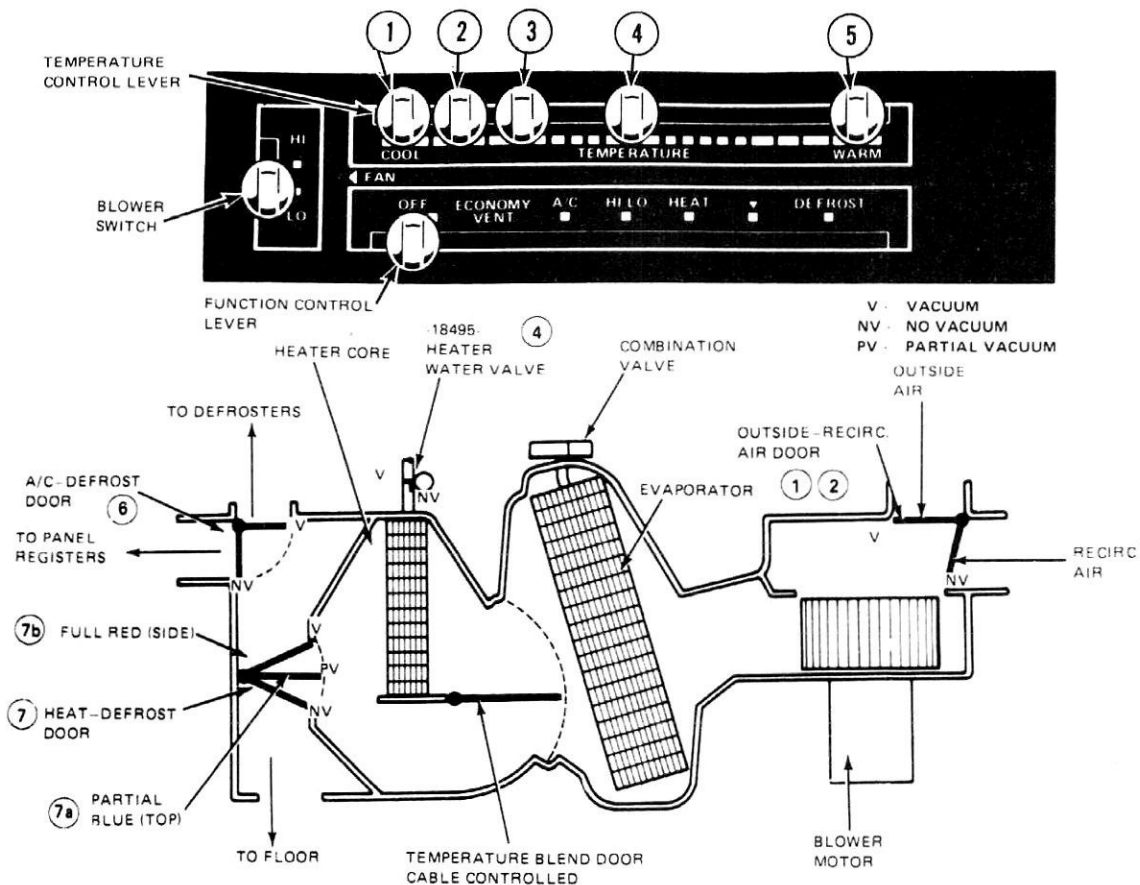
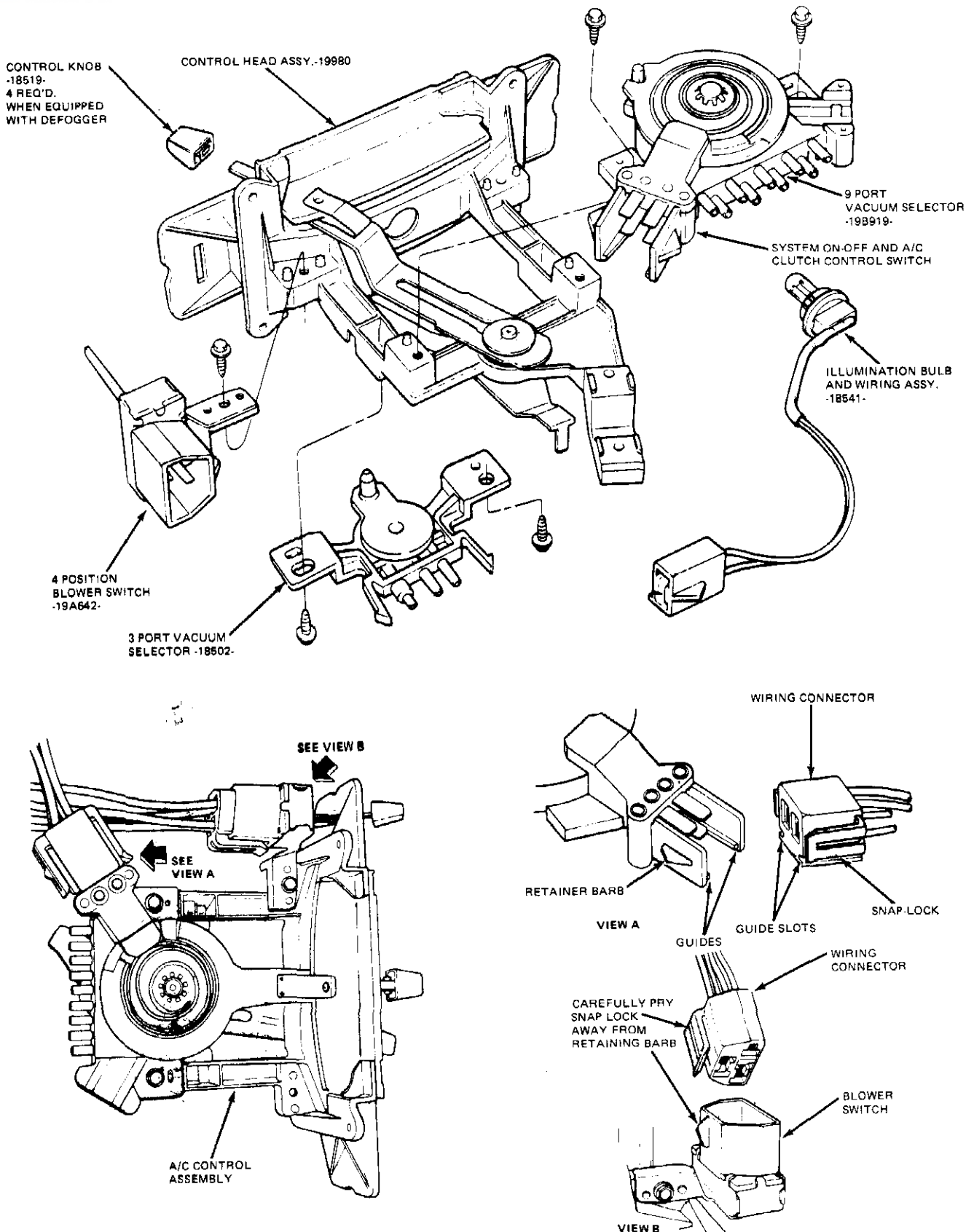




MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART						
FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM				
		OUTSIDE - RECIRC	WATER VALVE	A/C - DEFROST	HEAT - DEFROST	
					PARTIAL	FULL
OFF	Any Position	1 - 2	4	-	7a	7b
ECONOMY VENT	Any Position	-	4	6	-	-
A/C *	Cool - 1	1 - 2	4	6	-	-
	Cool - 2	1 - 2	-	6	-	-
	Cool - 3 Temp - 4	-	-	6	-	-
HI - LO	Warm - 5	-	-	6	-	-
	Cool - 1	-	4	6	7a	-
	Cool - 2	-	-	6	7a	-
HEAT	Cool - 3 Temp - 4	-	-	6	7a	-
	Warm - 5	-	-	6	7a	-
	Cool - 1	-	4	-	7a	7b
(DEFOG) *	Cool - 2	-	-	-	7a	7b
	Cool - 3 Temp - 4	-	-	-	7a	7b
	Warm - 5	-	-	-	7a	7b
DEFROST *	Cool - 1	-	4	-	-	-
	Cool - 2	-	-	-	-	-
	Cool - 3 Temp - 4	-	-	-	-	-
VACUUM LINE COLOR CODE		WHITE	GREEN	YELLOW	BLUE (TOP)	RED (SIDE)

