

SECTION C

49000 HEATER—AIR CONDITIONER SYSTEM

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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 Pulley022" to .057"
Clutch Type	Magnetic
Belt Tension	110 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	180°
Capacity of Cooling System with Air Conditioner	18.2 Qts.

13-72 ADJUSTMENT OF WARMER LEVER AND TEMPERATURE DOOR

full cold or left position.

made for the adjustment of the defroster control wire.

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.

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.

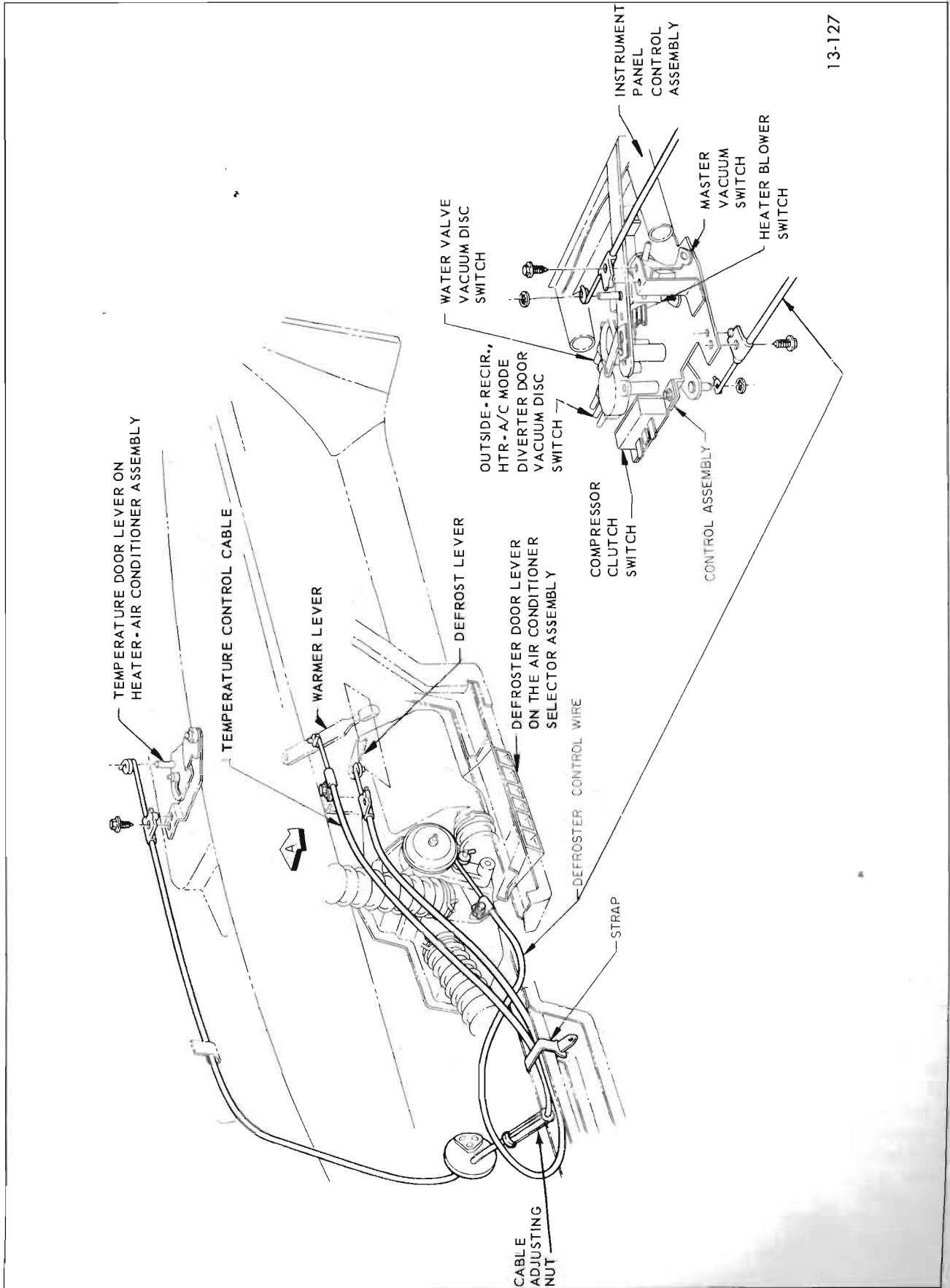
2. Adjust nut to provide 1/8" to 3/16" lever spring-back from the

NOTE: No provisions are

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



13-127

Figure 13-127—Control Cable Installation

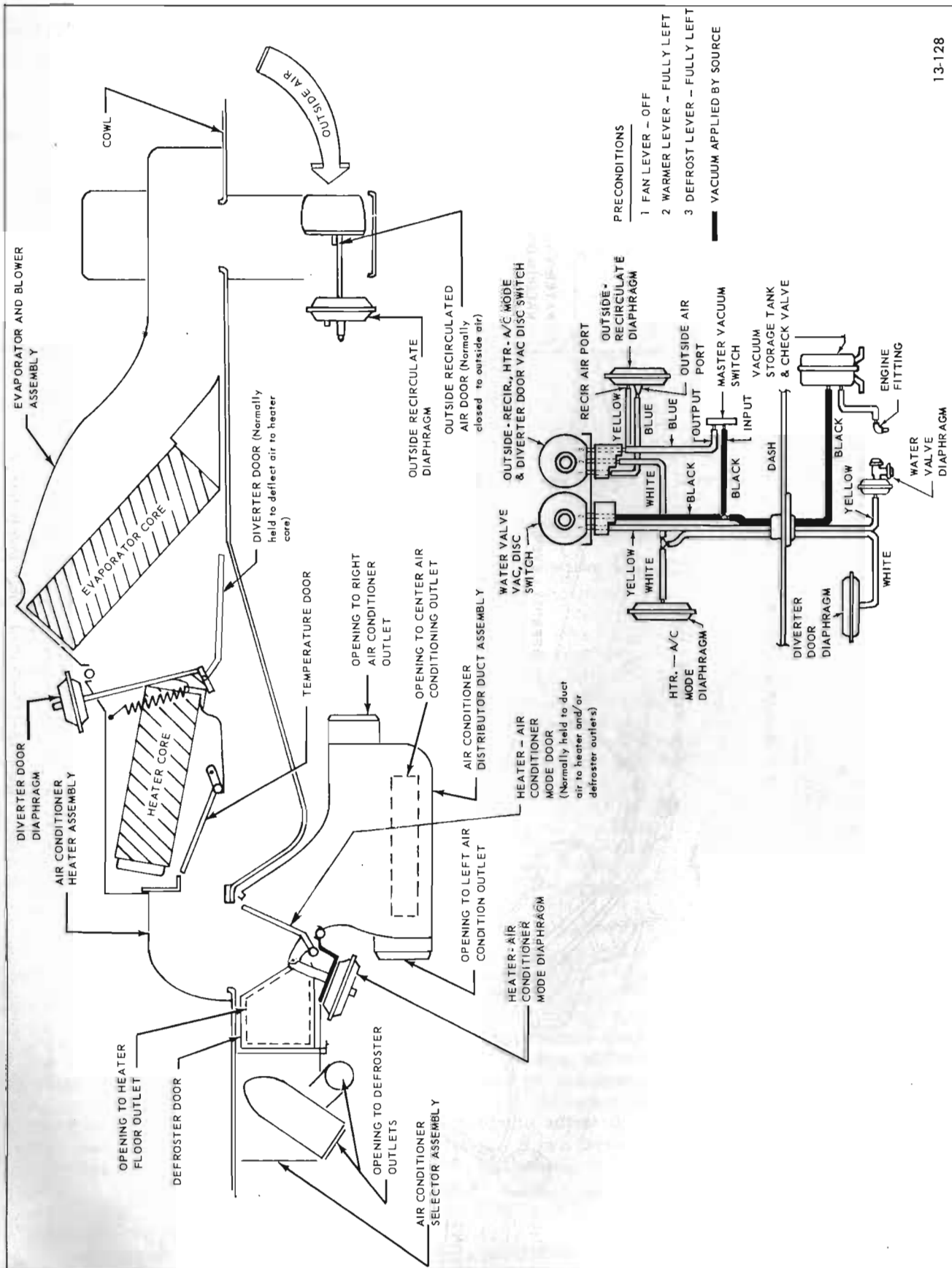


Figure 13-128—Heater - Air Conditioner System - Controls Off

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 de-fog 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 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.

