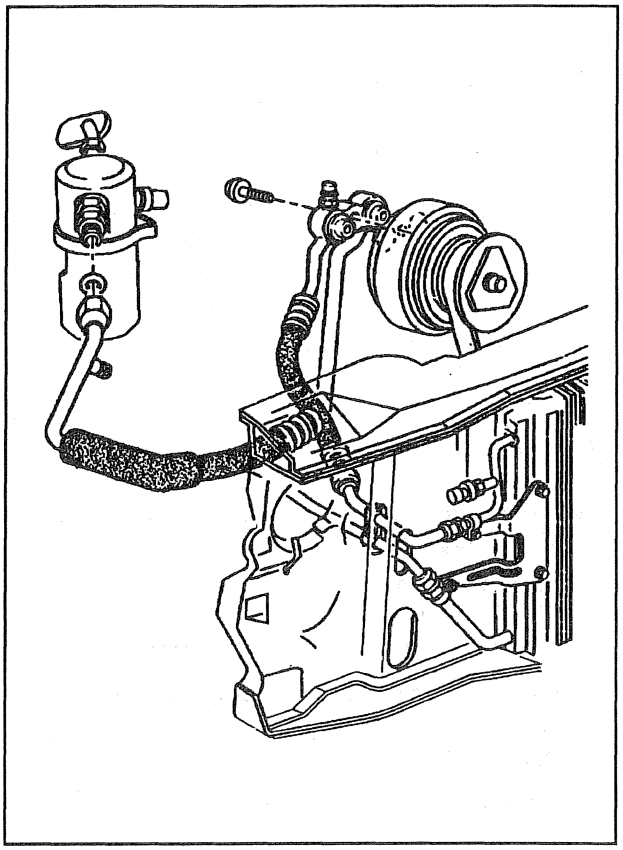


Figure 50—Compressor and Condenser Hose Assembly (7.4L Engines w/o Aux. A/C)

Install or Connect (Figures 48 through 52)

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

1. New O-ring seal.
   - Coat O-ring seal with 525 viscosity refrigerant oil.
2. Hose assembly to auxiliary compressor hose.

Tighten

   - Hose assembly to 24 N·m (18 lbs. ft.).
3. New O-ring seal.
   - Coat O-ring seal with 525 viscosity refrigerant oil.
4. Hose assembly to condenser.

Tighten

   - Hose assembly to 24 N·m (18 lbs. ft.).
5. New O-ring seal.
   - Coat O-ring seal with 525 viscosity refrigerant oil.
6. Hose assembly to accumulator.

Tighten

   - Hose assembly to 41 N·m (30 lbs. ft.).
7. Sealing washers. Refer to "Compressor Sealing Washers."
8. Hose assembly to the rear of the compressor.

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

9. Bolt.

Tighten

   - Bolt 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 53 and 54)

1. Discharge and recover refrigerant from the system.
2. Air cleaner assembly.
3. Evaporator tube (10) from auxiliary evaporator hose (15).
4. O-ring seal.
   - Raise the vehicle and support with suitable safety stands.
5. Refrigerant hose assembly (11) from auxiliary compressor hose (21).
6. O-ring seal (22).
7. Right front wheelhouse. Refer to SECTION 2B.