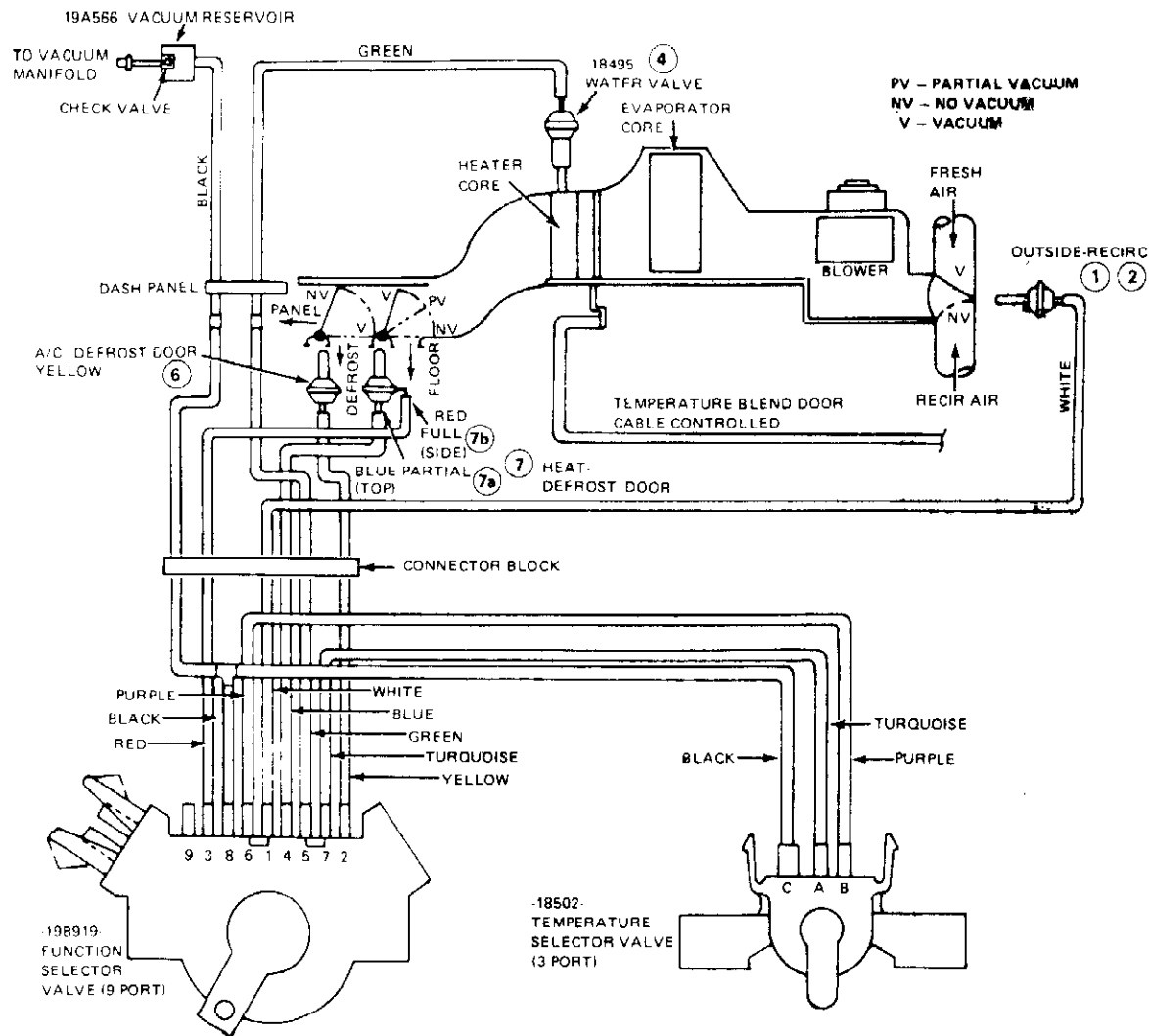
* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED
 - NO VACUUM

FIG. 1 Manual A/C-Heater System Air Flow Schematic and Vacuum Control Chart



L2023-28

FIG. 2 Manual A/C Control Assembly—Granada and Monarch



TEMP SELECTOR VALVE LEVER POSITIONS						
PORT	FUNCTION	COOL	TEMPERATURE	WARM	HOSE COLOR	
C	Source	V	V	V	Black	
A	Water Valve	V			Turquoise	
B	Outside-Recirc	V	V		Purple	

PORT	FUNCTION	FUNCTION SELECTOR VALVE LEVER POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▼ DEFOG	DEFROST	
1	Outside Recirc.	V		To 6					White 1-2
2	A/C- Defrost		V	V	V				Yellow 6
3	Full Heat- Defrost	V				V			Red 7b
4	Partial Heat- Defrost	V			V	V	V		Blue 7a
5	To Water Valve	V	V	To 7	To 7	To 7	To 7	To 7	Green 4
6	From Temp Selector Port B	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
7	From Temp Selector Port A	Seal	Seal	To 5	To 5	To 5	To 5	To 5	Turquoise
8	Source	V	V	V	V	V	V	V	Black
9	NOT USED IN THIS SYSTEM								

V VACUUM BLANK ATMOSPHERE

FIG. 3 Manual A/C-Heater System Vacuum Schematic and Selector Test

the heat exchanging surfaces of the evaporator. Gauge pressure at sea level is specified at 28.5 psi. The pressure reading is higher at higher altitudes because of gauge error not because of a change in pressure inside of the evaporator. See Diagnosis Manual or Shop Manual for gauge pressure vs. altitude chart. Suction "throttling" starts when the compressor suction pressure is decreasing below the pressure setting of the valve. Compressor suction pressure can continue to drop but evaporator pressure is held steady by the controlling or "throttling" action of the STV.

Figs. 8 and 9 show the combination valve location with 4.1L (250 CID) engines and 5.0L (302 CID) engines.

REFRIGERANT CHARGING VALVES

Two service access valves for charging the refrigeration system with R-12 are located in the refrigerant lines. One valve is in the suction line close to the compressor. The other is in the discharge line near the compressor.

VACUUM MOTORS

The outside-recirculating air door motor is located forward of the recirculating air inlet duct (Fig. 10). It can be serviced by removing two screws and a clip attaching the motor arm to the air door crank arm. The clip can be removed after removing the vacuum motor mounting screws by moving the motor link to the right.