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 diverter 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 refrigerant system.

b. Air Flow During Heater Mode of Operation

During heater operation, the Climate Control lever is in HTR po-

sition. 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

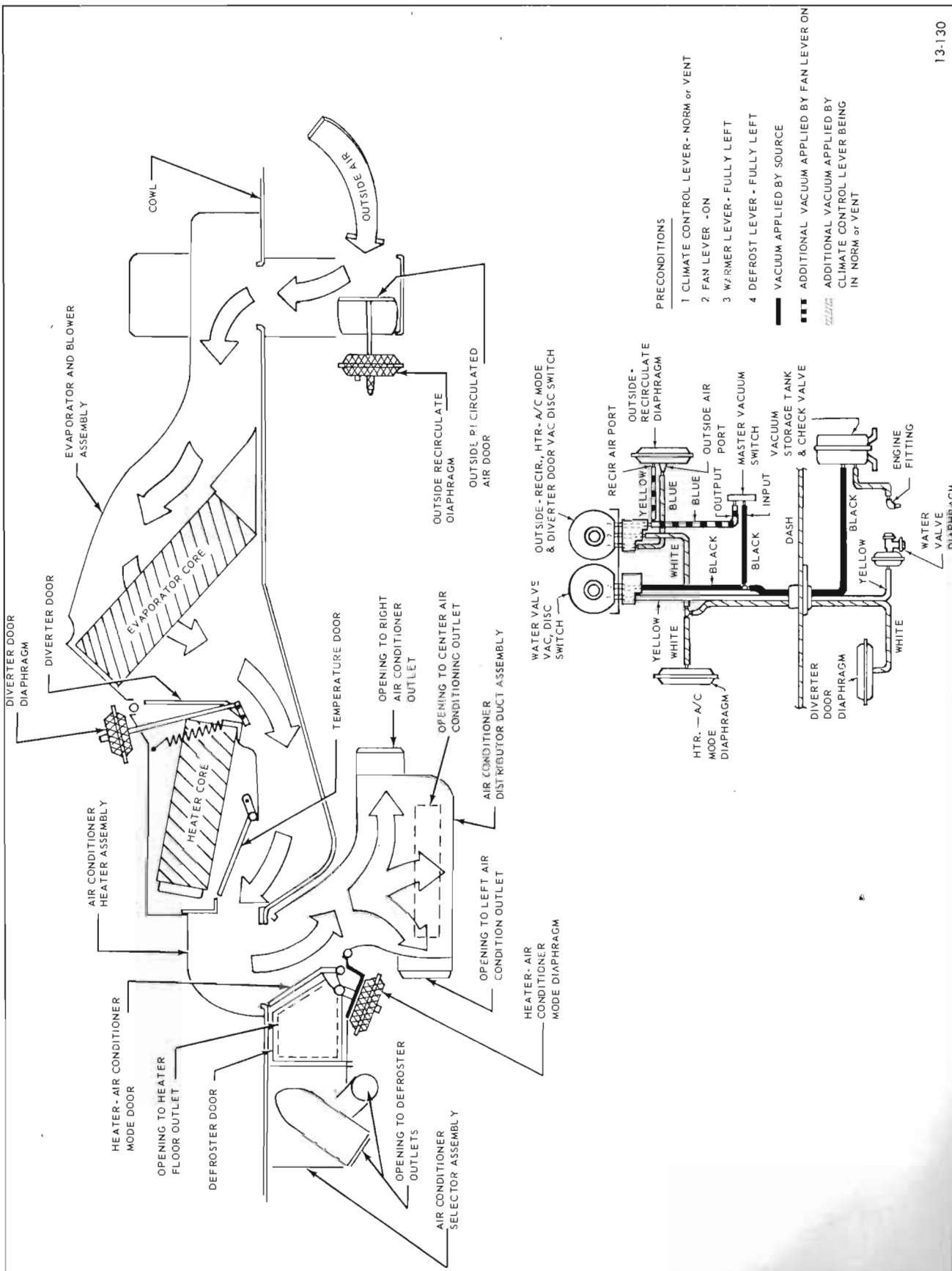
During simultaneous air conditioner and heater operation, the controls are set and the air flow is directed as described and shown in Figure 13-132. The air flow is similar to that for air conditioner only operation, with the exception that the Temperature door is opened as required to attain the desired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

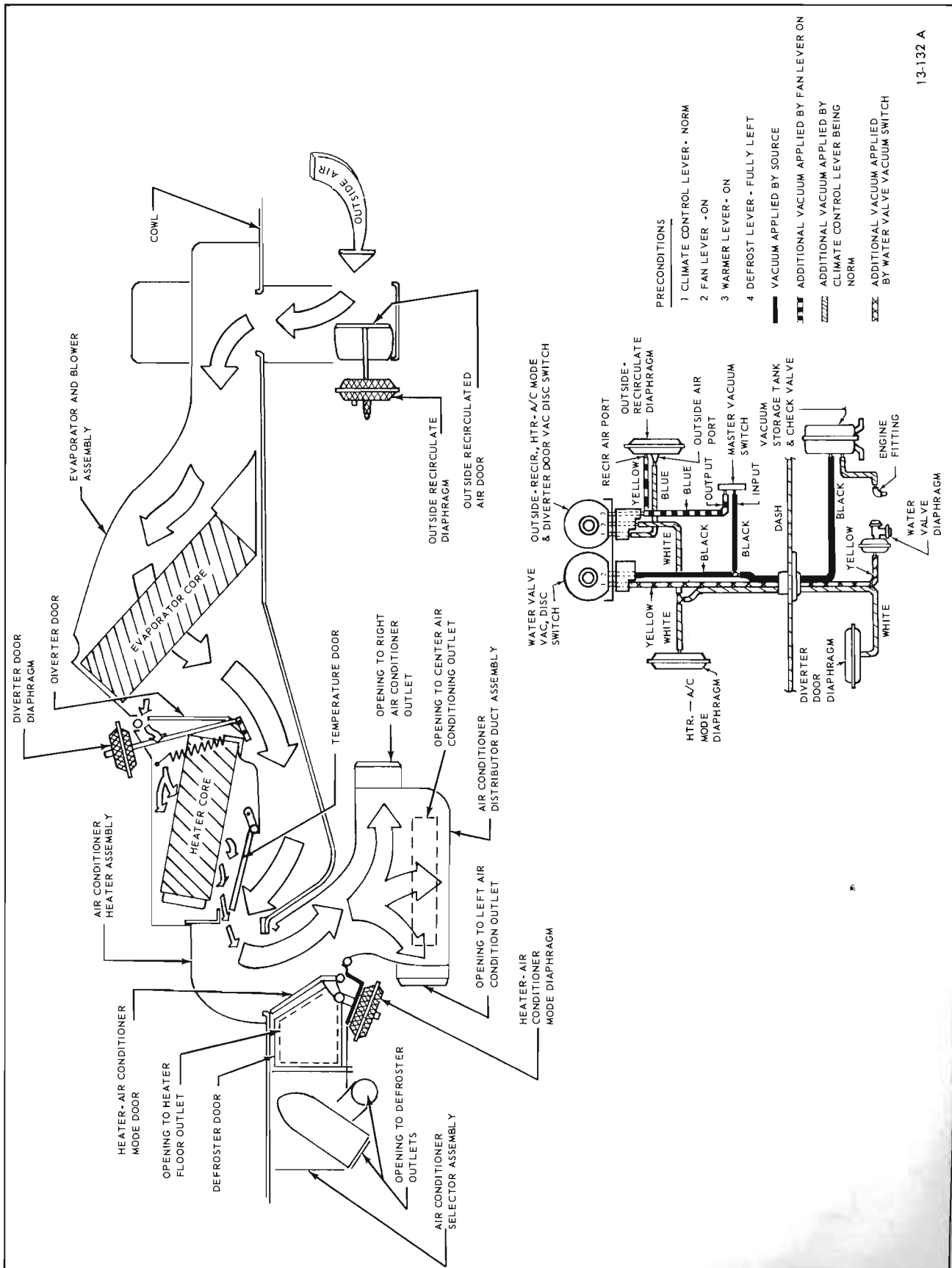
a. Fan Lever

This lever operates the Heater Blower electrical switch (see Figure 13-134) and the Master Vacuum switch. Three blower speeds (low, medium and high) are provided by movement of the lever. A fourth blower speed (low-low) is available when the Climate Control lever is in RECIR or NORM detents. Initial movement of the Fan Lever to



