SECTION C

HEATER—AIR CONDITIONER SYSTEM (49000 SERIES)

CONTENTS

DIVISION I SPECIFICATIONS AND ADJUSTMENTS

13-71 SPECIFICATIONS

a. Tightening Specifications

Part	Location	Torque Lb. Ft.
Nut	Drive Plate Nut to Compressor Shaft	14-16
Nut	Compressor Rear Head to Shell	19-23
Cap	Schrader Service Valve	4-5

For compressor mounting bracket bolts see Figure 13-136

Metal Tube Outside Diameter	Thread and Fitting Size	Steel Tubing Torque Lb. Ft.	Aluminum or Copper Tubing Torque Lb. Ft.	Nominal Torque Wrench Span
1/4	7/16	10-15	5-7	5/8
3/8	5/8	30-35	11-13	3/4
1/2	3/4	30-35	11-13	7/8
5/8	7/8	30-35	18-21	1-1/16
3/4	1-1/16	30-35	23-28	1-1/4

If a connection is made with steel to aluminum or copper, use torques for aluminum. In other words, use the lower torque specification.

Use steel torques only when both ends of connection are steel.

Figure 13-126—Pipe and Hose Connection Torque Chart

b. Compressor Specifications

Type	Six Cylinder Axial
Make	Frigidaire
Displacement - (cu. in.)	12.6
Oil	Frigidaire 525 Viscosity
Oil Content (New)	.10-1/2 oz. Fluid
Air Gap Between Clutch Drive Plate and Pulley	.022" to .057"
Clutch Type	Magnetic
Belt Tension	100 Lbs.

c. General Specifications

Type of Refrigerant	Freon 12, Ucon 12, Genetron 12, Isotron 12
Refrigerant Capacity (Fully Charged)	4.25 Lbs.
Type of Thermostat	190°
Capacity of Cooling System with Air Conditioner	18.2 Qts.

13-72 ADJUSTMENT OF WARMER LEVER AND TEMPERATURE DOOR

1. The temperature control wire adjusting nut may be reached from under the instrument panel in the area between the steering column and the parking brake bracket. See Figure 13-127.

2. Adjust nut to provide 1/8" to 3/16" lever spring-back from the full cold or left position.

NOTE: The temperature door upper pivot plate has slotted holes that appear to be adjustment points, but no attempt should be made to adjust this plate in the field. It is a factory pre-set unit and should operate properly.

NOTE: No provisions are made for the adjustment of the defroster control wire.

DIVISION II DESCRIPTION AND OPERATION

13-73 GENERAL DESCRIPTION OF SYSTEM

The 49000 Series heater-air conditioner system is of the series type with all incoming air flowing

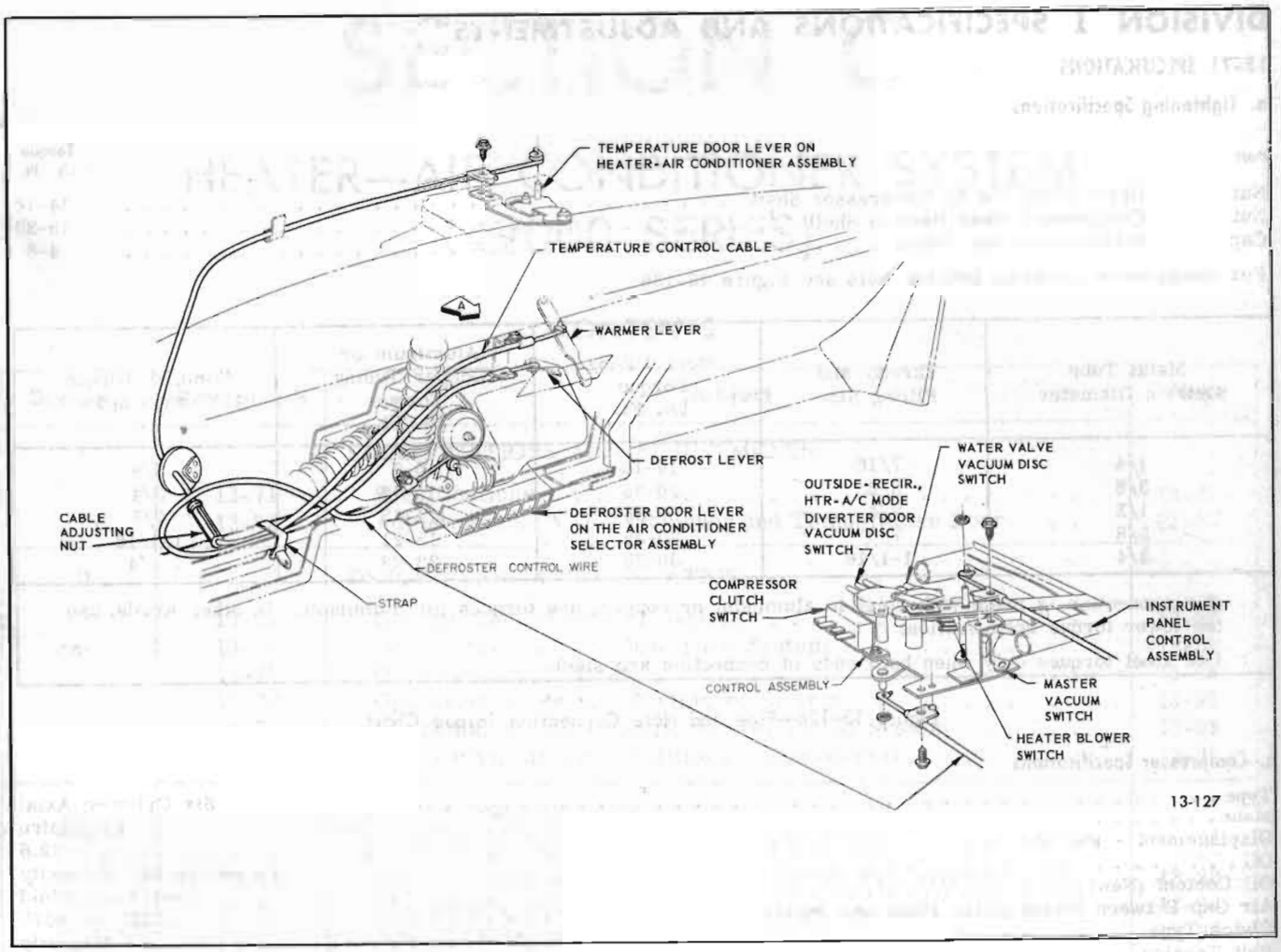

Figure 13-127—Control Cable Installation (49000 Series)

from blower, through the evaporator core and then, depending on temperature door position, either through or around the heater core. This type of system allows full air conditioner operation (temperature door closed or off) plus air conditioner temperature control (temperature door partially open). This position also provides dehumidification to defog the inside of the windows during relatively cool damp weather plus heater only operation (selector lever in heater position).

Provisions are also made for operation of air conditioner unit on recirculate when maximum cooling is needed. This position allows the outside-recirculated air door to assume a partially open position to provide approximately 25% outside air and 75% recirculated air to the system. Any climate control selector position other than "RECIR" furnishes 100% outside air to the system. The removal of stale air, smoke, etc. from inside the car is accomplished by the use of an air pressure valve located at the rear of parcel shelf. This is a flapper-type of valve which allows air to exhaust at the rear anytime it is admitted through the vent, heater, or air conditioner systems and provides a continuous change of the air within the passenger compartment. When the climate control lever is in the VENT position, outside air is admitted to the system and discharged from the air conditioner outlets. The first blower switch position allows for ram air flow only, successive positions of the switch give low, medium and high blower speeds. This outside air may also be heated by moving the temperature lever from the OFF position.

13-74 DESCRIPTION OF AIR FLOW THRU SYSTEM

The following description of the route the air takes as it flows through the system under various modes of operation is divided into three parts: (1) air flow during air conditioner operation, (2) heater and defroster operation, and (3) both air conditioner and heater operation.