The A/C Defrost door motor and Heat/Defrost door motors can be reached from under the instrument panel.

The vacuum-controlled water valve is located in the engine compartment near the dash panel and is readily accessible for service.

COMPRESSOR ASSEMBLY 6-CYLINDER ENGINE

The compressor and clutch assembly is mounted in a vertical position on the forward right side of the engine (Fig. 11).

COMPRESSOR ASSEMBLY 8-CYLINDER ENGINES

The compressor and clutch assembly is mounted horizontally on the forward left side of the engine (Fig. 12).

AMBIENT AIR TEMPERATURE SWITCH

The ambient air temperature switch is located on the hood support vertical bracket in front of the condenser (Fig. 13). The switch is a temperature sensitive, snap-action unit installed in the compressor clutch circuit to prevent unnecessary compressor operation at low temperatures. It closes the circuit to the clutch at 50°F maximum and opens the circuit at 35°F minimum with a minimum differential of 3°F between opening and closing temperatures.

ADJUSTMENTS

TEMPERATURE CONTROL CABLE

1. Loosen the temperature control cable mounting screw.
2. Move the temperature control lever all the way to the left.
3. Move the temperature blend door crank arm to maximum cool position (clockwise).
4. With the temperature lever and temperature door held in their respective positions, tighten the cable mounting screw to 20 in. lbs. torque.

REMOVAL AND INSTALLATION (FIG. 14)

CONTROL HEAD ASSEMBLY (FIG. 2)

1. Disconnect vacuum harness at inline connector.
2. Remove vacuum connector from 9-port selector valve.
3. Remove the control cable from the control head (one screw, one pushnut).
4. Disconnect the electrical connectors from the blower and clutch switches. Refer to Fig. 2 for disconnect procedure used on snaplock connectors. Disconnect the illumination bulb wiring.
5. Disconnect the wiring from the defogger switch and indicator lamp (jewel), if so equipped.
6. Remove the light switch knob and bezel and the windshield wiper switch and radio knobs.
7. Remove the three screws securing the cluster applique at the top and pull the applique rearward to disengage four (4) snap-in clips along the lower edge.
8. Remove the four (4) screws holding the control head assembly to the instrument panel. Move the control assembly forward and out of the instrument panel.
9. To install, reverse the above procedure. Adjust the temperature control cable if necessary.

EVAPORATOR CASE ASSEMBLY (FIG. 6)

Observe Safety Precautions outlined in Part 36-31.

1. Drain the engine coolant, discharge the refrigerant from the A/C system and disconnect the battery.
2. Disconnect the two heater hoses (two clamps) from the heater core tubes at the dash panel. Plug the core tubes to prevent coolant leakage during core removal.

3. Disconnect the vacuum supply hose from the water valve and the system supply hose from the in-line connection at the supply tank. Push the vacuum line grommet inward through the dash panel. Remove the sight shield and brackets from instrument panel.
4. Remove the heat distribution duct from the evaporator assembly two (2) screws; one (1) clip.
5. Remove tunnel to cowl brace (left of evaporator plenum assembly), if so equipped. Refer to Defroster Nozzle Removal and Installation and remove the defroster nozzle.
6. Remove the glove box liner (five screws).
7. Disconnect the vacuum hoses from the A/C-Defrost and A/C-Heat door vacuum motors. Remove the clip attaching the vacuum harness to the plenum. Disconnect the vacuum harness at the in-line connector to the control vacuum harness.
8. Remove the two (2) nuts securing the Heat/Defrost door vacuum motor to the plenum and swing the vacuum motor rearward on the crank arm.
9. Remove the control cable from the evaporator case (one screw, one pushnut).
10. Loosen the right door sill scuff plate, right "A" pillar trim panel, and remove the right cowl side trim panel.
11. Remove the right lower instrument panel to cowl side bolt and just loosen the right upper instrument panel to cowl upper bolt.
12. Remove the cowl to lower instrument panel brace. Disconnect the evaporator mid-case to cowl mounting strap at the cowl. Leave the strap loosely attached to the evaporator.
13. Remove two (2) screws securing the plenum to the left mounting bracket. Remove two (2) screws and three (3) clips securing plenum to evaporator case.
14. Raise the plenum to clear the tabs on the top of the evaporator case. Move the plenum to the left and position it on the floor tunnel, free of the evaporator case.
15. Remove the heater core from the evaporator case by pulling on the tab of the rear heater core gasket.
16. Disconnect the wiring harness from the resistor assembly and the blower motor.
17. Remove the right courtesy lamp from the instrument panel clip.
18. Remove three (3) right evaporator-to-dash-panel nuts in engine compartment.
19. Remove the right evaporator-to-cowl bracket bolt.
20. Pull the evaporator case away from the dash panel and raise the plenum end while pulling the blower end downward. Swing the plenum end of the case to the right and pull the case rearward under the instrument panel rail. **Extreme care must be taken when pulling back on the instrument panel to prevent cranking the plastic panel. Aged or cold instrument panels may crack more easily.**

As the evaporator case clears the panel edge, swing the plenum end of the case back to the left and lift unit out of the car.