13-130

Figure 13-130—Air Flow During NORM or VENT Operation



13-132 A

Figure 13-132—Air Flow During Both Air Conditioner and Heater Operation

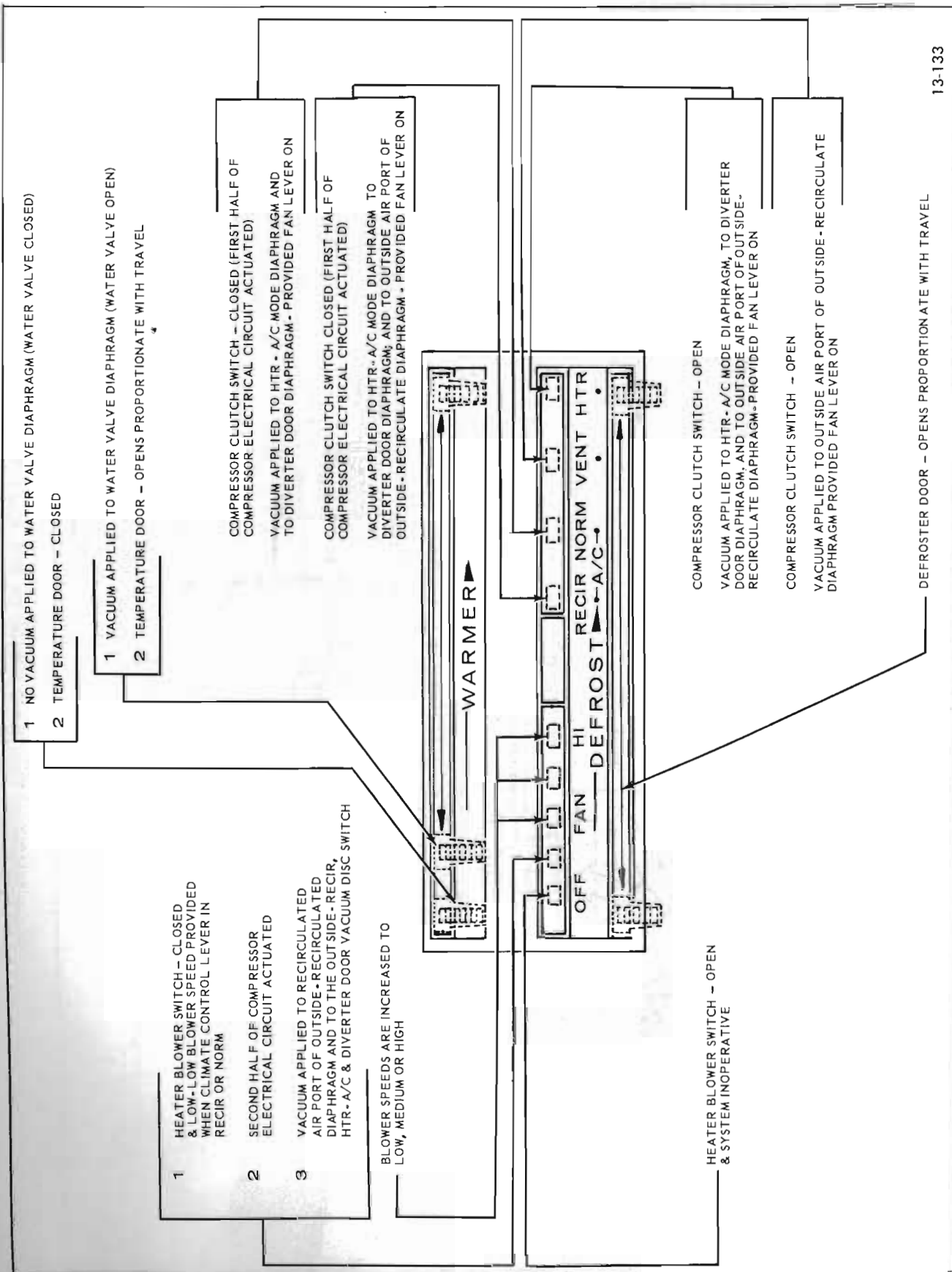
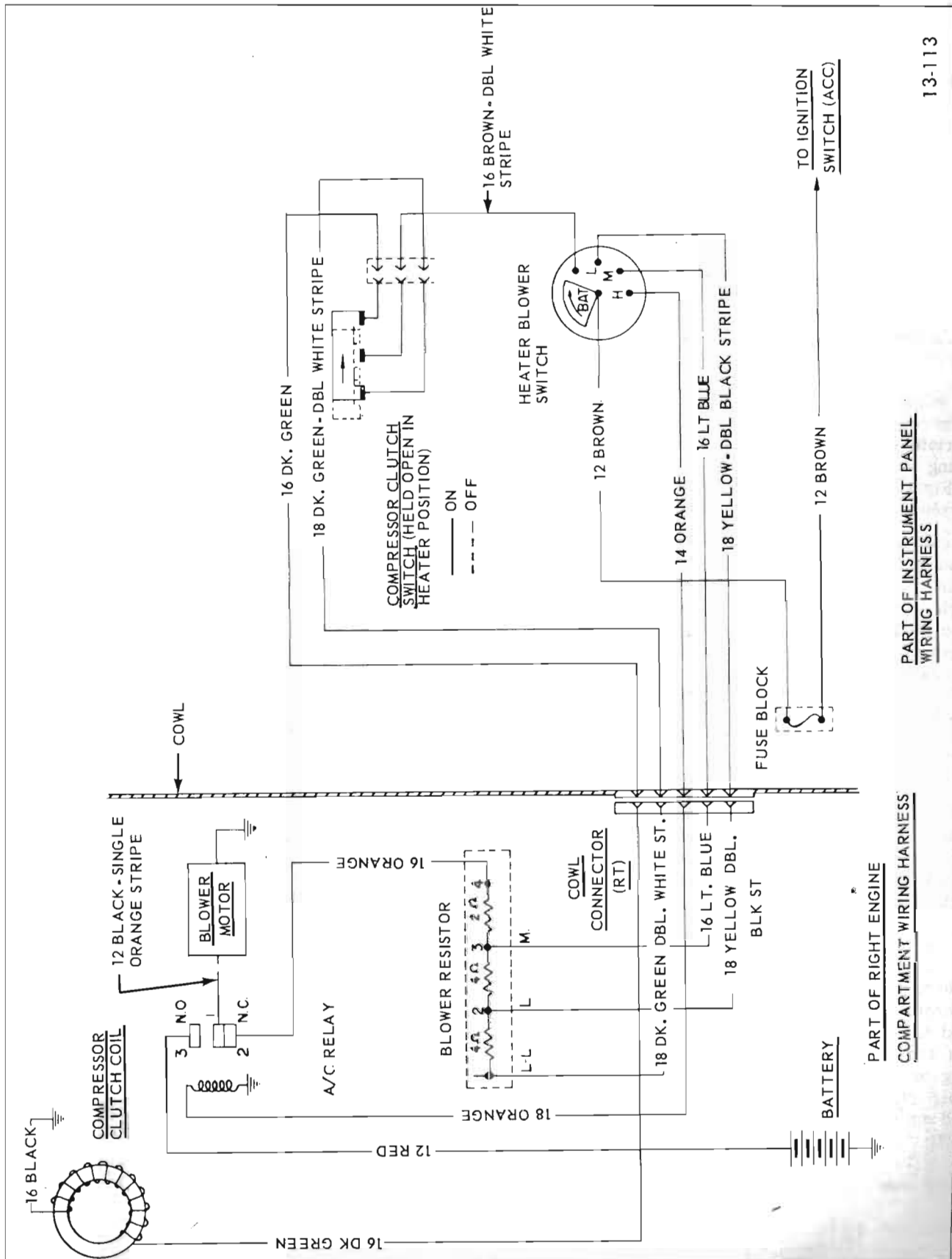


Figure 13-133—Heater - Air Conditioner Controls



13-113

PART OF INSTRUMENT PANEL WIRING HARNESS

PART OF RIGHT ENGINE COMPARTMENT WIRING HARNESS

Figure 13-134—Heater - Air Conditioner System Schematic

the first detent 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 diaphragms 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 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 B, Paragraph 13-46)

DIVISION III

SERVICE PROCEDURES (SERVICING REFRIGERANT CHARGED COMPONENTS)

13-79 GENERAL SERVICE INFORMATION AND SAFETY PRECAUTIONS

(Refer to Section A, Paragraph 13-14)