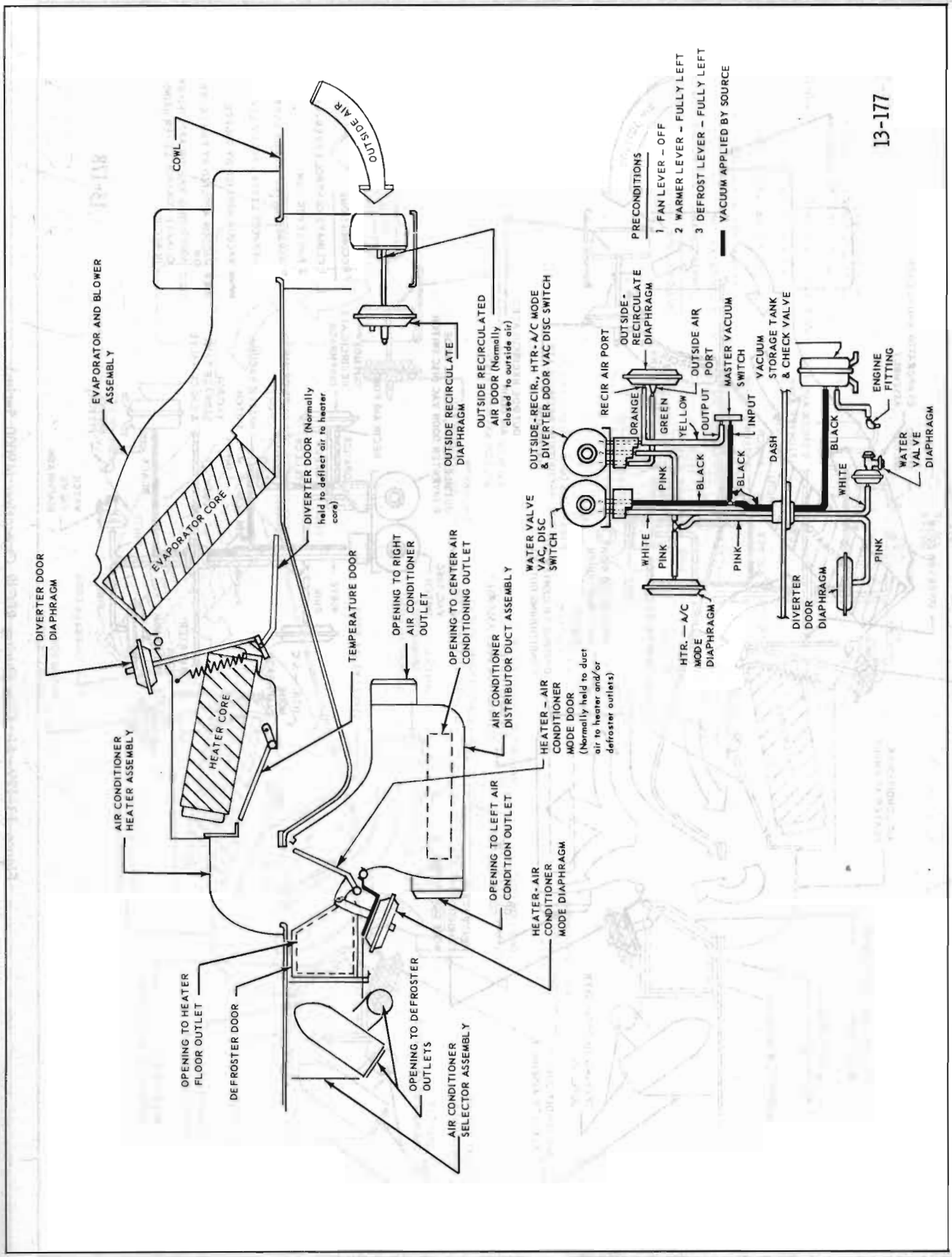

Figure 13-128—Heater - Air Conditioner System - Controls Off (49000 Series)

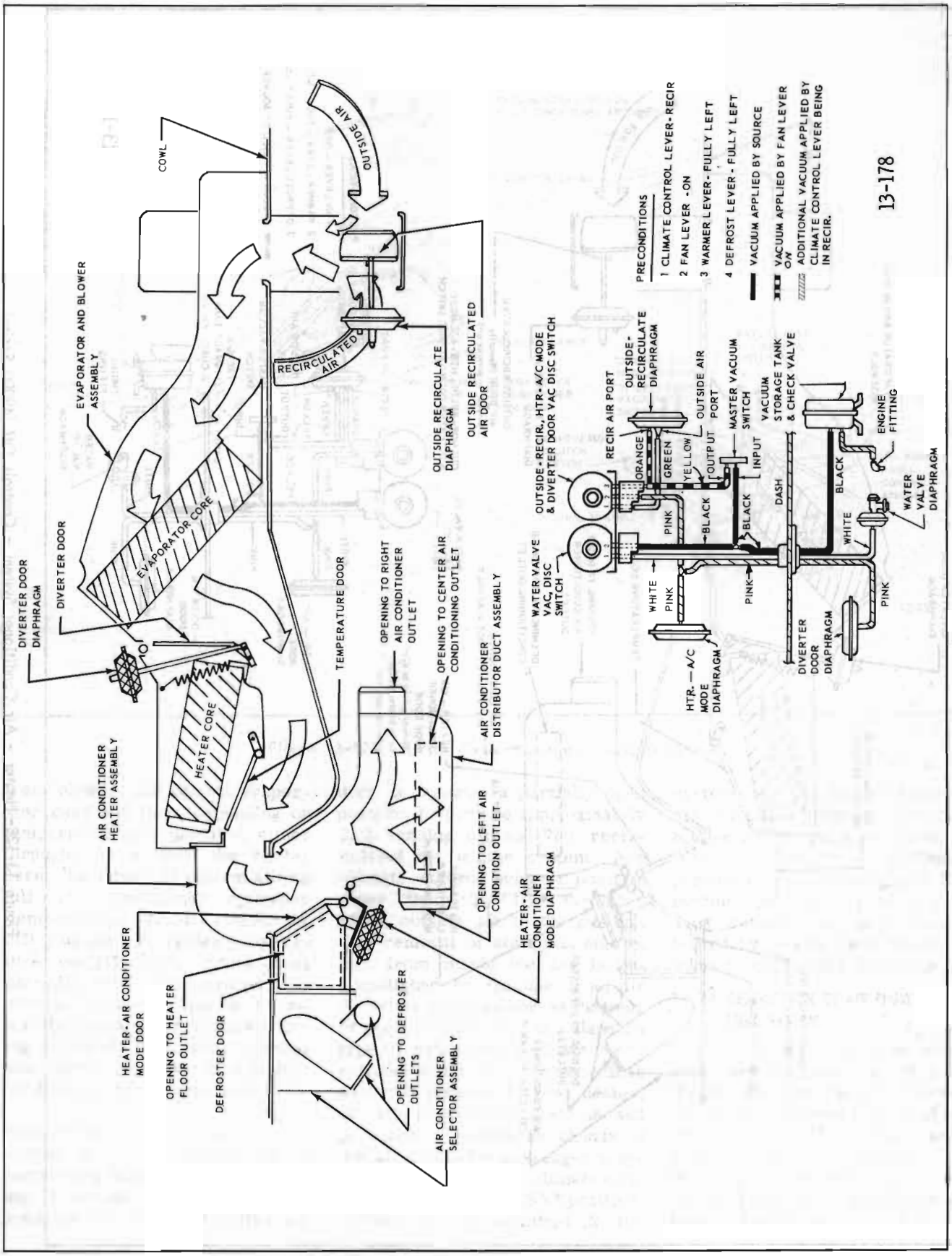

Figure 13-129—Air Flow During RECIR Operation (49000 Series)

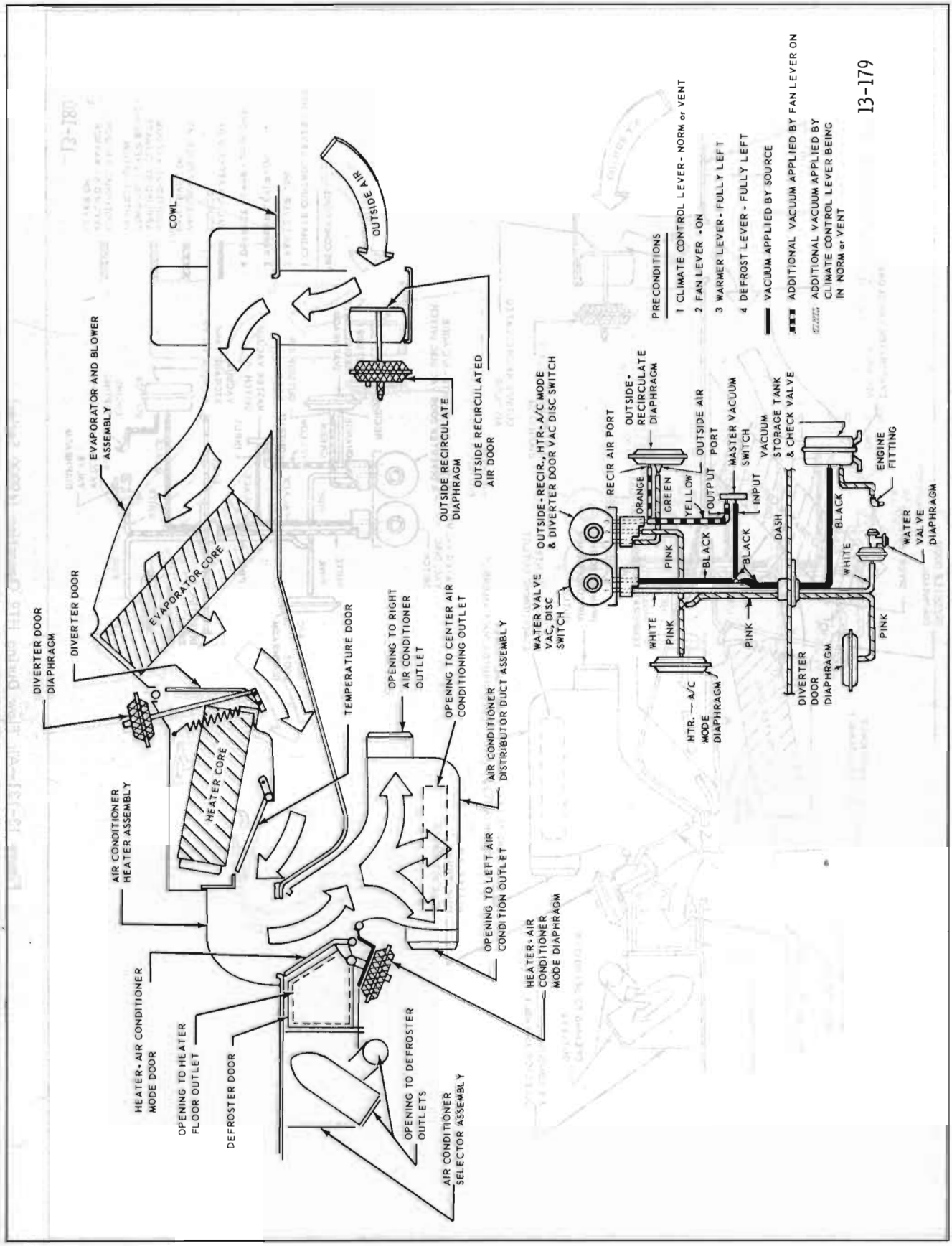

Figure 13-130—Air Flow During NORM or VENT Operation (49000 Series)