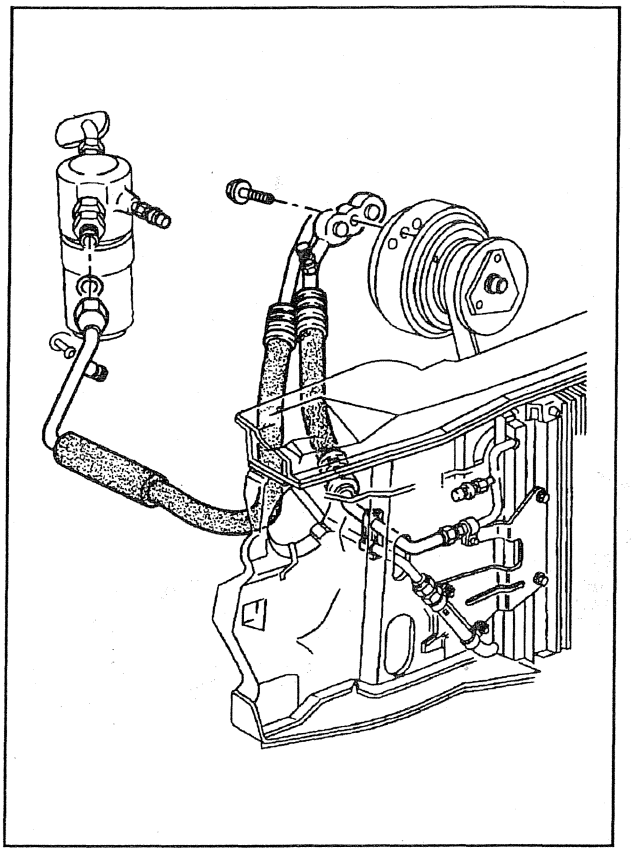


Figure 51—Compressor and Condenser Hose Assembly (Pickup, Extended Cab and Crew Cab)

8. Auxiliary evaporator hose (20) from auxiliary evaporator (26).
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 53 and 54)

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

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).

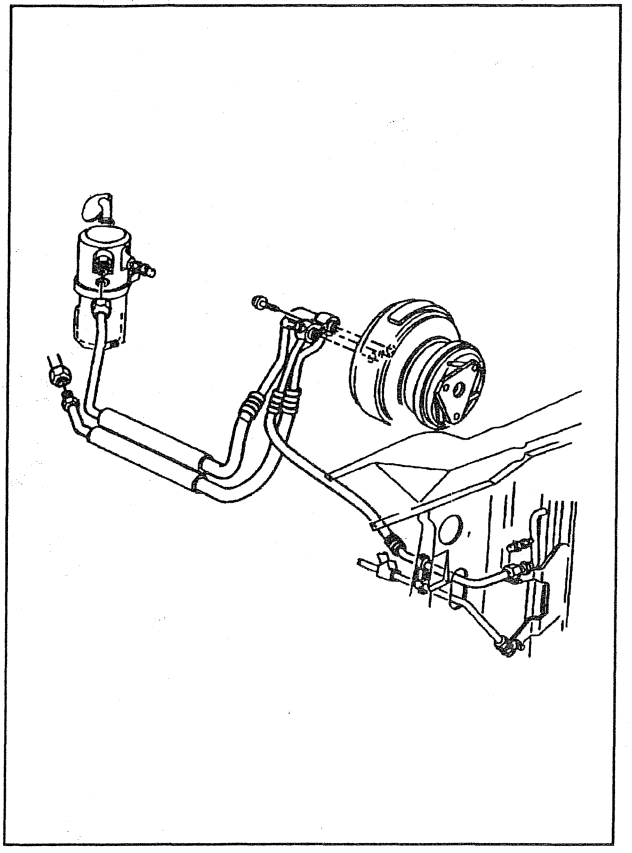


Figure 52—Compressor and Condenser Hose Assembly (7.4L Engines w/Aux. A/C)

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).

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).

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.