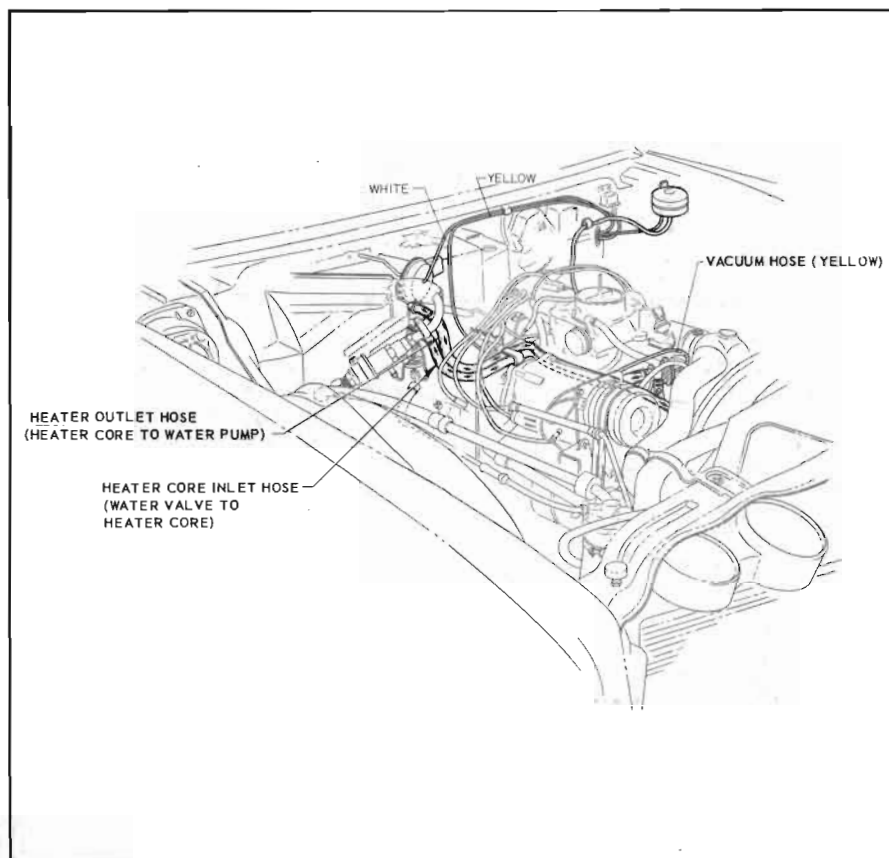


Figure 13-135—Installation of Heater Hoses

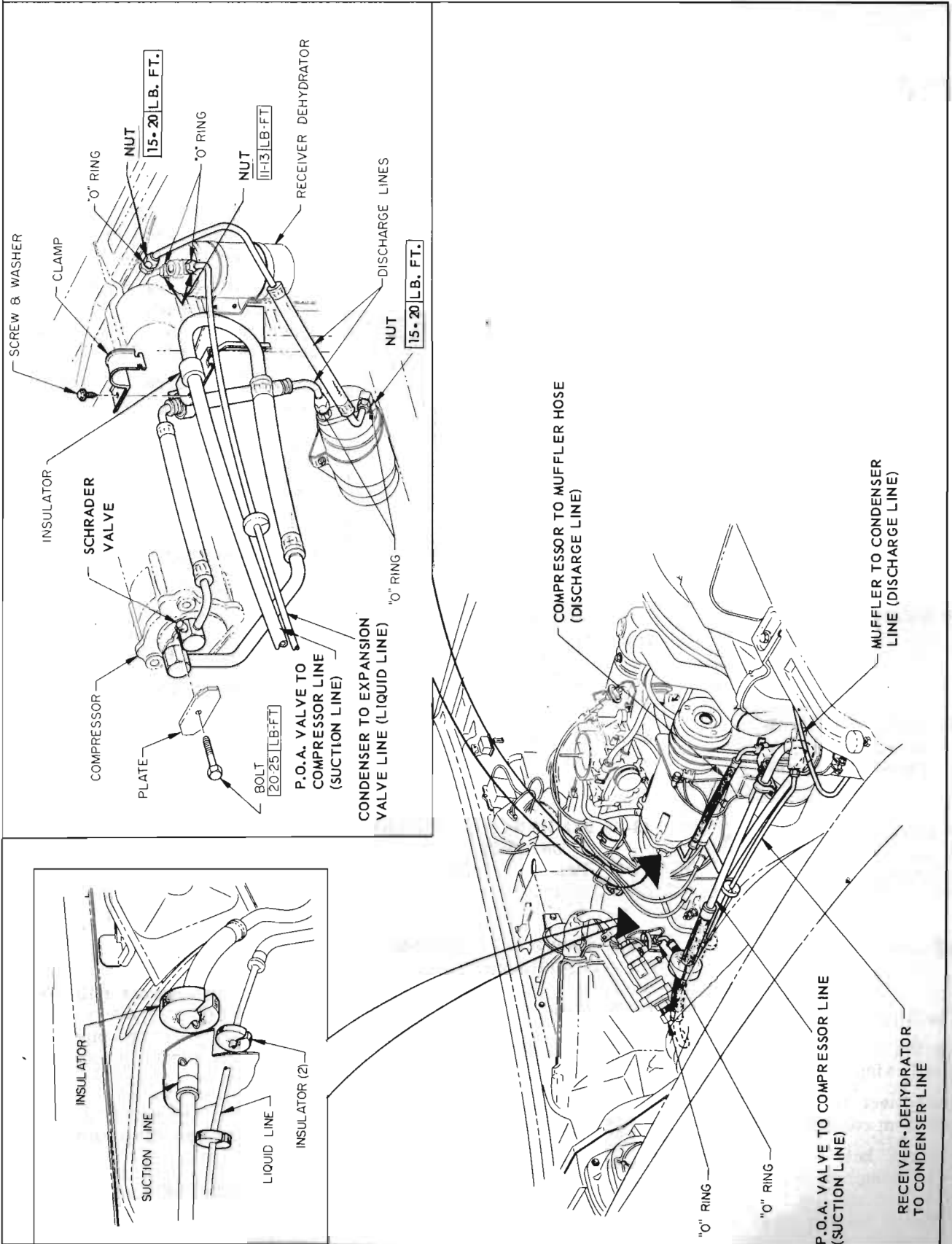


Figure 13-136—Engine Compartment Refrigerant Line Layout

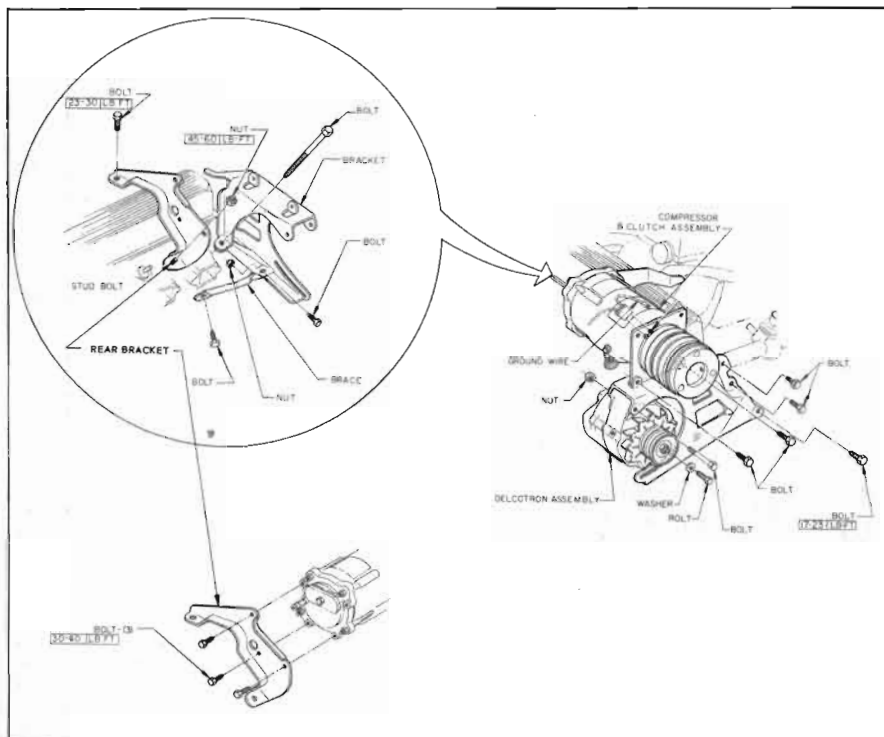


Figure 13-137—Installation of Compressor

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

1. Discharge system.
2. Loosen locking nut and Delcotron and swing inboard.
3. Disconnect two (2) wire connector from compressor.
4. Remove bolt and plate from rear of compressor and disconnect suction and discharge lines. See Figure 13-136. Tape refrigerant lines closed.

5. Remove two (2) bolts from front of compressor and three (3) from rear bracket and lift out compressor. See Figure 13-137.

6. Install reverse of removal procedure.

13-84 DISASSEMBLY AND REASSEMBLY OF COMPRESSOR

(Refer to Section A,
Paragraphs 13-20 thru 13-22)

13-85 REMOVAL AND INSTALLATION OF MUFFLER

1. Discharge system.
2. Disconnect discharge lines from muffler and tape openings closed. See Figure 13-136.
3. Remove two (2) bolts securing muffler bracket to support and remove. Remove muffler from underside of car.
4. Install reverse of removal procedure.

13-86 REMOVAL AND INSTALLATION OF CONDENSER

1. Remove three (3) bolts securing radiator mounting plate to upper tie bar and one (1) bolt securing plate to shroud. Remove plate. See Figure 13-138.
2. Discharge system.
3. Disconnect refrigerant lines from condenser and tape.
4. Remove bolt, washer, and shim securing condenser bracket to upper tie bar and remove condenser. See Figure 13-138.
5. Install reverse of removal procedure.

13-87 REMOVAL AND INSTALLATION OF RECEIVER-DEHYDRATOR

1. Discharge system.
2. Disconnect condenser and liquid line from receiver-dehydrator and tape openings closed. See Figure 13-136.
3. Release clamps and lift out receiver-dehydrator. See Figure 13-138.
4. Install reverse of removal procedure.