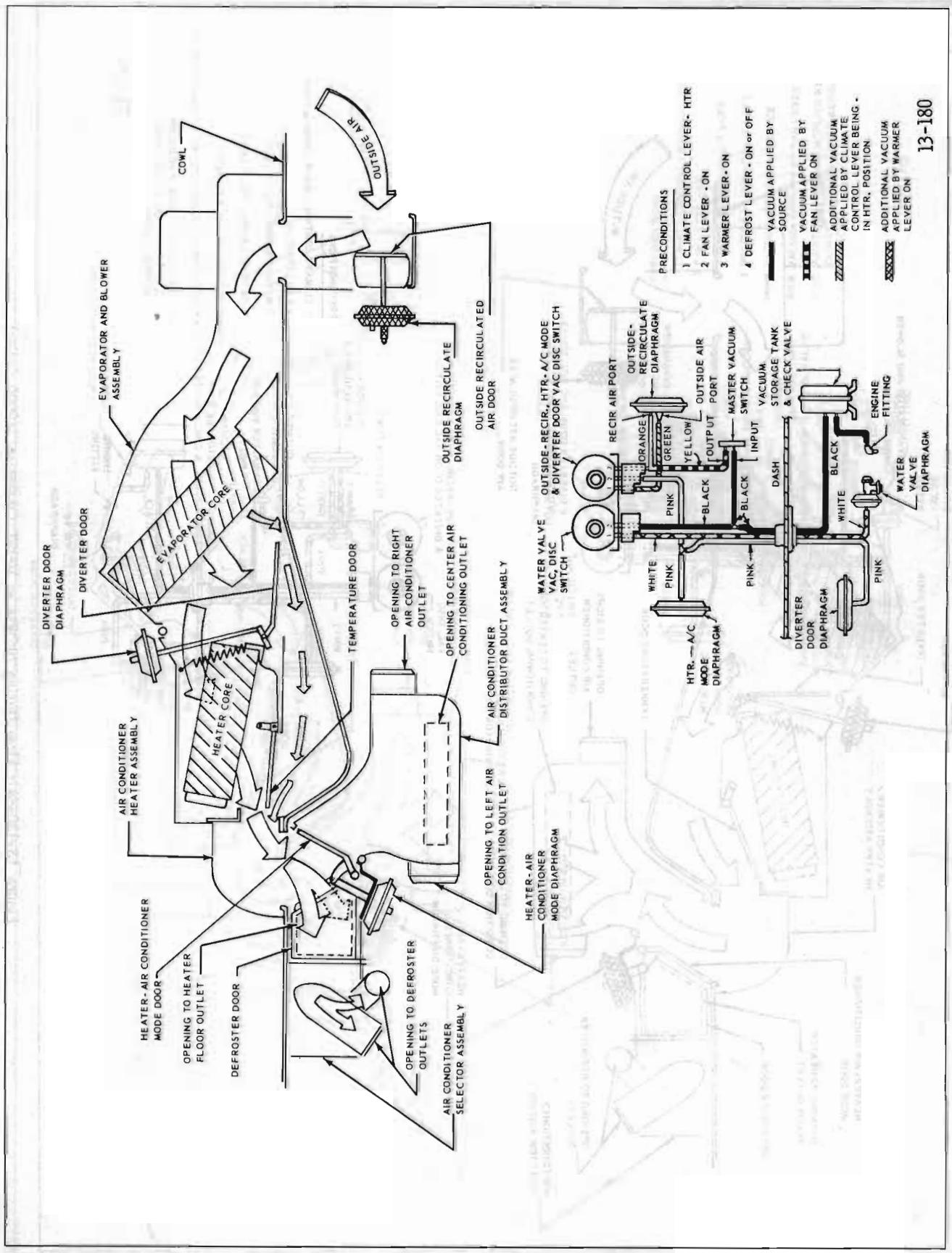

Figure 13-131—Air Flow During HTR Operation (49000 Series)

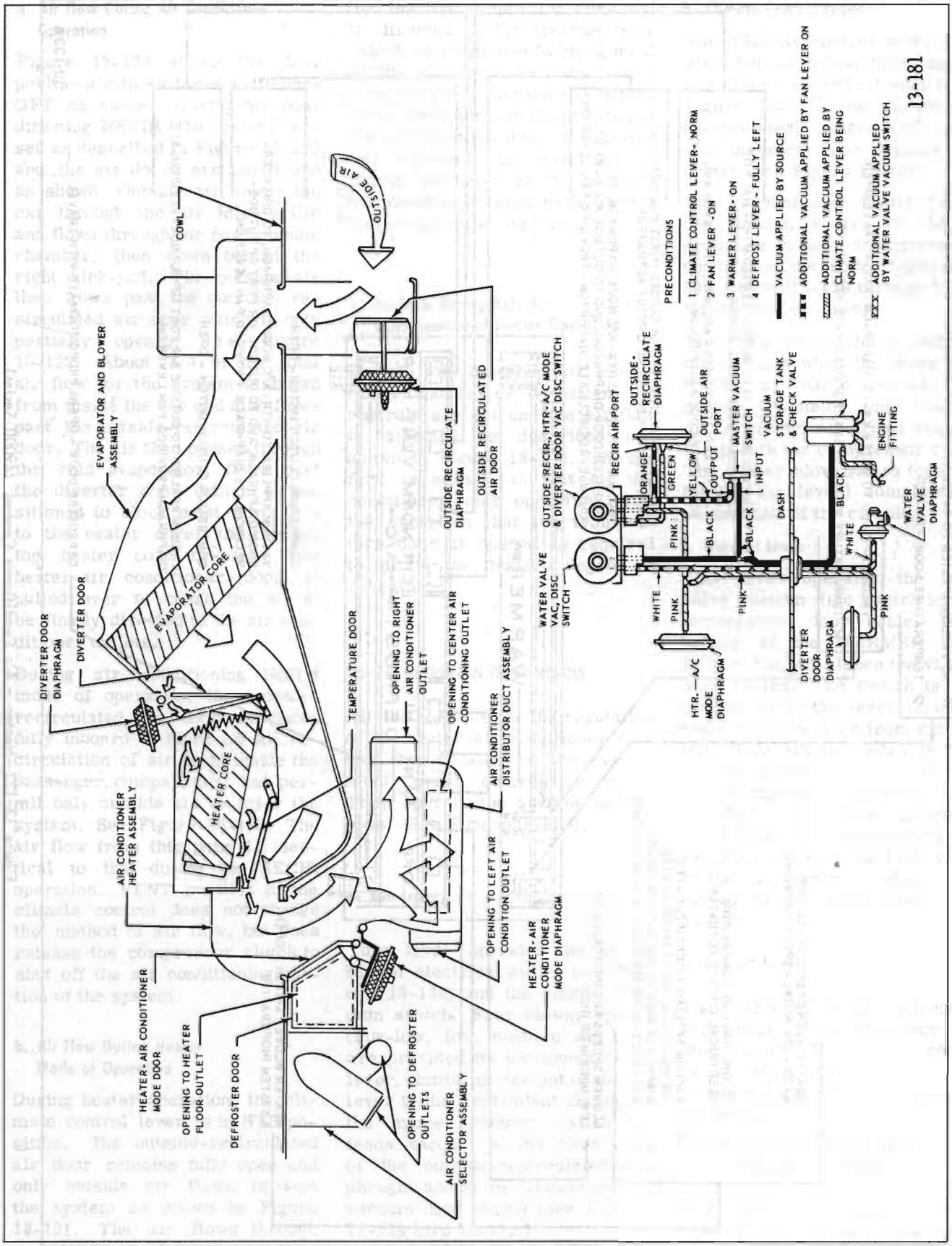

Figure 13-132—Air Flow During Both Air Conditioner and Heater Operation (49000 Series)

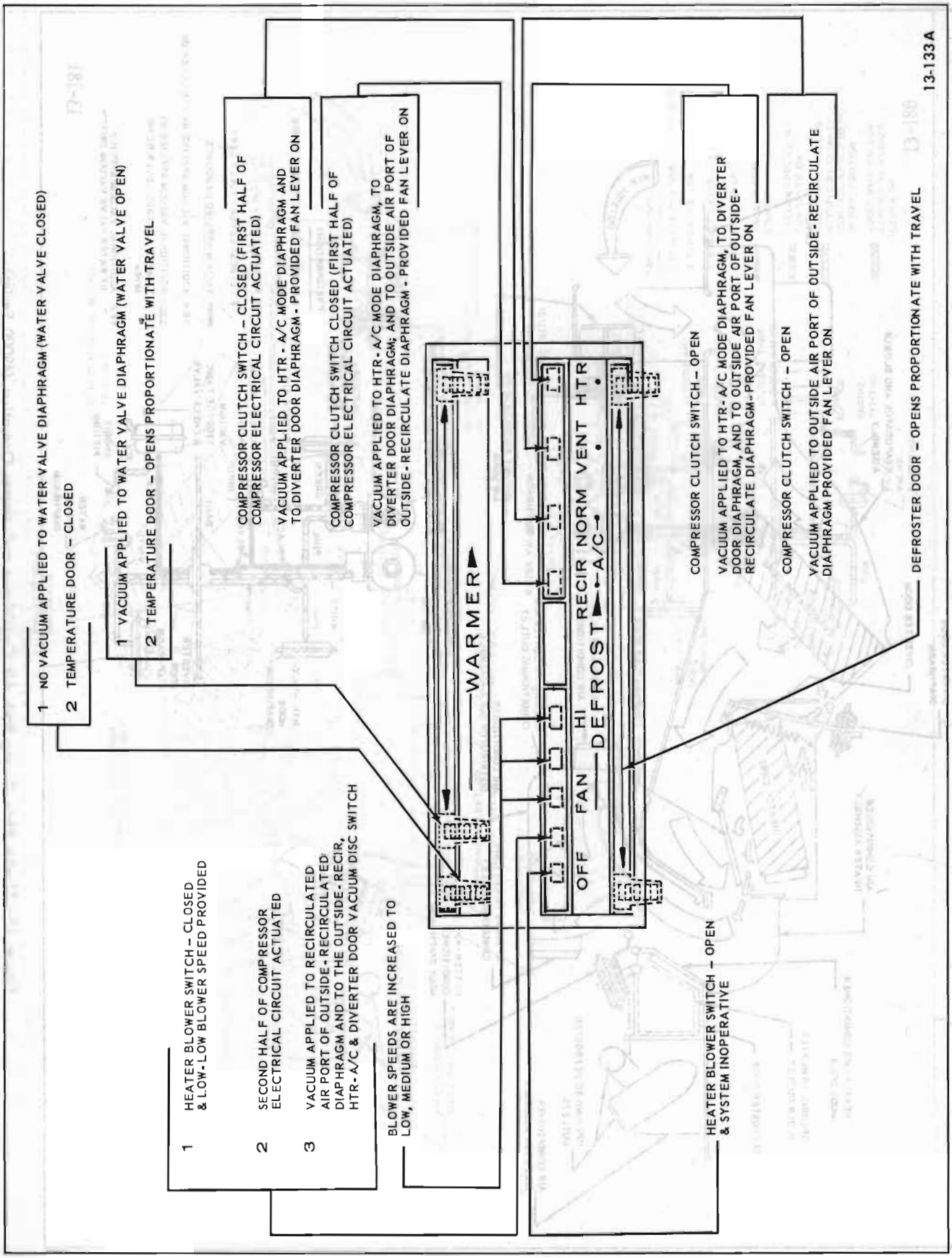

Figure 13-133—Heater - Air Conditioner Controls (49000 Series)