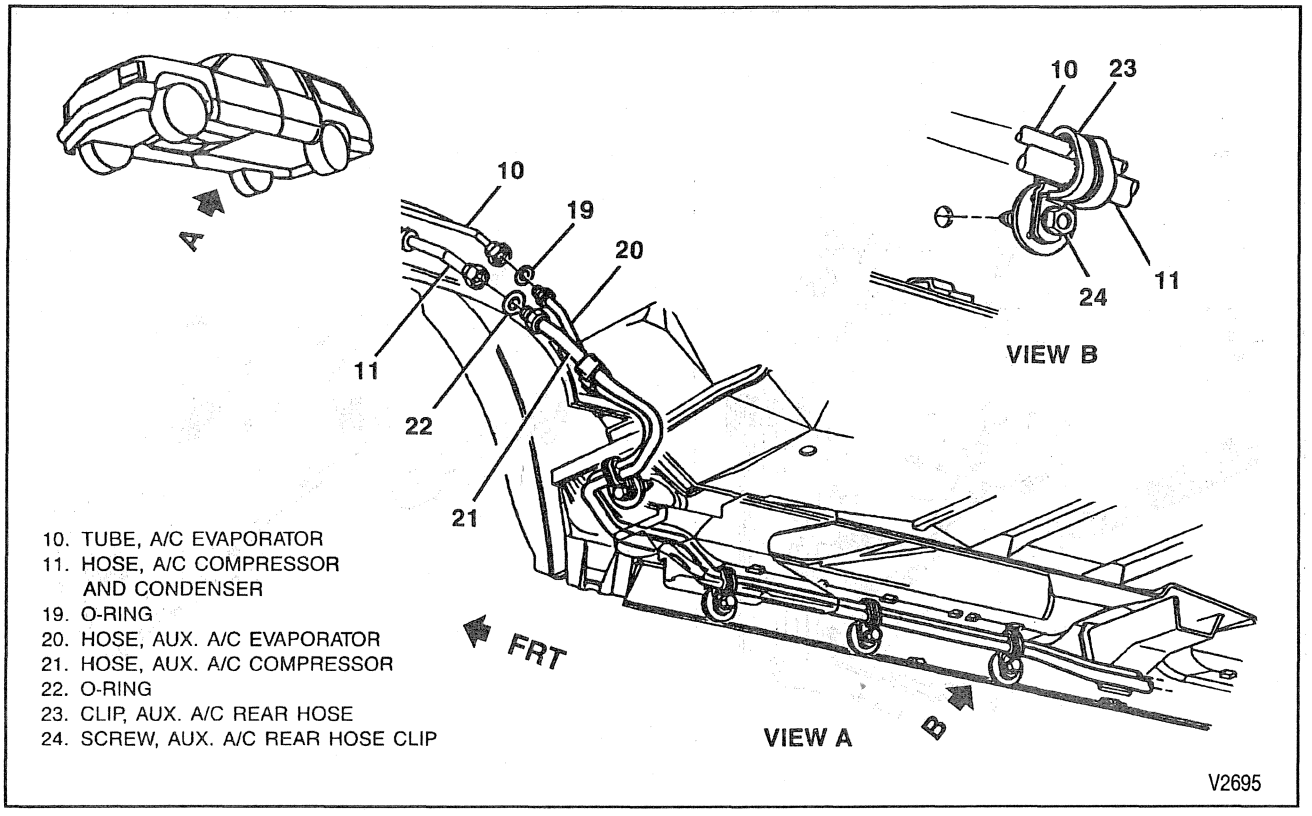


Figure 53—Auxiliary Condenser Hose Routing

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 55 and 56)

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.
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.
   A. Remove case clip (figure 56).
   B. Remove eleven case screws.
   C. Separate case halves.
9. Pipe insulator
10. Evaporator core (26).