Cover the front edge of the evaporator case to prevent scratching the instrument panel when removing or installing the case.

EVAPORATOR CORE (FIG. 5)

1. Remove the evaporator case following the instructions given above.
2. With the evaporator case placed on a bench, remove the blower motor and wheel assembly (four (4) screws).
3. Remove the recirculating air inlet duct (four (4) screws).
4. Remove the eight (8) upper to lower case attaching screws and two clips.
5. Separate the evaporator core tube to dash seal from case surface.
6. Remove the lower half of the evaporator case.
7. Remove the evaporator core from the upper case.
8. To install the evaporator core, reverse the above procedure with the following added instructions:

The evaporator core tube to dash seal must be re-cemented to the evaporator case.

Be sure that the heater core tube to dash seal is positioned properly during installation.

Install new O-rings on the manifold plate. Always dip the new O-rings in refrigerant oil before installing.

Evacuate and charge the refrigerant system with Refrigerant 12 following the procedure given in Part 36-32. System capacity is given in the Specifications section of this Part.

HEATER CORE (FIG. 5)

The refrigerant system components and Refrigerant 12 charge do not have to be disturbed when removing and installing the heater core.

1. Drain the engine coolant and disconnect the battery ground cable.
2. Disconnect two (2) heater hose clamps at the dash panel in the engine compartment. Plug the core tubes to prevent coolant leakage during removal.
3. Remove the heat distribution duct from the evaporator assembly (two screws, one clip).
4. Remove the seat belt interlock module and bracket.
5. Remove the glove box liner and sight shields.
6. Loosen the right door sill scuff plate, right "A" pillar trim cover and remove the right cowl side trim panel.
7. Loosen instrument panel to right cowl side bolt and remove the instrument panel brace bolt at the lower rail, below the glove box.
8. Remove tunnel-to-cowl brace (left of evaporator plenum assembly), if so equipped. Refer to Defroster Nozzle Removal and Installation and remove the defroster nozzle.
9. Disconnect the vacuum hoses from the A/C-Defrost and Heat/Defrost door motors. Remove the screw from the clip holding the vacuum harness to the plenum.

10. Remove two (2) Heat/Defrost door mounting nuts and swing the motor rearward on the door crankarm.
 11. Remove two (2) screws attaching the plenum to the left mounting bracket. Then remove the two (2) screws and two clips securing the plenum to the evaporator case.
 12. Raise the plenum to clear the tabs on the top of the evaporator case.
 13. Move the plenum to the left as far as possible, (approximately 4 inches) pulling rearward on the instrument panel to gain clearance. **Take extreme care when pulling back on the instrument panel to avoid cracking the plastic panel.**
- NOTE: There is very little clearance between the plenum and the wiper motor assembly.**
14. Pull the heater core to the left using the tab molded into the rear heater core seal. As the rear surface of the heater core clears the evaporator case, pull the core rearward and downward to clear the instrument panel.
 15. Reverse the above procedure to install the core.

NOTE: Before installing the core, make sure that the heater core tube to dash panel seal is in place between the evaporator case and the dash panel.

DEFROSTER NOZZLE (FIG. 4)

1. Remove the instrument panel crash pad.
2. Remove the radio speaker or panel to cowl brace.
3. Remove the four (4) nozzle to cowl bracket mounting screws.

4. Lift the defroster nozzle upward through the crash pad opening.
5. To install, reverse the above procedure. Be sure to check that the nozzle mates properly to the plenum opening.

BLOWER MOTOR AND WHEEL (FIG. 15)

1. Disconnect the ground cable from the battery.
2. Loosen the right door sill scuff plate, right "A" pillar trim cover and remove the right cowl side trim panel.
3. Remove the right lower instrument panel to cowl side bolt.
4. Remove the cowl to lower instrument panel brace bolt.
5. Disconnect the wiring harness connectors from the blower motor.
6. Remove the blower motor and wheel assembly from the scroll (four (4) screws). It is necessary to pull rearward on the lower edge of the instrument panel to gain clearance.

Take extreme care when pulling back on the instrument panel to avoid cracking the plastic panel.