13-88 REMOVAL AND INSTALLATION OF EXPANSION VALVE

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.
4. Tape all connections.
5. Install reverse of removal procedure.

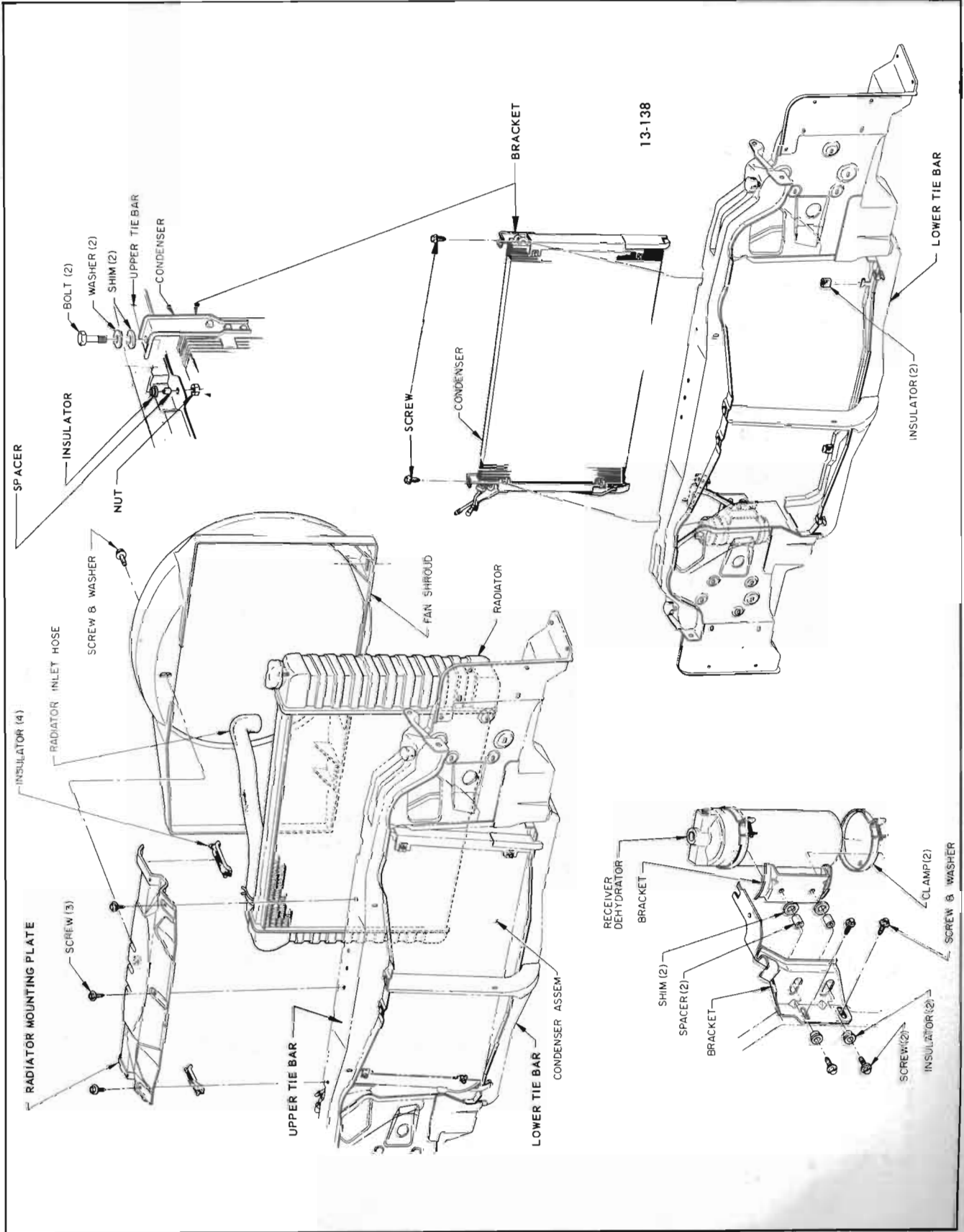
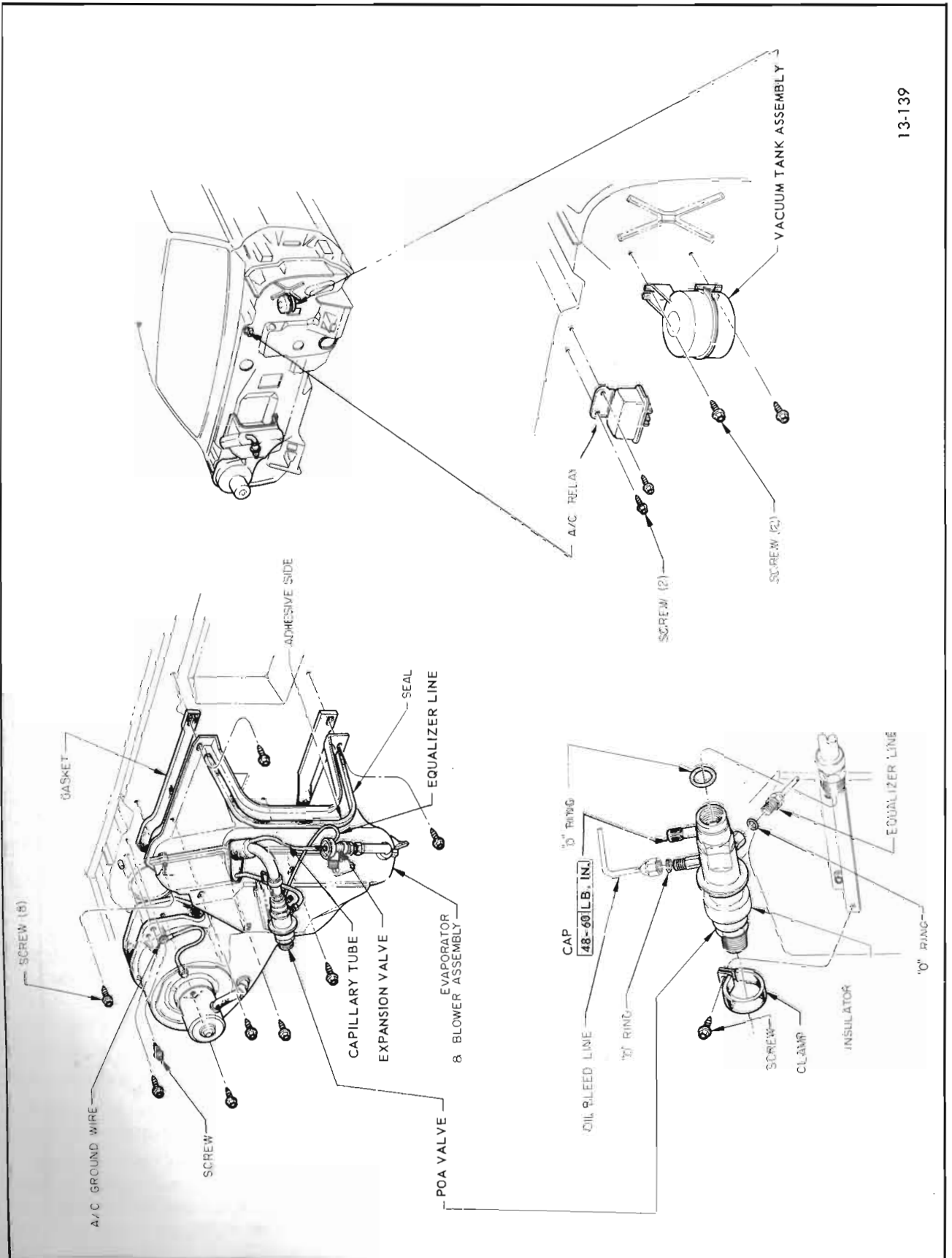