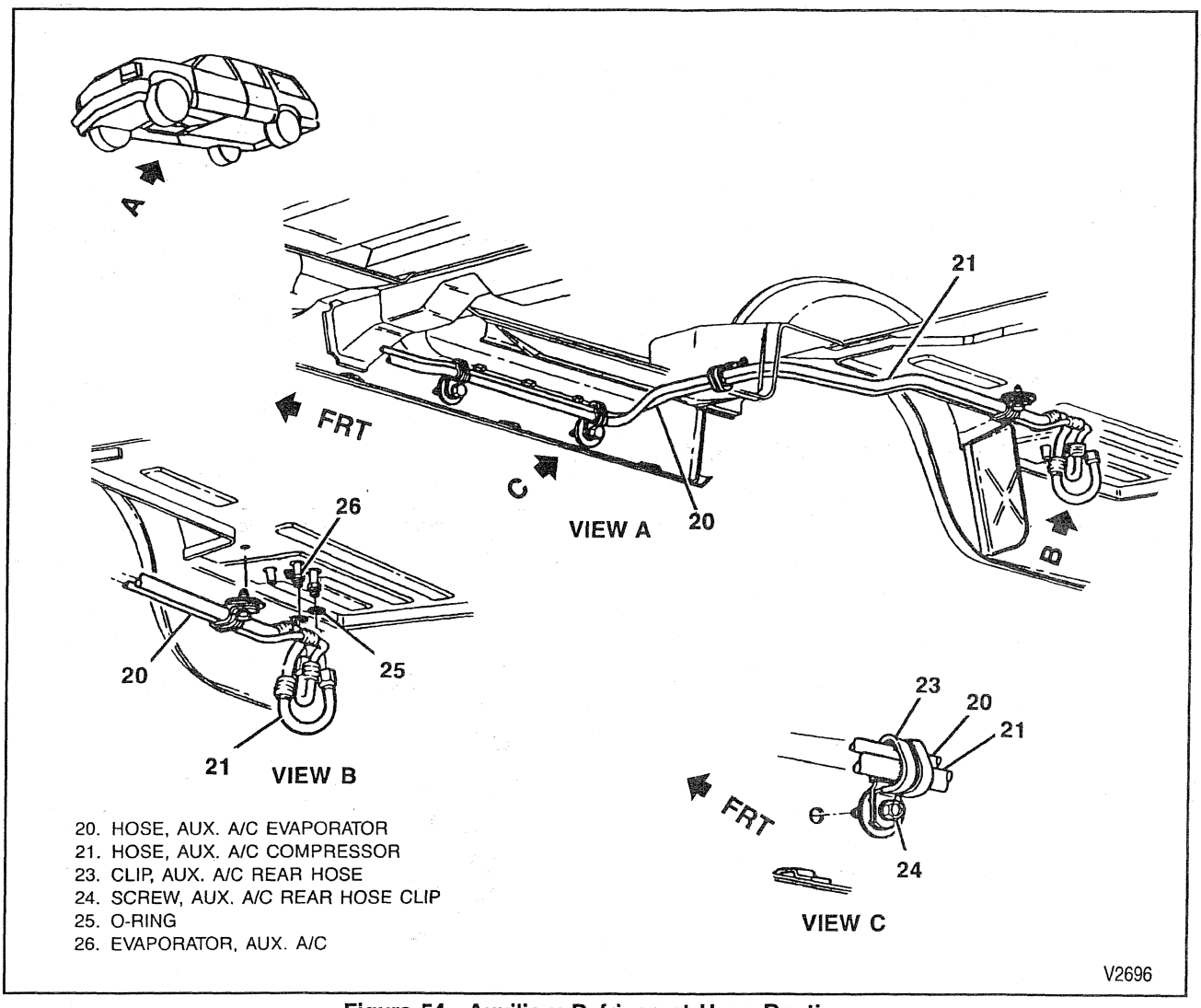
Install or Connect (Figures 55 and 56)

1. Evaporator core (26). Refer to "Refrigerant Oil Distribution," if replacing evaporator.
2. Pipe insulator.
3. Heater/evaporator case cover and screws.
   - Case clip (figure 56).
4. Auxiliary heater case to the vehicle.
5. Auxiliary refrigerant hoses (20 and 21) to auxiliary evaporator (26). Refer to "Compressor and Condenser Hose Assembly."
6. Rear heater hoses to auxiliary heater core (32), if equipped. Refer to SECTION 1A.
7. Electrical connectors, as necessary.
8. Right rear wheelhouse. Refer to SECTION 2B.
9. Right rear quarter trim panel. Refer to SECTION 10A4.
10. Rear quarter interior trim, as necessary. Refer to SECTION 10A4.
11. Refrigerant to the system.
    - Check the system for leaks.