7. To install the blower and wheel, reverse the above procedure.

CONDENSER (FIG. 16)

1. Discharge the refrigerant system.
2. Remove the lower hood lock and vertical support brace.

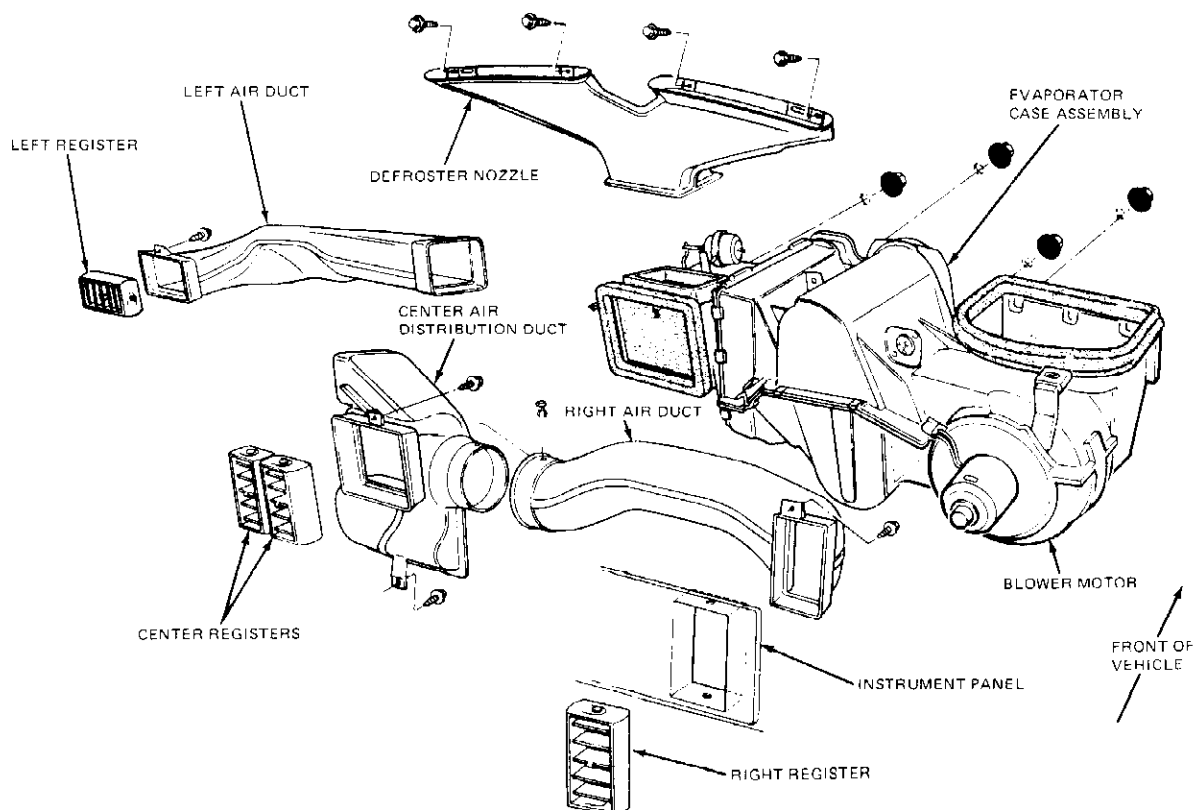
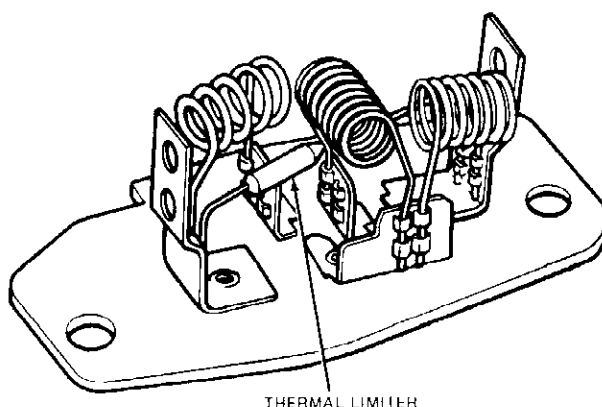


FIG. 4 Air Distribution Ducts Granada and Monarch

3. Disconnect the ambient air temperature switch.
4. Disconnect the liquid and discharge lines at the fittings on the left side of the radiator support.
5. Remove the four (4) condenser mounting screws and move the condenser upward and out of vehicle.
6. To install, reverse the above procedure. Install new O-rings in the refrigerant line connections, being