a. Air Flow During Air Conditioner Operation

Figure 13-128 shows the door positions with switches and levers OFF or closed. During air conditioning RECIR, the controls are set as described in Figure 13-129 and the air doors are positioned as shown. Outside air enters the car through the air inlet grille and flows through the cowl plenum chamber, then down behind the right kick-pad. The outside air then flows past the outside- recirculated air door which is only partially opened. See Figure 13-129. About 3/4 of the total air flow for the system is drawn from inside the car and also flows past the outside-recirculated air door. The air then passes through the cold evaporator, flows past the divertor door (which is positioned to block most of air flow to the heater core) and through the heater core by-pass. The heater-air conditioner door is pulled over to cause the air to be finally directed to the air conditioner outlets.

During air conditioning NORM mode of operation, the outside-recirculated air door is drawn fully inboard to block off all recirculation of air from inside the passenger compartment and permit only outside air to enter the system. See Figure 13-130. The air flow from this point is identical to that during the RECIR operation. VENT position of the climate control does not change the method of air flow, but does release the compressor clutch to shut off the air conditioning portion of the system.

b. Air Flow During Heater Mode of Operation

During heater operation, the climate control lever is in HTR position. The outside-recirculated air door remains fully open and only outside air flows through the system as shown in Figure 13-131. The air flows through the inactive evaporator core and is directed by the diverter door (which is positioned to block most of the air flow from the heater core by-pass) through the heater core. Depending on the position of the temperature door, the heated and unheated air mix and is finally directed by the heater-air conditioner door to the heater and/or defroster outlets.

c. Air Flow During Both Air Conditioner and Heater Operation

During simultaneous air conditioner and heater operation, the controls are set and the air flow is directed as described and shown in Figure 13-132. The air flow is similar to that for air conditioner only operation, with the exception that the temperature door is opened as required to attain the desired degree of reheating.

13-75 OPERATION OF CONTROLS

All the controls for the regulation of the heater-air conditioner system are located on the instrument panel control assembly. They operate the system as follows: (See Figure 13-133).

a. Fan Lever

This lever operates the heater blower electrical switch (see Figure 13-134) and the master vacuum switch. Four blower speeds (low-low, low, medium and high) are provided by movement of the lever. Initial movement of the fan lever to the first detent also opens the master vacuum switch and feeds vacuum to the first stage of the outside-recirculated diaphragm and to the climate control vacuum disc switch (see Figures 13-129 thru 13-132.)

b. Climate Control Lever

The Climate control lever operates two switches: the compressor clutch electrical switch (see Figure 13-134) and the outside-recirculated, heater-A/C mode, and diverter door vacuum disc switch (see Figure 13-127).

The vacuum disc switch directs the vacuum source to the appropriate vacuum diaphgrams depending on the mode of operation. See Figure 13-129 through 13-131 for vacuum circuits.

The compressor clutch switch is closed only when the lever is in RECIR or NORM detents. This switch completes only one half of the electrical circuit required to operate the compressor clutch. The heater blow switch (operated by the fan lever) completes the second half of the circuit.

c. Warmer Lever

This lever operates the water valve vacuum disc switch and the temperature door cable. Positioning of the WARMER lever fully to the left closes the vacuum disc switch. The switch is fully opened when the lever is moved more than one inch from extreme left. This allows coolant to begin flowing through the heater core. The temperature control cable attached to this lever progressively opens the temperature door exposing more of the heater core to the air stream as the lever is moved to the right. See Figure 13-127.

d. Defrost Lever

The DEFROST lever controls the positioning of the defroster door (see Figure 13-127), by a control cable. Movement of the door is proportionate with the travel of the lever.

13-76 OPERATION OF HEATER PORTION OF SYSTEM

The flow of coolant or water through the heater core is as

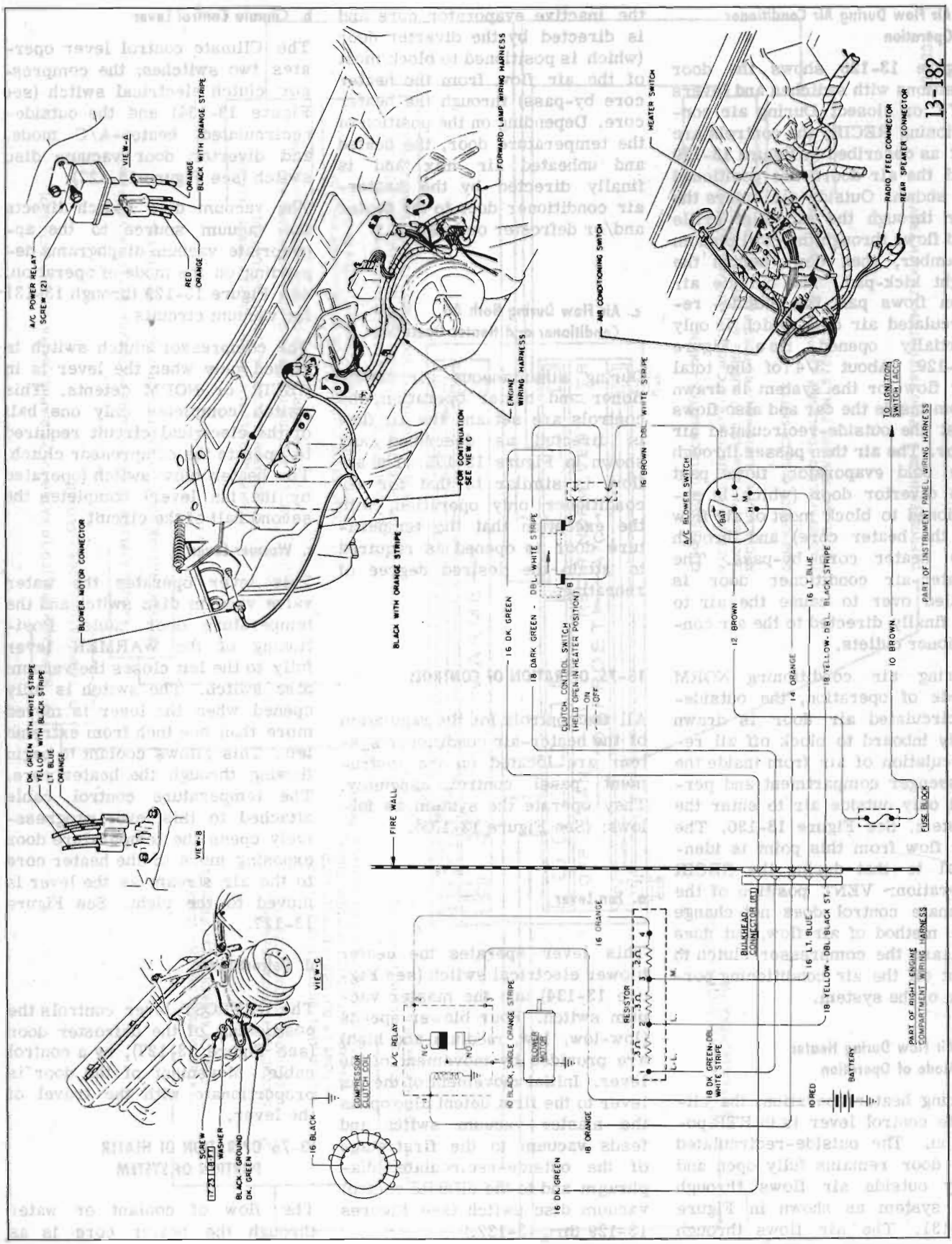

Figure 13-134—Heater - Air Conditioner Schematic and Wiring Harness Installation (49000 Series)