BLOWER MOTOR RESISTOR

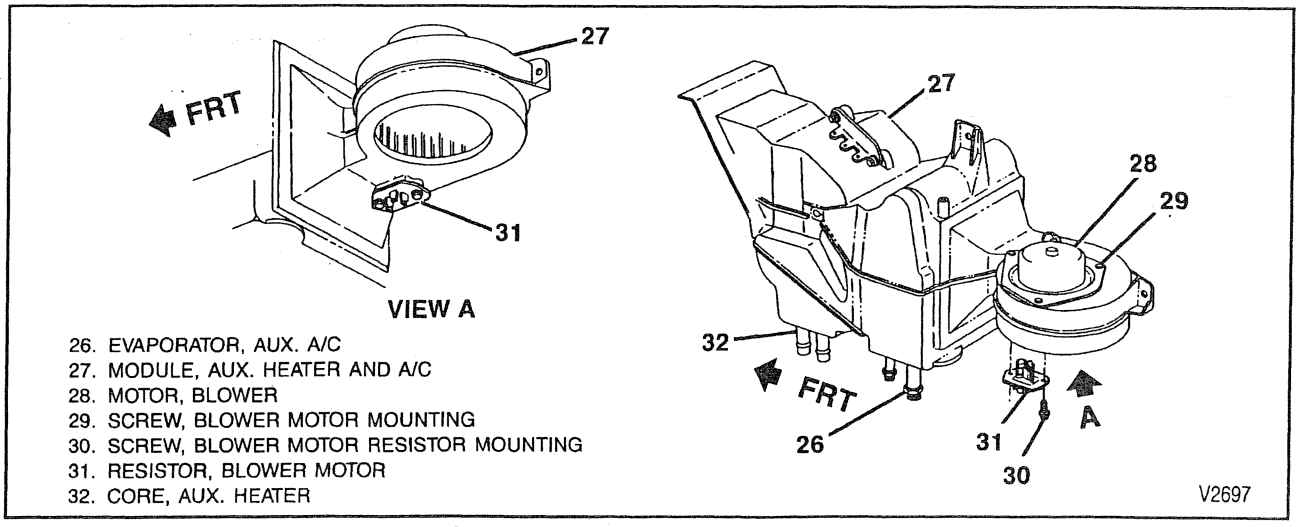
Remove or Disconnect (Figure 55)

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).



20. HOSE, AUX. A/C EVAPORATOR
21. HOSE, AUX. A/C COMPRESSOR
23. CLIP, AUX. A/C REAR HOSE
24. SCREW, AUX. A/C REAR HOSE CLIP
25. O-RING
26. EVAPORATOR, AUX. A/C

Figure 54—Auxiliary Refrigerant Hose Routing



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 55—Auxiliary Heater Module

Install or Connect (Figure 55)

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 (Figures 55 and 57)

1. Negative battery cable. Refer to SECTION 0A.
2. Right rear quarter trim panel cover. Refer to SECTION 10A4.
3. Electrical connectors.
4. Screws (29).
5. Cooling tube.
6. Blower motor (28).
7. Fan cage from the motor (figure 57)

Install or Connect (Figures 55 and 57)

1. Fan cage to the motor (figure 57).
2. Blower motor (28) to the heater case.

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

3. Screws (29).

Tighten

- Screws (29) to 1.7 N·m (15 lbs. in.).