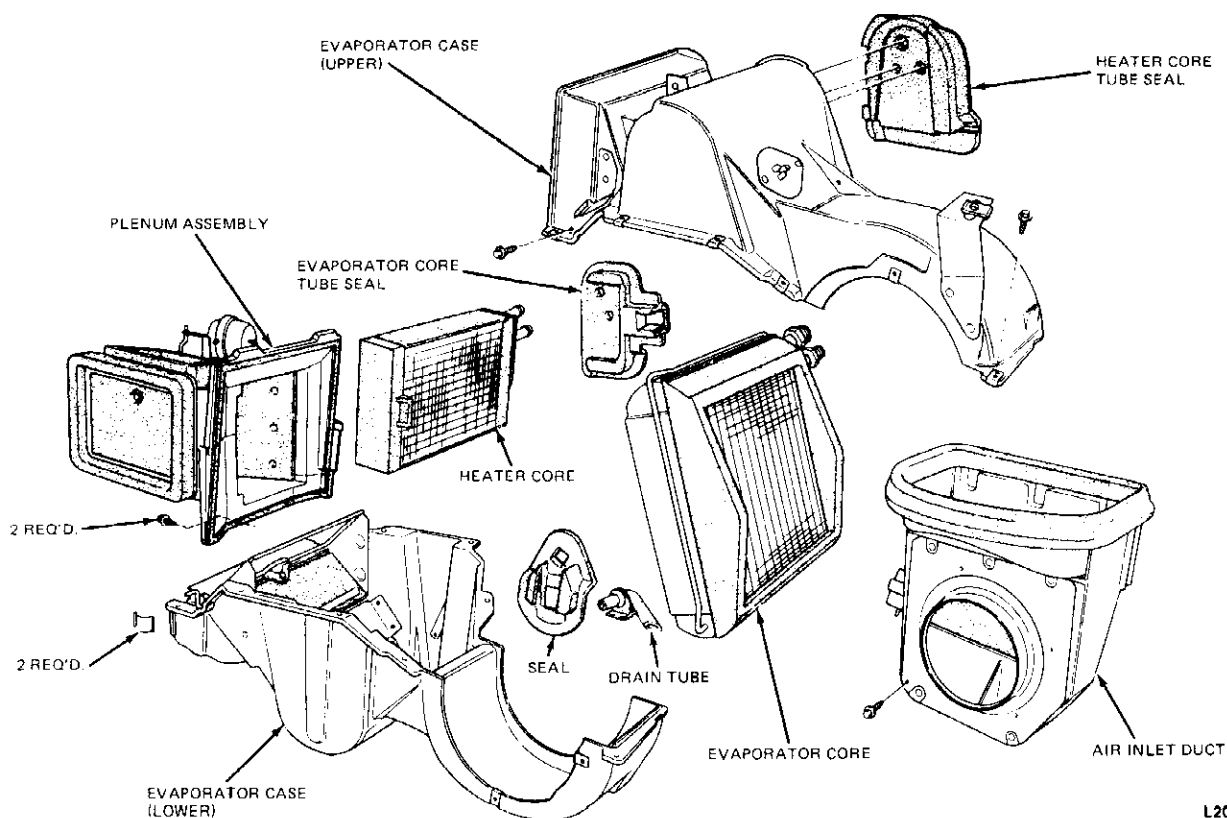
sure to dip the rings in refrigerant oil before installing.

7. Evacuate and recharge the refrigerant system with Refrigerant 12 following the procedure given in Part 36-32. System capacity is given in the Specifications Section of this Part.



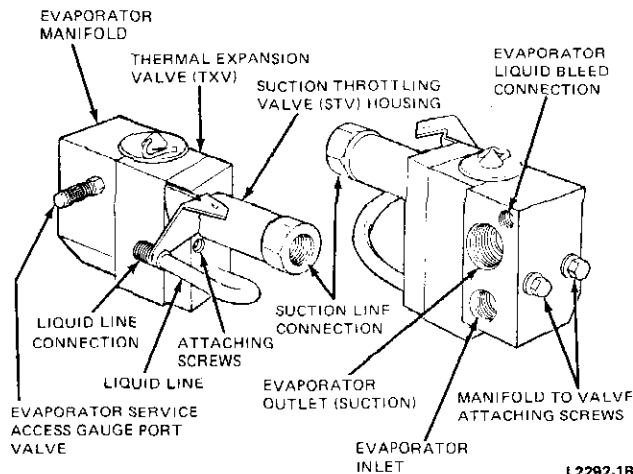
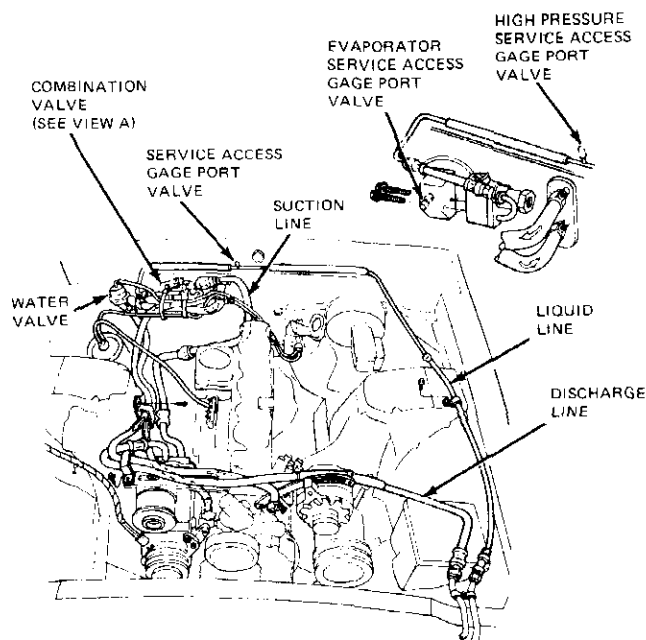
L2448-1A