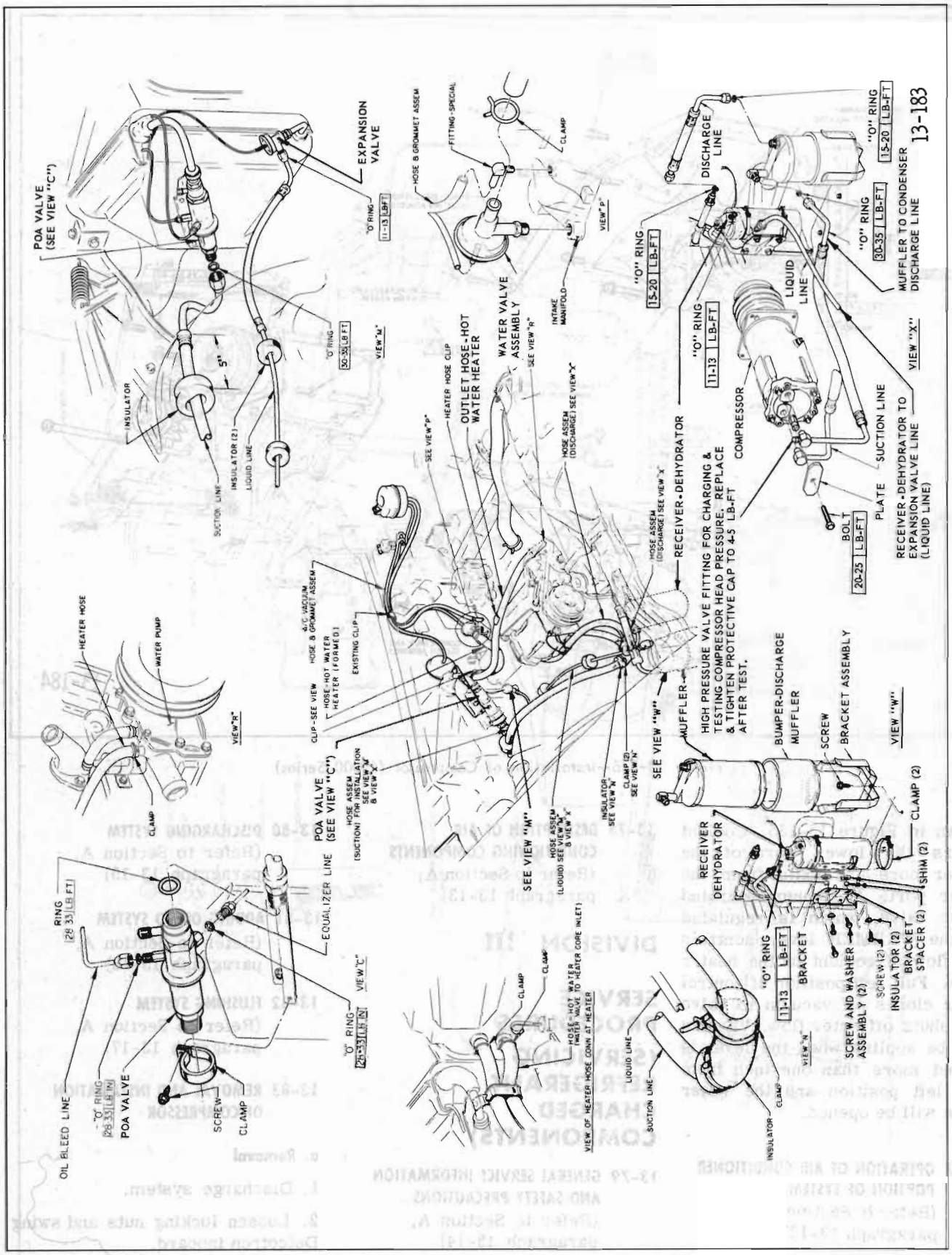

Figure 13-135—Installation of Heater and Refrigerant Hoses (49000 Series)

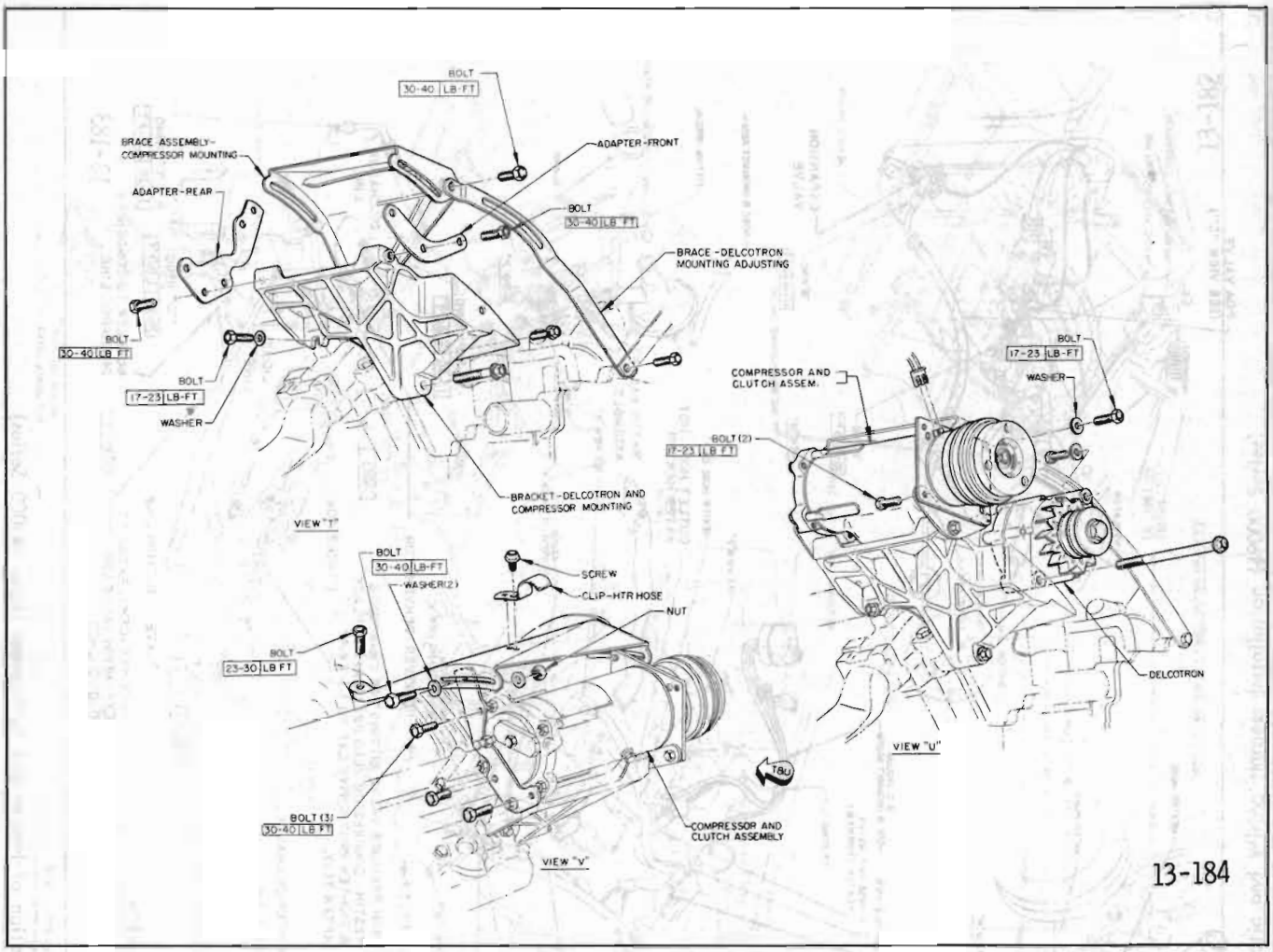

Figure 13-136—Installation of Compressor (49000 Series)

shown in Figure 13-135. Coolant enters the lower port of the heater core and exits from the upper port. A vacuum operated water valve, which is regulated by the WARMER lever controls the flow of coolant to the heater core. Full left position of control lever closes off vacuum to valve and shuts off water flow. Vacuum will be applied when the lever is moved more than one inch from full left position and the water valve will be opened.

13-77 OPERATION OF AIR CONDITIONER PORTION OF SYSTEM
(Refer to Section A, paragraph 13-12)

13-78 DESCRIPTION OF AIR CONDITIONING COMPONENTS
(Refer to Section A, paragraph 13-13)

DIVISION III

SERVICE PROCEDURES (SERVICING REFRIGERANT CHARGED COMPONENTS)

13-79 GENERAL SERVICE INFORMATION AND SAFETY PRECAUTIONS
(Refer to Section A, paragraph 13-14)

13-80 DISCHARGING SYSTEM
(Refer to Section A, paragraph 13-15)

13-81 ADDING OIL TO SYSTEM
(Refer to Section A, paragraph 13-16)

13-82 FLUSHING SYSTEM
(Refer to Section A, paragraph 13-17)

13-83 REMOVAL AND INSTALLATION OF COMPRESSOR

a. Removal

1. Discharge system.

2. Loosen locking nuts and swing Delcotron inboard.

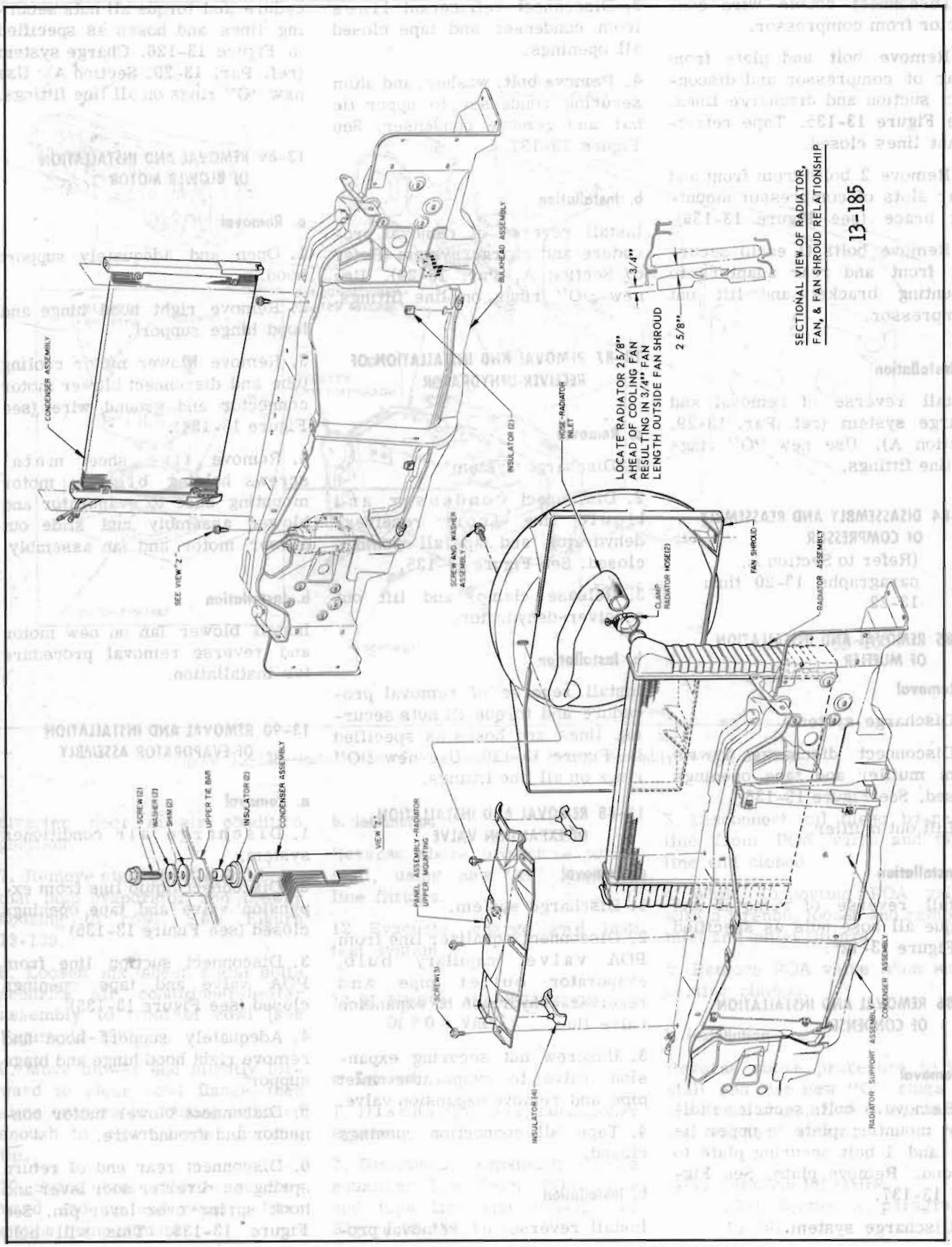

Figure 13-137—Condenser and Radiator Installation (49000 Series)