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

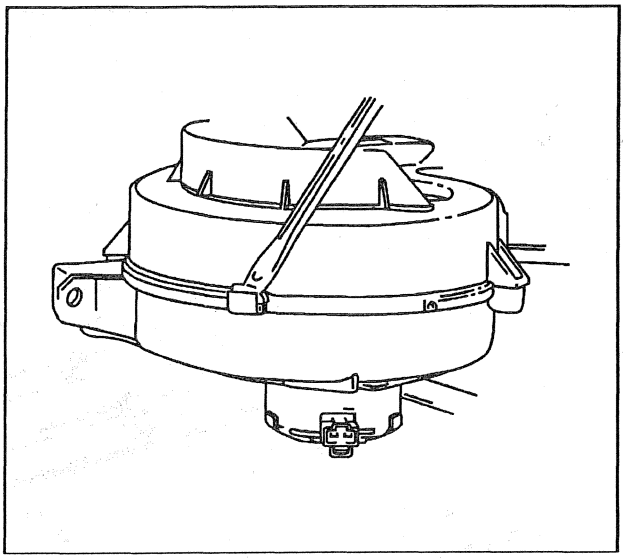


Figure 56—Removing Case Clip

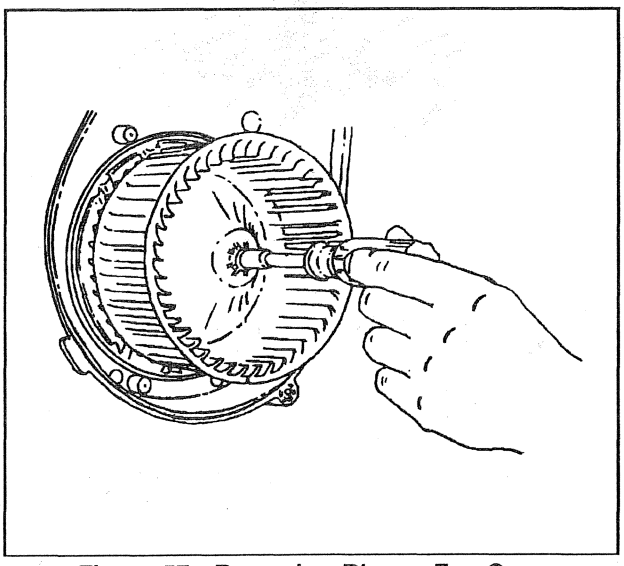


Figure 57—Removing Blower Fan Cage

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 (6.5L)	40 N·m (30 lbs. ft.)
Compressor Bracket Mounting Bolts (7.4L)	50 N·m (37 lbs. ft.)
Compressor Bracket Mounting Nuts (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.)

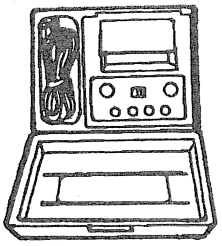
T2964

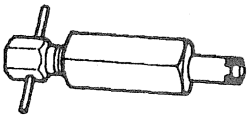
R134A METRIC FITTING SIZES

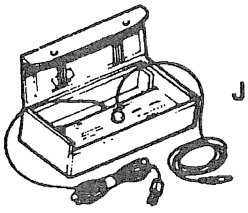
RPO	HEX FITTING SIZE (mm)	CONNECTION	B/U HEX FITTING SIZE (mm)	TORQUE (N·m)
C60/C69	24	A/C Cond. Hose to Cond. Inlet		27.5 +/- 7.5
C60/C69	24	Evap. Tube to Cond. Outlet		27.5 +/- 7.5
C60/C69	22	Evap. Tube to Module	20	27.5 +/- 7.5
C60/C69	32	A/C Accum. to Module	27	45.0 +/- 7.0
C60/C69	27	A/C Comp. Hose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

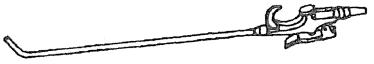
T3122

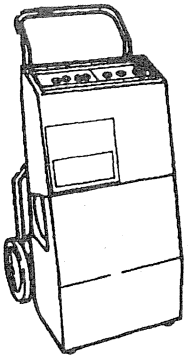
SPECIAL TOOLS

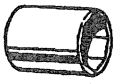
1.  J 21213-A

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