Figure 13-138—Installation of Receiver-Dehydrator and Condenser



13-139

Figure 13-139—Installation of Evaporator Assembly & POA Valve

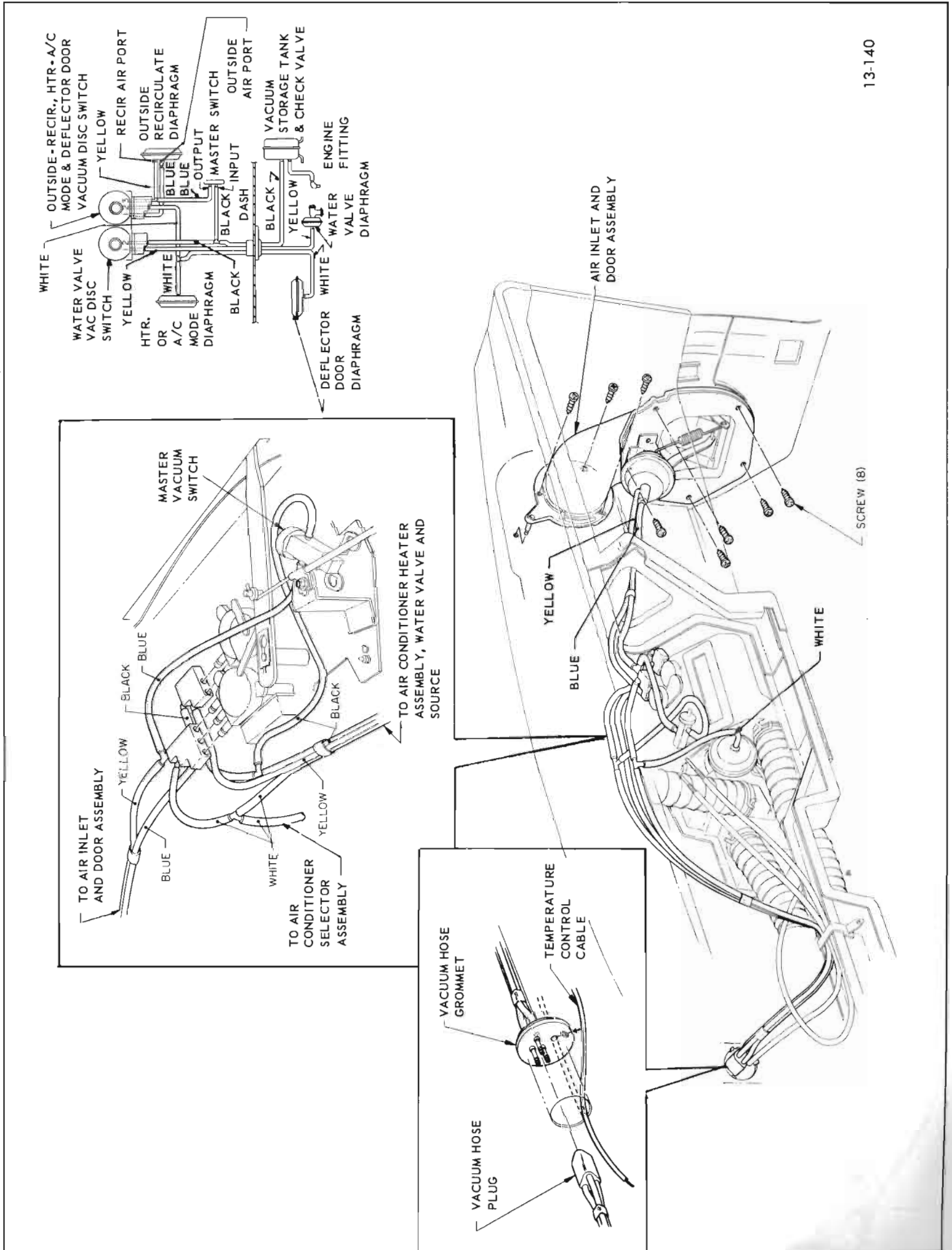


Figure 13-140—Vacuum Hose Layout

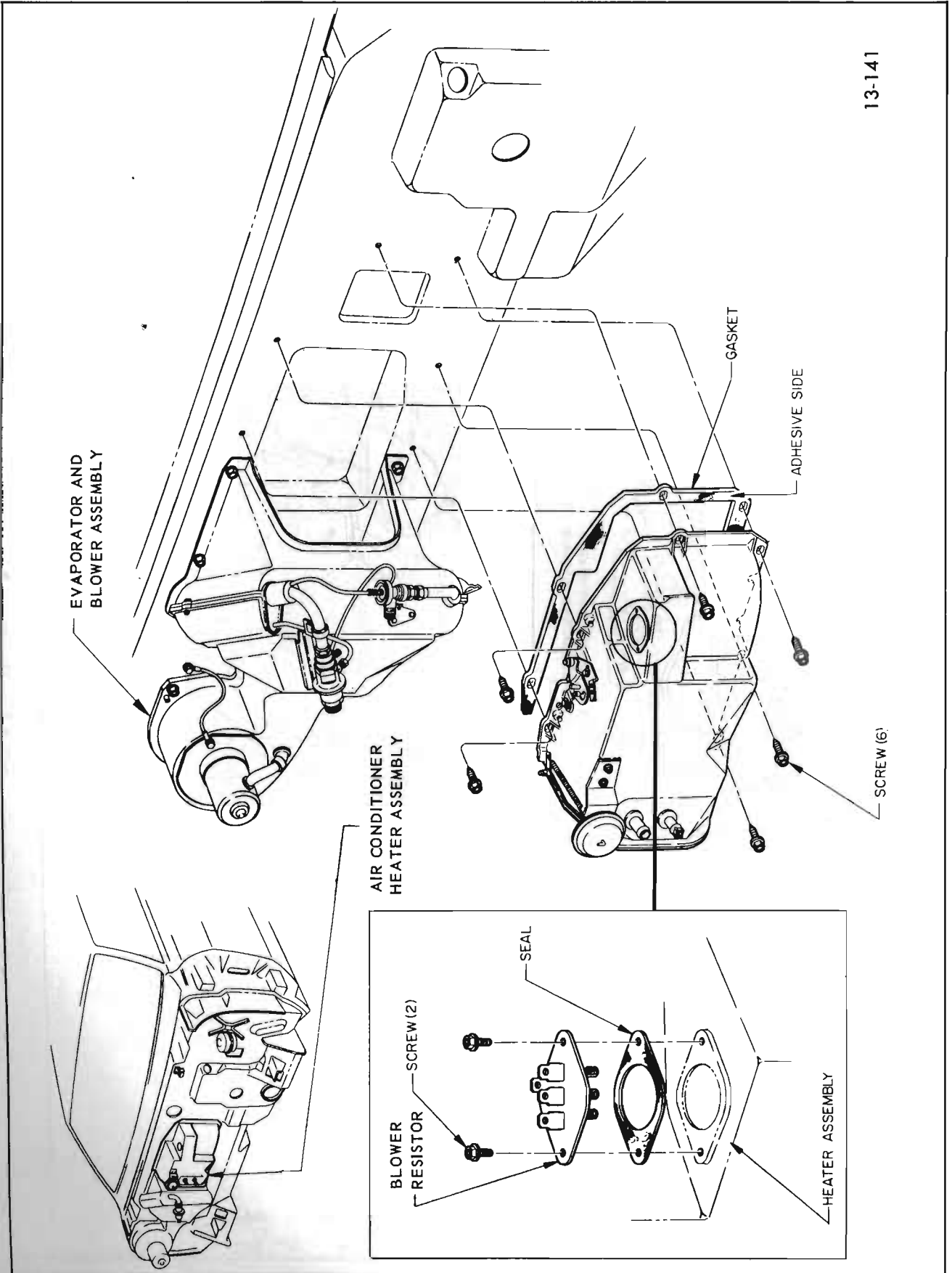


Figure 13-141—Installation of Air Conditioner Heater Assembly

<u>TEST NO. 1</u>						
<u>Ambient Temperature (°F)</u>			<u>Evaporator Pressure at POA Valve (PSIG)</u>	<u>Compressor Head Pressure (PSIG)</u>	<u>Left outlet Temperature (°F)</u>	<u>Right outlet temperature (°F)</u>
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

<u>TEST NO. 2</u>						
<u>Ambient Temperature (°F)</u>	<u>Relative Humidity</u>	<u>Engine R. P. M.</u>	<u>Evaporator Pressure at POA Valve (PSIG)</u>	<u>Compressor Head Pressure (PSIG)</u>	<u>Left outlet temperature (°F)</u>	<u>Right out let temperature (°F)</u>
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