3. Disconnect double wire connector from compressor.

4. Remove bolt and plate from rear of compressor and disconnect suction and discharge lines. See Figure 13-135. Tape refrigerant lines closed.

5. Remove 2 bolts from front and rear slots of compressor mounting brace (see Figure 13-136).

6. Remove bolts (1 each) securing front and rear adapters to mounting bracket and lift out compressor.

b. Installation

Install reverse of removal and charge system (ref. Par. 13-29, Section A). Use new "O" rings on line fittings.

13-84 DISASSEMBLY AND REASSEMBLY OF COMPRESSOR

(Refer to Section A, paragraphs 13-20 thru 13-22

13-85 REMOVAL AND INSTALLATION OF MUFFLER

a. Removal

1. Discharge system.

2. Disconnect discharge lines from muffler and tape openings closed. See Figure 13-135.

3. Lift out muffler.

b. Installation

Install reverse of removal and torque all hose nuts as specified in Figure 13-126.

13-86 REMOVAL AND INSTALLATION OF CONDENSER

a. Removal

1. Remove 3 bolts securing radiator mounting plate to upper tie bar and 1 bolt securing plate to shroud. Remove plate. See Figure 13-137.

2. Discharge system.

3. Disconnect refrigerant lines from condenser and tape closed all openings.

4. Remove bolt, washer, and shim securing condenser to upper tie bar and remove condenser. See Figure 13-137.

b. Installation

Install reverse of removal procedure and charge system (Refer to Section A, Par. 13-29). Use new "O" rings on line fittings.

13-87 REMOVAL AND INSTALLATION OF RECEIVER-DEHYDRATOR

a. Removal

1. Discharge system

2. Disconnect condenser and liquid line from receiver-dehydrator and tape all openings closed. See Figure 13-135.

3. Release clamps and lift out receiver-dehydrator.

b. Installation

Install reverse of removal procedure and torque all nuts securing lines and hoses as specified in Figure 13-126. Use new "O" rings on all line fittings.

13-88 REMOVAL AND INSTALLATION OF EXPANSION VALVE

a. Removal

1. Discharge system.

2. Disconnect equalizer line from POA valve, capillary bulb, evaporator outlet pipe and receiver-dehydrator to expansion valve line.

3. Unscrew nut securing expansion valve to evaporator inlet pipe and remove expansion valve.

4. Tape all connection openings closed.

b. Installation

Install reverse of removal procedure and torque all nuts securing lines and hoses as specified in Figure 13-126. Charge system (ref. Par. 13-29, Section A). Use new "O" rings on all line fittings.

13-89 REMOVAL AND INSTALLATION OF BLOWER MOTOR

a. Removal

1. Open and adequately support hood.

2. Remove right hood hinge and hood hinge support.

3. Remove blower motor cooling tube and disconnect blower motor connector and ground wire (see Figure 13-134).

4. Remove five sheet metal screws holding blower motor mounting base to evaporator and blower assembly and slide out blower motor and fan assembly.

b. Installation

Install blower fan on new motor and reverse removal procedure for installation.

13-90 REMOVAL AND INSTALLATION OF EVAPORATOR ASSEMBLY

a. Removal

1. Discharge air conditioner system.

2. Disconnect liquid line from expansion valve and tape openings closed (see Figure 13-135)

3. Disconnect suction line from POA valve and tape openings closed (see Figure 13-135)

4. Adequately support hood and remove right hood hinge and hinge support.

5. Disconnect blower motor connector and ground wire.

6. Disconnect rear end of return spring on diverter door lever and hook spring over lever pin. See Figure 13-138. This will hold

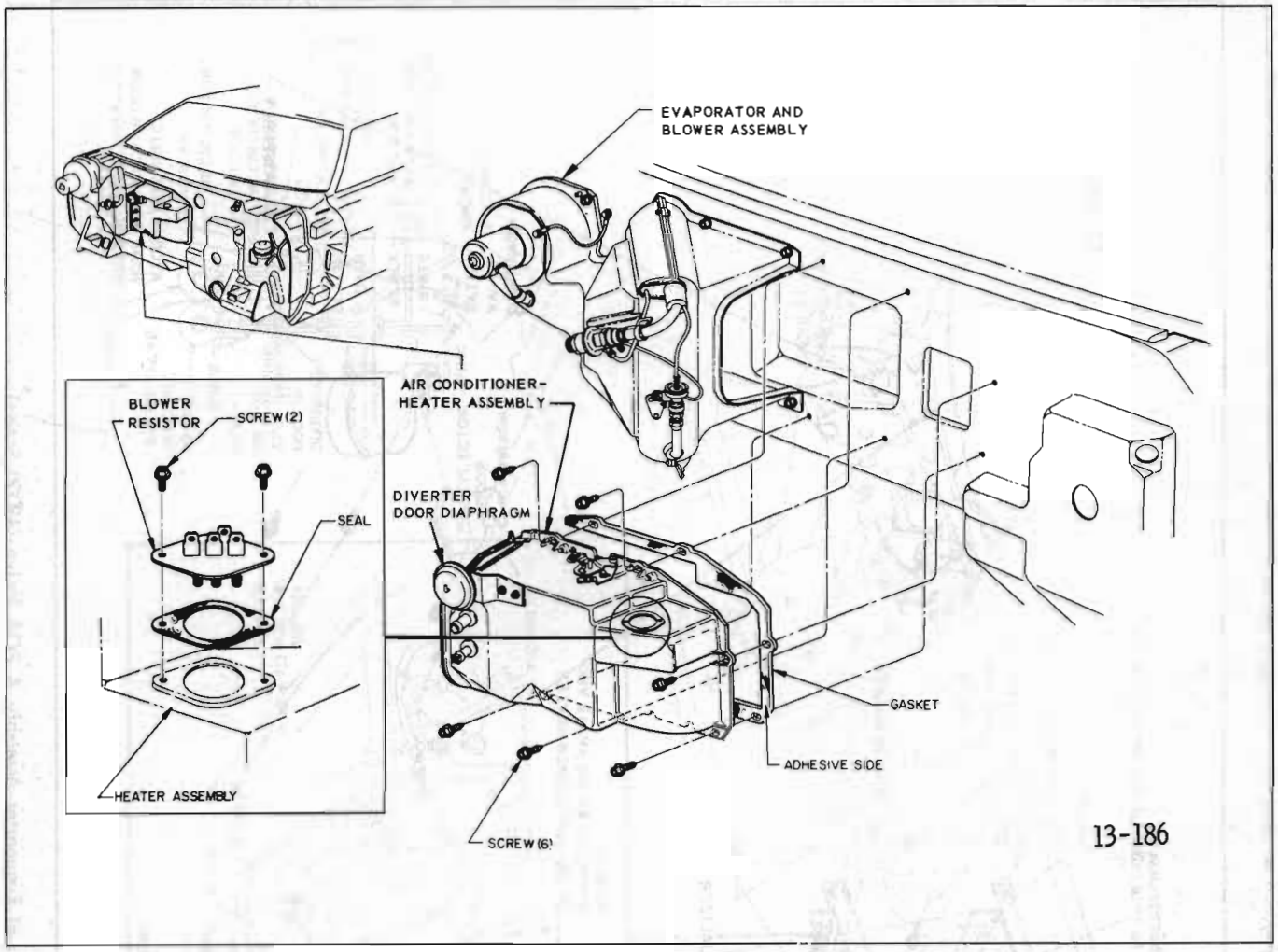

Figure 13-138—Installation of Air Conditioner Heater Assembly (49000 Series)

diverter door in air condition position.

7. Remove eight sheet metal bolts that hold evaporator and blower housing to cowl. See Figure 13-139.

8. Loosen six sheet metal bolts securing air conditioner-heater assembly to front of cowl (see Figure 13-138).

9. Move blower end slightly forward to clear cowl flange, then slide evaporator housing outboard enough to clear heater housing lip.

10. Swing evaporator case forward and up and remove from engine compartment.

b. Installation

Reverse above procedure to install, using new "O" rings on line fittings.

12. Evacuate, charge and leak test system.

13-91 REMOVAL AND INSTALLATION OF P O A VALVE

a. Removal

1. Discharge air conditioner system.

2. Disconnect expansion valve equalizer line from POA valve and tape line end closed. See Figure 13-139.

3. Disconnect oil bleed by-pass line from POA valve and tape line end closed.

4. While supporting POA valve with a wrench, loosen and remove inlet and outlet fittings.

5. Remove POA valve from supporting clamps.

b. Installation

Reverse above procedure to install and use new "O" rings on all line fittings. Evacuate, charge and leak test system.

13-92 CHARGING THE SYSTEM

(Ref. Section A, paragraph 13-29).