Figure 13-142—Air Conditioner Functional Test Data - 49000 Series

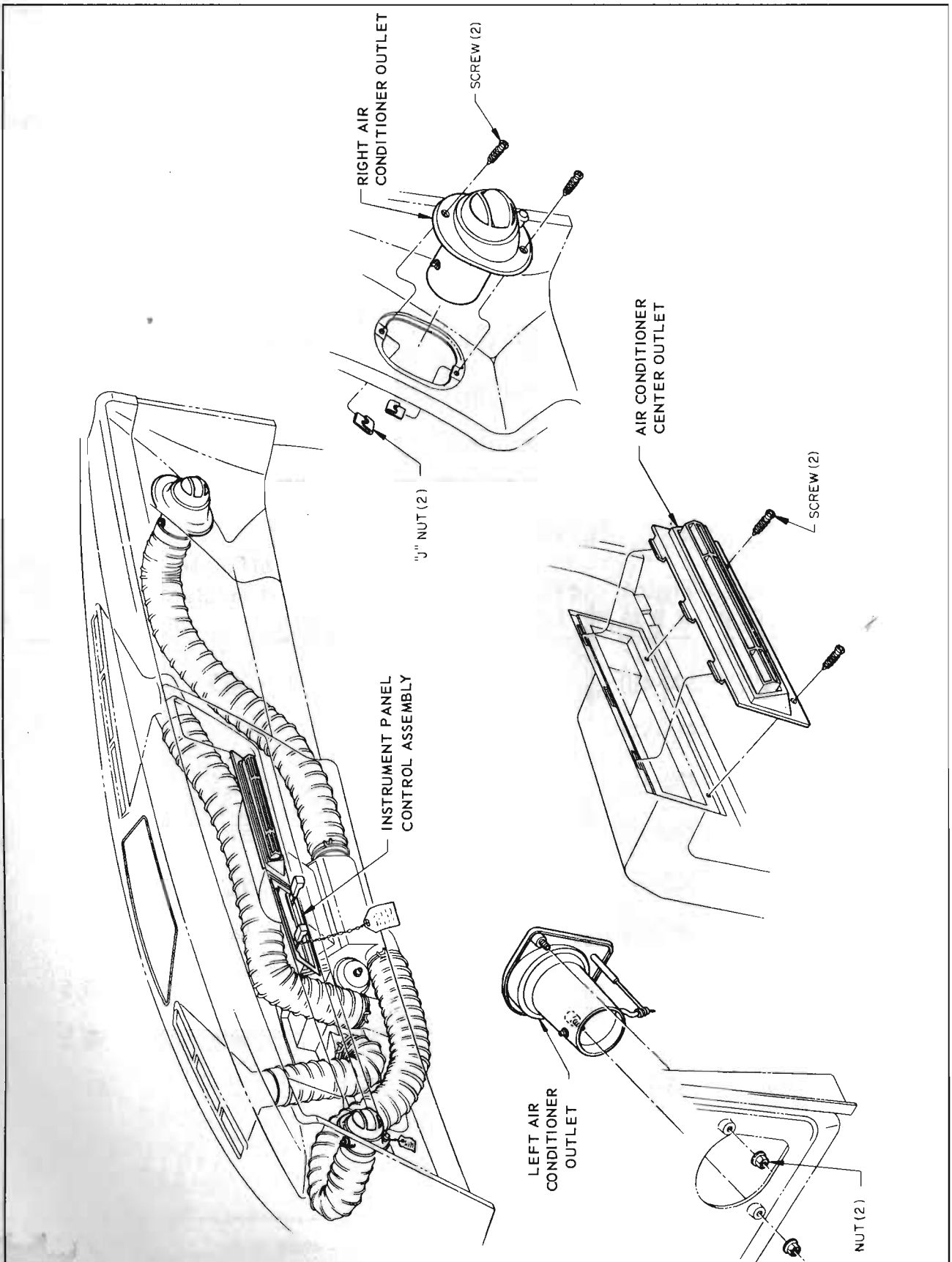
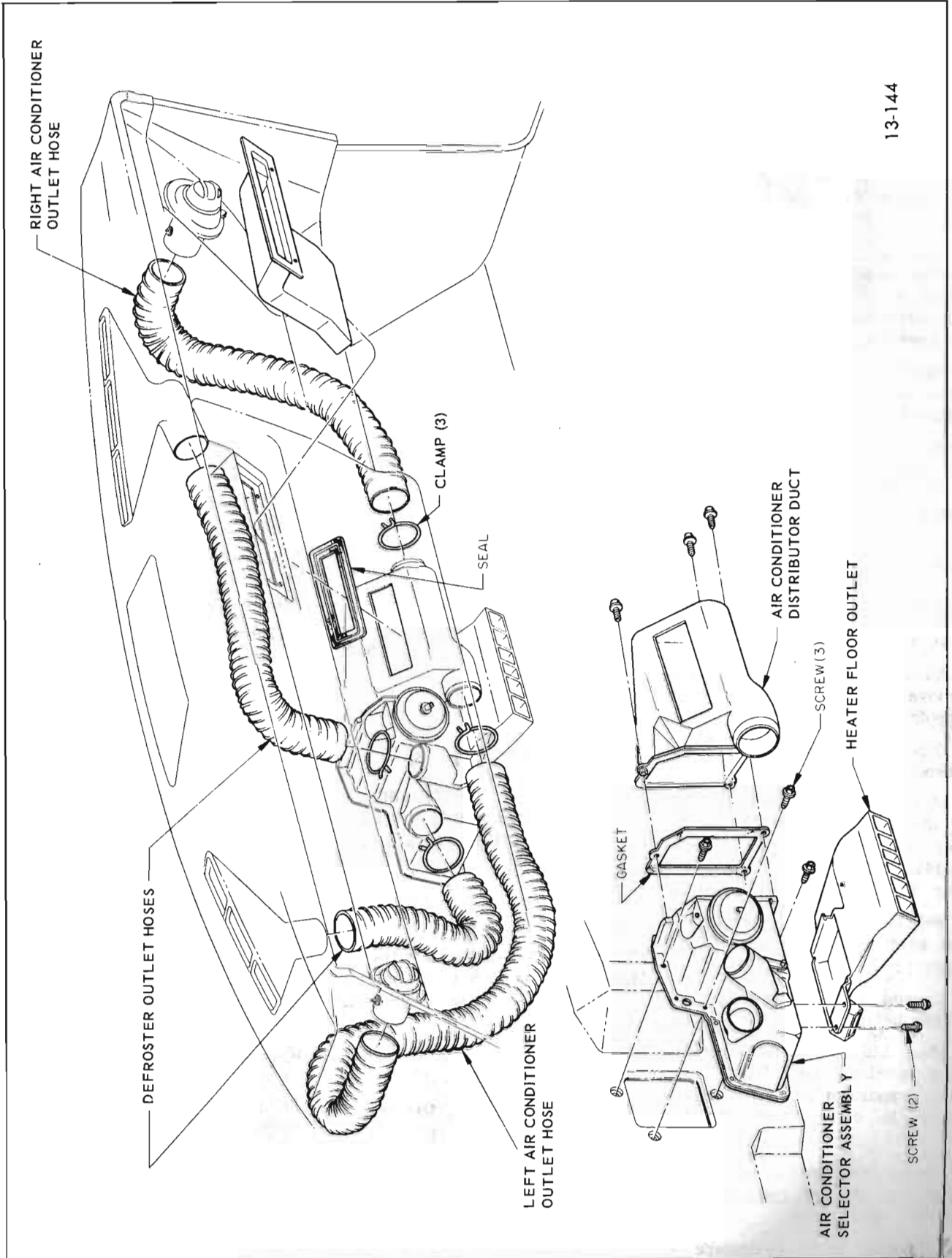


Figure 13-143—Installation of Air Conditioner Outlet



13-144

Figure 13-144—Installation of Air Conditioner Distributor Duct, Selector Assembly, Heater Floor Outlet and Hosing

**13-89 REMOVAL AND INSTALLATION
OF BLOWER MOTOR**

1. Open and adequately support hood.
2. Remove right hood hinge and hood hinge support.
3. Remove blower cooling tube and disconnect blower hot wire and ground wire.
4. Remove five sheet metal screws holding blower motor mounting base to blower housing and slide out blower motor and fan assembly.
5. Install blower fan on new motor and reverse removal procedure for installation.

**13-90 REMOVAL AND INSTALLATION
OF EVAPORATOR ASSEMBLY**

1. Discharge air conditioner system.
2. Disconnect liquid line from expansion valve and tape openings.
3. Disconnect suction line from POA valve, tape openings, and move out of the way.
4. Adequately support hood and remove right hood hinge and hinge support.
5. Disconnect blower hot and ground wires.
6. Move rear end of return spring on diverter door lever to hook over lever pin. See Figure 13-141. This will hold diverter door in air condition position.
7. Remove eight sheet metal bolts that hold evaporator and blower housing to firewall.
8. Loosen six sheet metal bolts holding heater housing to firewall.
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.
11. 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 POA VALVE**

1. Discharge air conditioner system.
2. Disconnect expansion valve equalizer line from POA valve and tape line end.
3. Disconnect oil bleed by-pass line from POA valve and tape line end.
4. While supporting POA valve with another wrench, loosen and remove inlet and outlet fittings.
5. Remove POA valve from supporting clamps.
6. Reverse above procedure to install, using new "O" rings.
7. Evacuate, charge and leak test system.

13-92 CHARGING THE SYSTEM

See Section A, Paragraph 13-29.

**(SERVICING AIR
DISTRIBUTION
COMPONENTS)****13-93 REMOVAL AND INSTALLATION
OF OUTSIDE-RECIRCULATED AIR
DOOR VACUUM DIAPHRAGM**

1. Remove right cowl kick pad.
2. Pull hoses from plastic diaphragm cover.
3. Remove mounting screws and link attaching screw. Swing glove box down out of way for better visibility.
4. Reverse above procedure to install.

**13-94 REMOVAL AND INSTALLATION
OF HEATER ASSEMBLY**

1. Drain coolant from radiator.
2. Disconnect inlet and outlet hoses from heater core.
3. Disconnect temperature con-

trol wire and housing from lever and mounting.