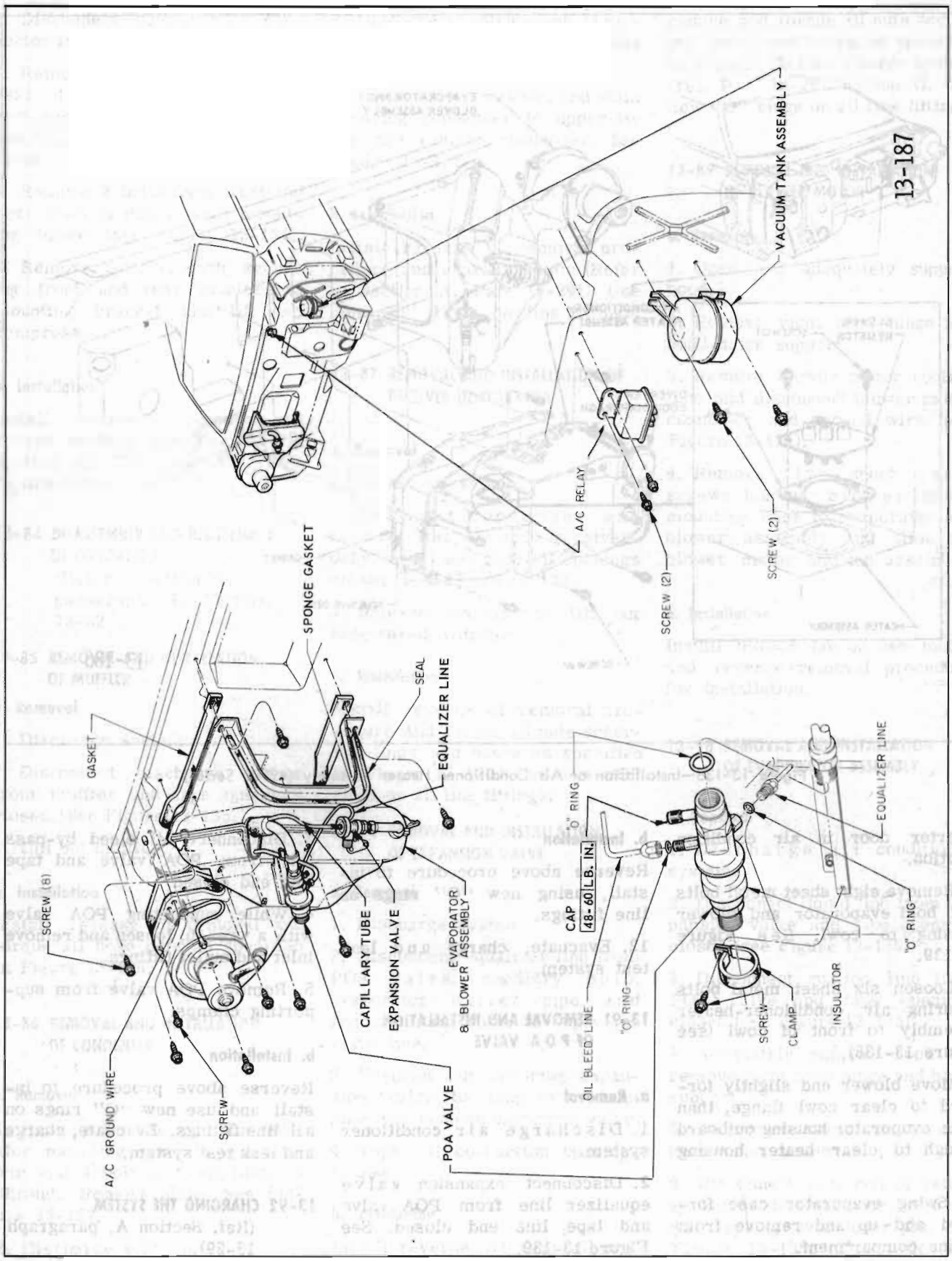

Figure 13-139—Installation of Evaporator Assembly & POA Valve (49000 Series)

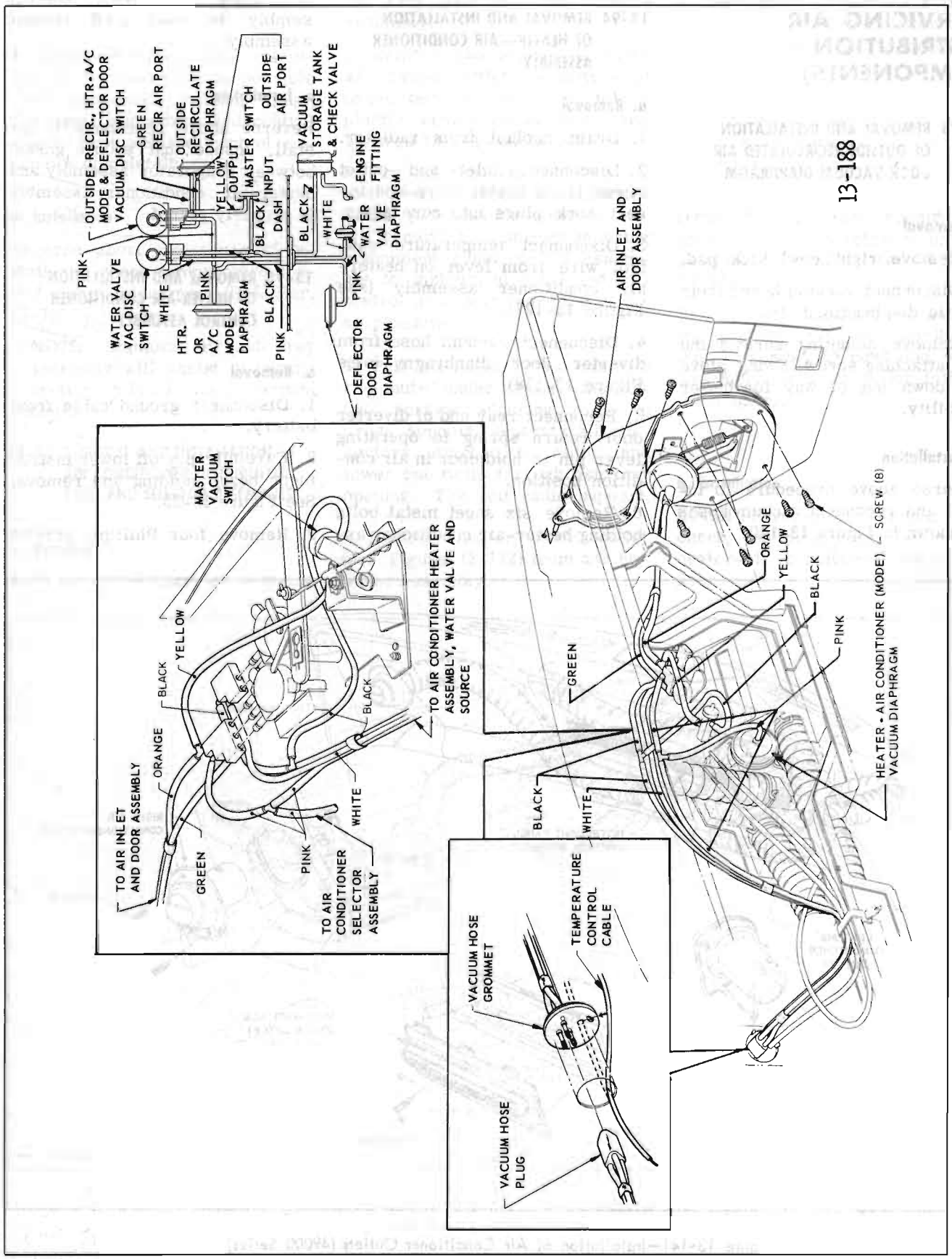

Figure 13-140—Vacuum Hose Layout (49000 Series)

(SERVICING AIR DISTRIBUTION COMPONENTS)

13-93 REMOVAL AND INSTALLATION OF OUTSIDE-RECIRCULATED AIR DOOR VACUUM DIAPHRAGM

a. Removal

1. Remove right cowl kick pad.

2. Disconnect vacuum hoses from plastic diaphragm.

3. Remove mounting screws and link attaching screw. Swing glove box down out of way for better visibility.

b. Installation

Reverse above procedure to install and reconnect vacuum hoses as shown in Figure 13-140.

13-94 REMOVAL AND INSTALLATION OF HEATER—AIR CONDITIONER ASSEMBLY

a. Removal

1. Drain coolant from radiator.

2. Disconnect inlet and outlet hoses from heater core and insert cork plugs into core pipes.

3. Disconnect temperature control wire from lever on heater-air conditioner assembly (see Figure 13-127).

4. Disconnect vacuum hose from diverter door diaphragm (see Figure 13-138).

5. Reconnect rear end of diverter door return spring to operating lever pin to hold door in air condition position.

6. Remove six sheet metal bolts holding heater-air conditioner assembly to cowl and remove assembly.

b. Installation

Reverse above procedure to install. Insure that sponge gasket between evaporator assembly and heater-air conditioner assembly is properly seated.