4. Disconnect vacuum tube from diverter door diaphragm.
5. Move rear end of diverter door return spring over to operating lever pin to hold door in air condition position.
6. Remove six sheet metal bolts holding heater housing to firewall.
7. Remove core and housing from engine compartment.
8. Reverse above procedure to install, being careful of sponge gasket between heater housing and evaporator housing.

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

1. Disconnect battery ground cable from battery.
2. Carefully pry lower instrument bezel molding and remove. See Figure 12-13.
3. Remove four Phillips screws holding control plate to instrument panel.
4. Carefully slide control assembly as far rearward as possible before disconnecting vacuum, electrical and bowden wire connectors. Then remove control assembly completely.
5. Reverse above procedure to install and check temperature bowden cable adjustment.

NOTE: Removal of ash tray assembly may assist in re-connecting wires and vacuum hoses.

DIVISION IV**TROUBLE
DIAGNOSIS****13-96 TROUBLE DIAGNOSIS**

See Division IV of Section B, paragraph 13-65.

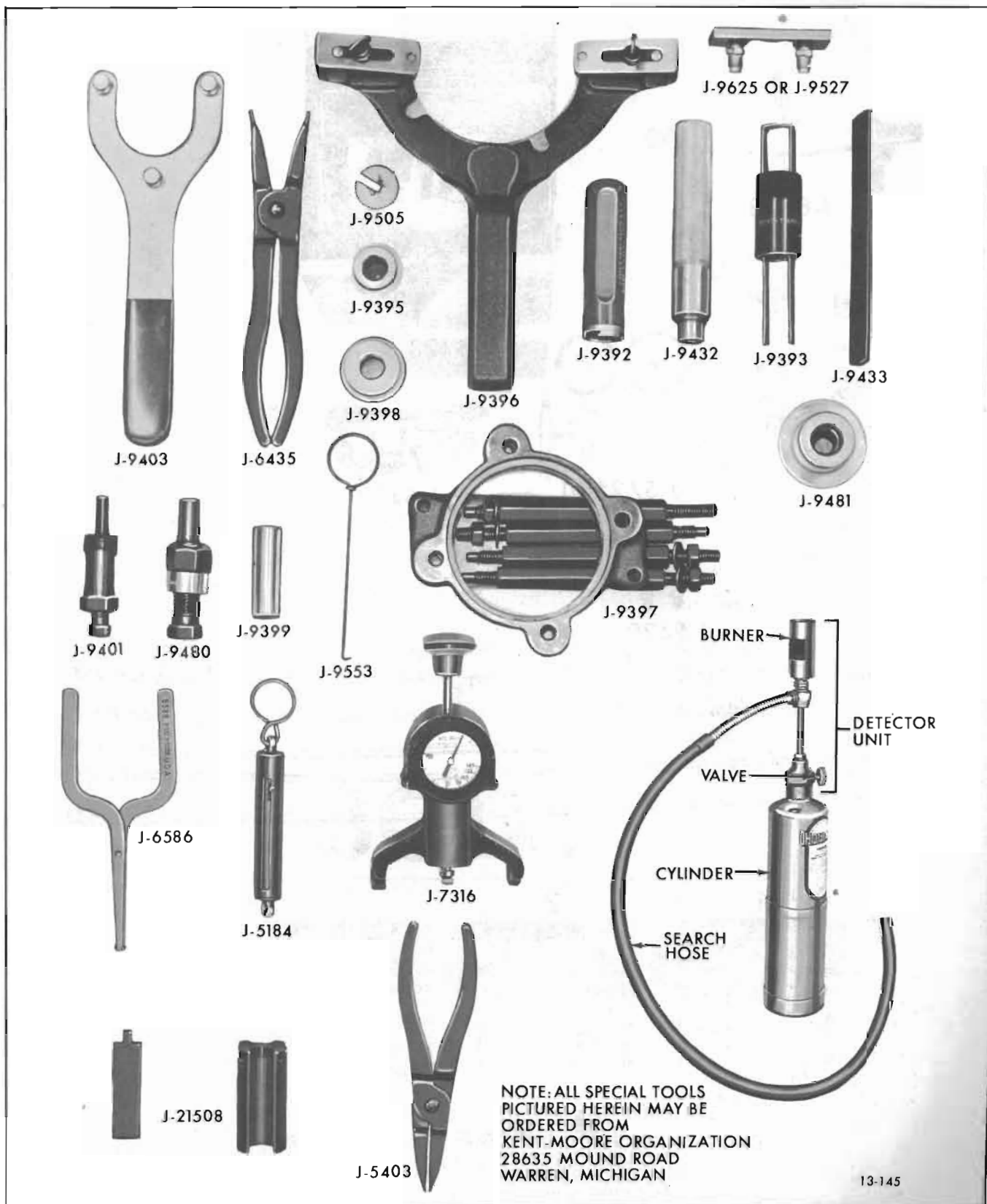


Figure 13-145—A/C Service Tools

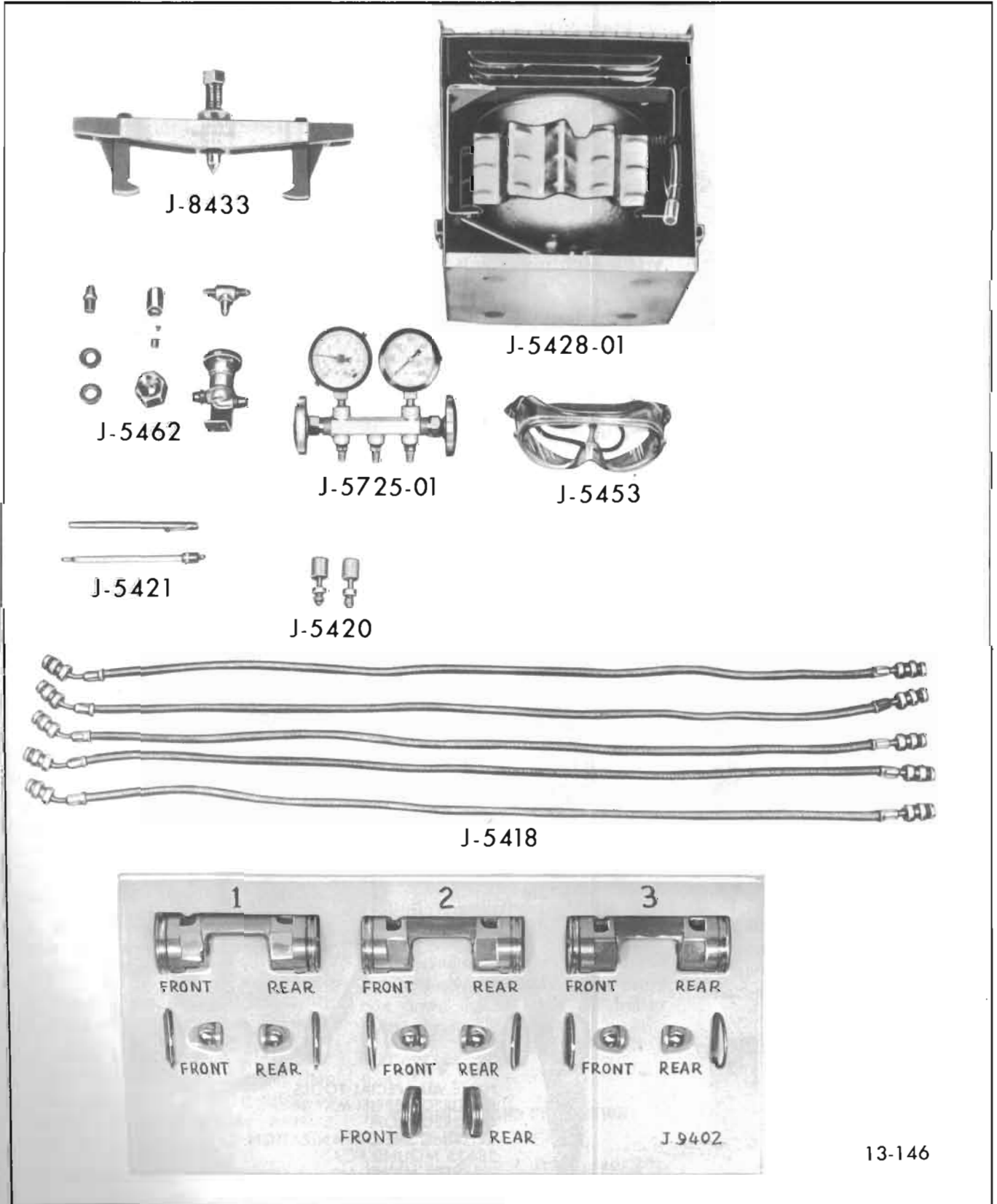


Figure 13-146—A/C Service Tools