13-95 REMOVAL AND INSTALLATION OF HEATER-AIR CONDITIONER CONTROL ASSEMBLY

a. Removal

1. Disconnect ground cable from battery.

2. Carefully pry off lower instrument bezel molding and remove. See Figure 12-25.

3. Remove four Phillips screws

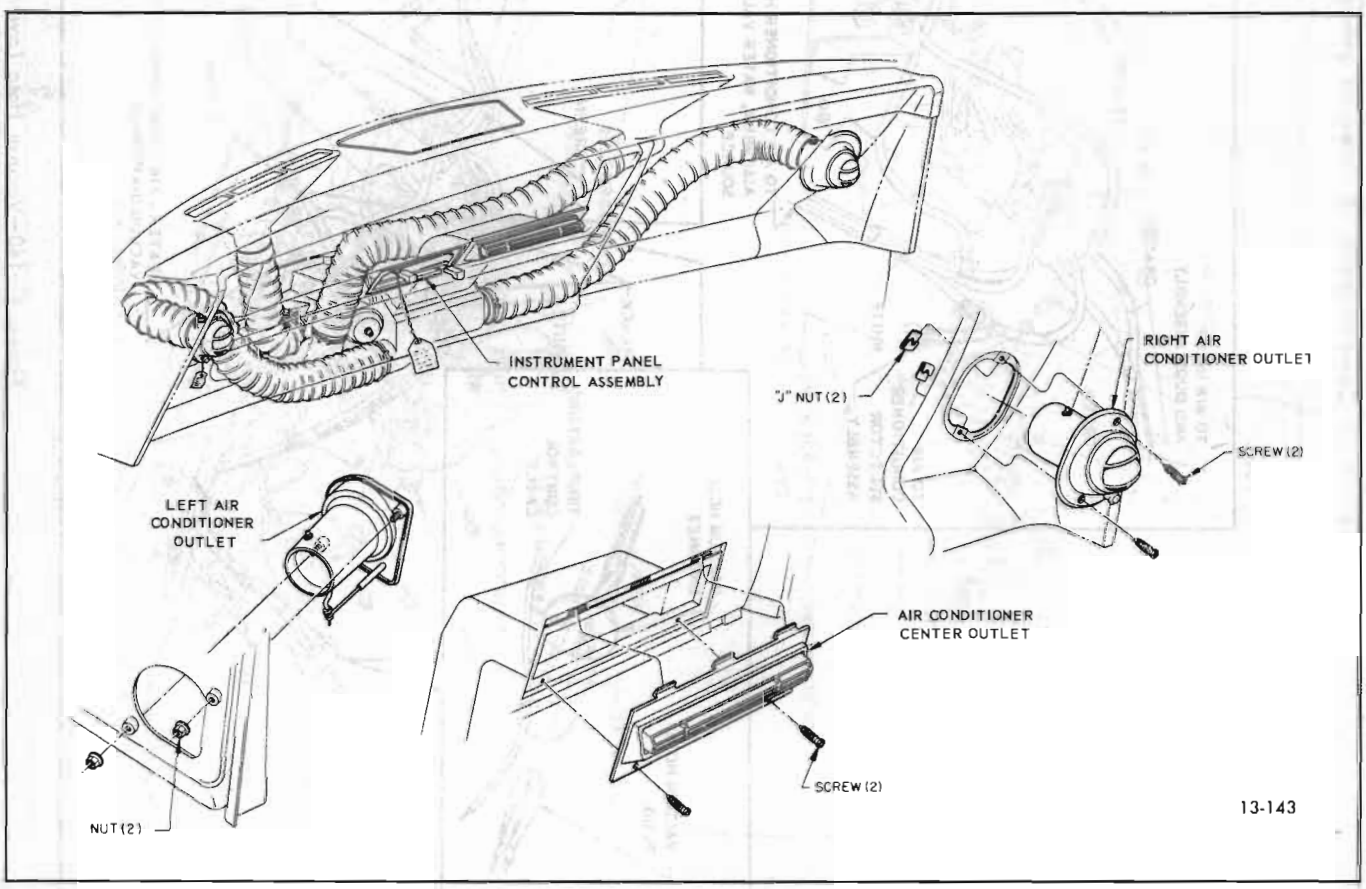

Figure 13-141—Installation of Air Conditioner Outlets (49000 Series)

holding control to instrument panel.

4. Carefully slide control assembly as far rearward as possible and disconnect vacuum lines, electrical connectors and control wires, then remove control assembly completely.

b. Installation

Reverse above procedure to install and check temperature control cable adjustment (Ref. Par. 13-72).

NOTE: Removal of ash tray assembly will assist in reconnecting wires and vacuum hoses.

13-96 REMOVAL AND INSTALLATION OF AIR CONDITIONER DISTRIBUTOR DUCT AND SELECTOR ASSEMBLIES

a. Removal

1. Take out six screws securing ash tray assembly and remove assembly.

2. Remove two screws securing a/c center outlet to instrument panel, take off outlet and pull out plastic center outlet duct. See Figures 13-141 and 13-142.

3. Pry off thin chrome strip on instrument panel (see Figure 12-25) just under a/c center outlet, remove four screws securing instrument panel control assembly to instrument panel and pull control assembly rearward as far as possible.

4. Pull off radio knobs, unscrew two nuts under knobs, unscrew two screws securing radio to cross support, separate all connectors attached to radio, and lower out radio through ash tray opening. Take off radio support.

5. Remove heater floor outlet (see Figure 13-142) from a/c selector assembly.

6. Disconnect all air hoses from a/c selector and distributor duct assemblies and position hoses out of way.

7. Disconnect defroster control wire from defroster door lever on air conditioner selector assembly.

8. Disconnect pink vacuum hose from heater-air conditioner (mode) vacuum diaphragm on a/c selector assembly (see Figure 13-140).

9. Take off three screws securing a/c selector and distributor duct assembly to cowl and work assembly out from under instrument panel.

b. Installation

Install reverse of removal and check for proper functioning of heater-air conditioner mode air door.

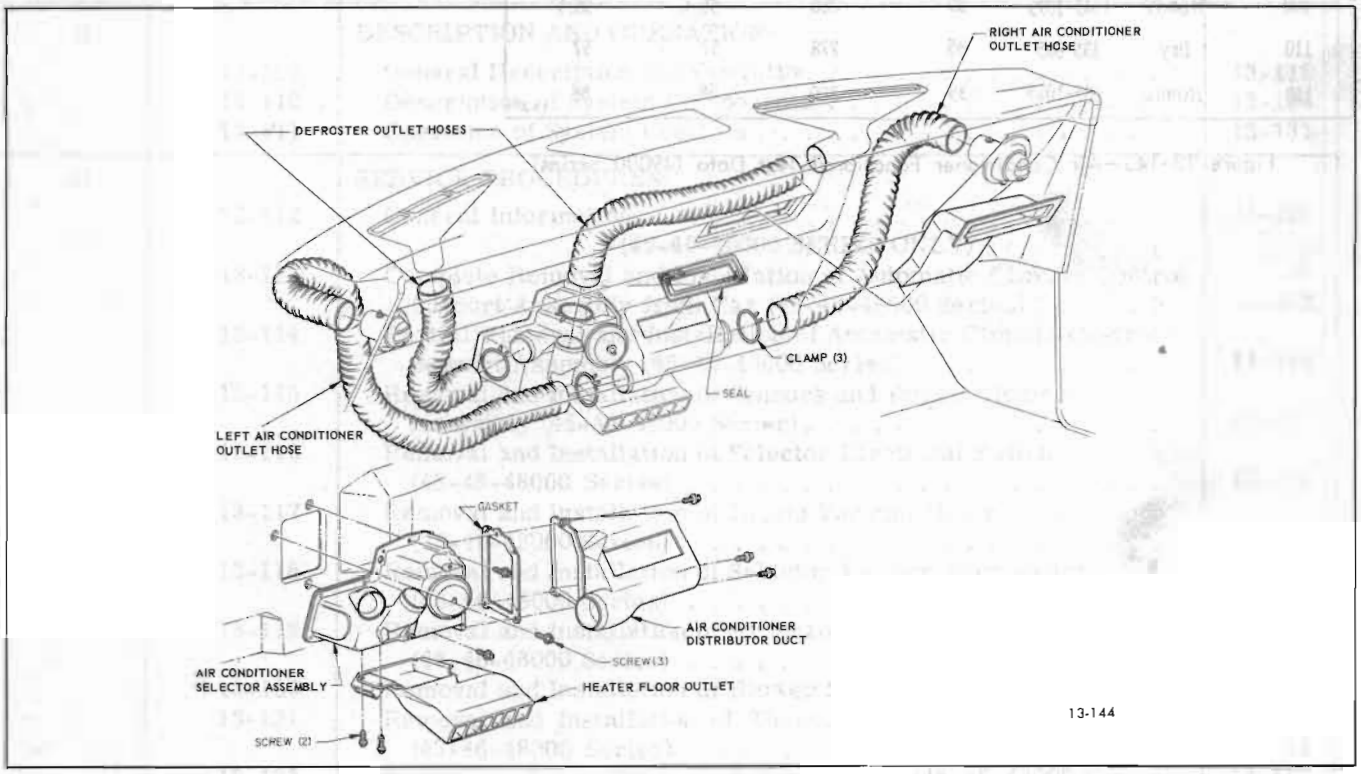

Figure 13-142—Installation of Air Conditioner Distributor Duct, Selector Assembly, Heater Floor Outlet and Hosing (49000 Series)

TEST NO. 1

Ambient Temperature (°F)	Evaporator Pressure at POA Valve (PSIG)	Compressor Head Pressure (PSIG)	Left outlet Temperature (°F)	Right outlet temperature (°F)
70	28-30	200-250	42-44	42-45
80	28-30	220-275	45-48	45-48
90	28-30	250-310	46-49	46-49
100	28-30	275-330	48-54	49-54
110	28-30	290-350	50-55	50-55

TEST NO. 2

Ambient Temperature (°F)	Relative Humidity	Engine R. P. M.	Evaporator Pressure at POA Valve (PSIG)	Compressor Head Pressure (PSIG)	Left outlet temperature (°F)	Right outlet temperature (°F)
70	Dry	390-410	30	135	46.5	46.5
70	Humid	515-535	35	160	50	50
80	Dry	450-470	35	175	51.5	51
80	Humid	720-740	35	210	55	55
90	Dry	560-590	35	205	52.5	52.5
90	Humid	845-875	35	240	54	54
100	Dry	745-760	35	252	55.5	55.5
100	Humid	1045-1075	35	280	58.5	58.5
110	Dry	835-865	35	278	57	57
110	Humid	985-1015	35	300	58	58

13-27

Figure 13-143—Air Conditioner Functional Test Data (49000 Series)

DIVISION IV

TROUBLE DIAGNOSIS

13-97 TROUBLE DIAGNOSIS

Ref. Division IV of Section A, paragraphs 13-33, 13-34, and 13-35. Ref. Figure 13-143 for functional test specifications.