FIG. 5 Thermal Limiter Resistor Assembly

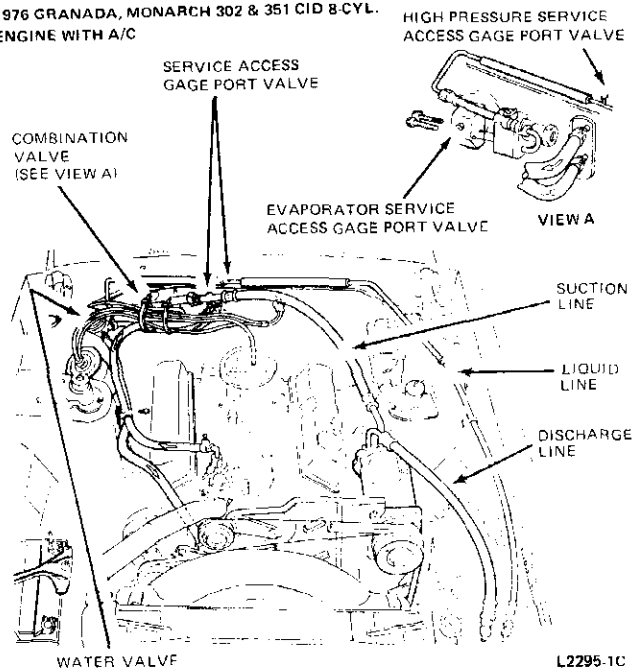


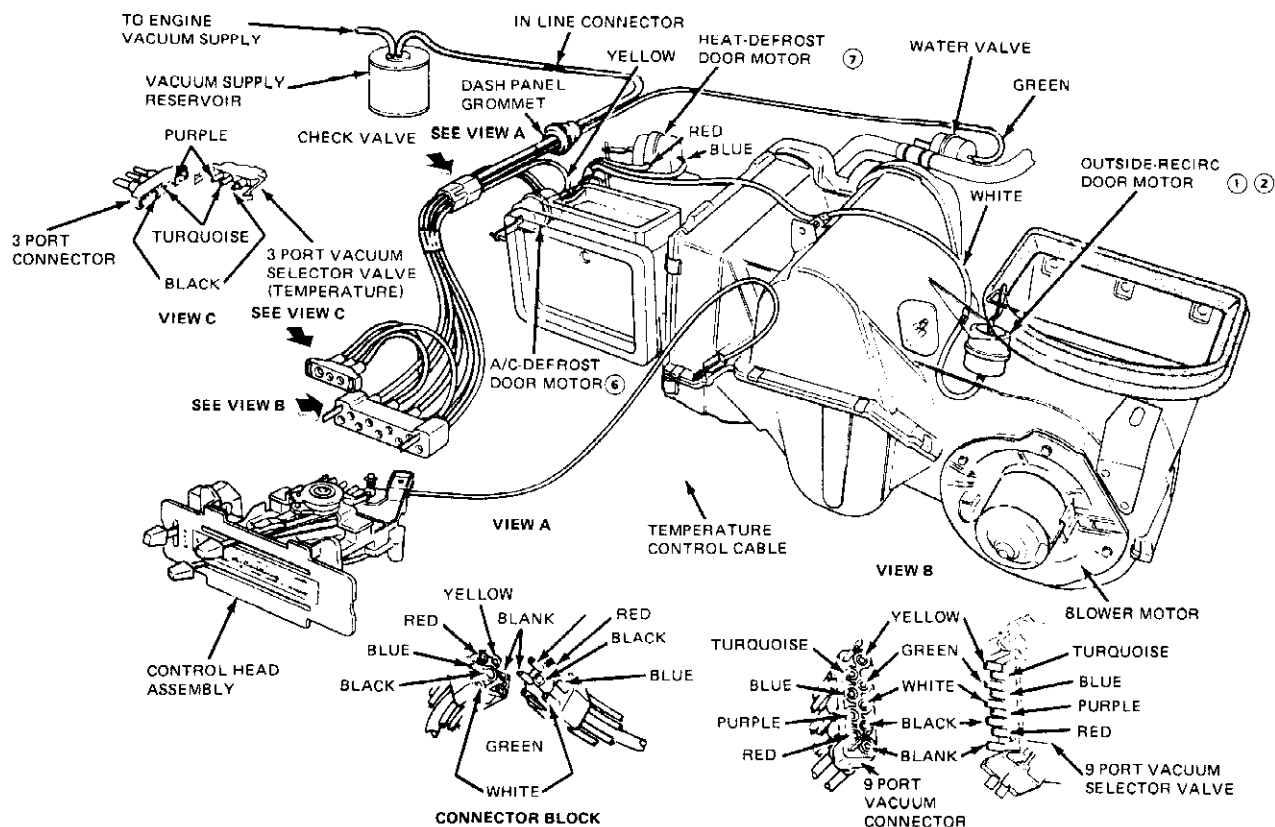
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FIG. 6 Evaporator Case Assembly—Granada and Monarch

**FIG. 7 Combination Valve****FIG. 8 Combination Valve with 4.1L (250 CID) Engine**

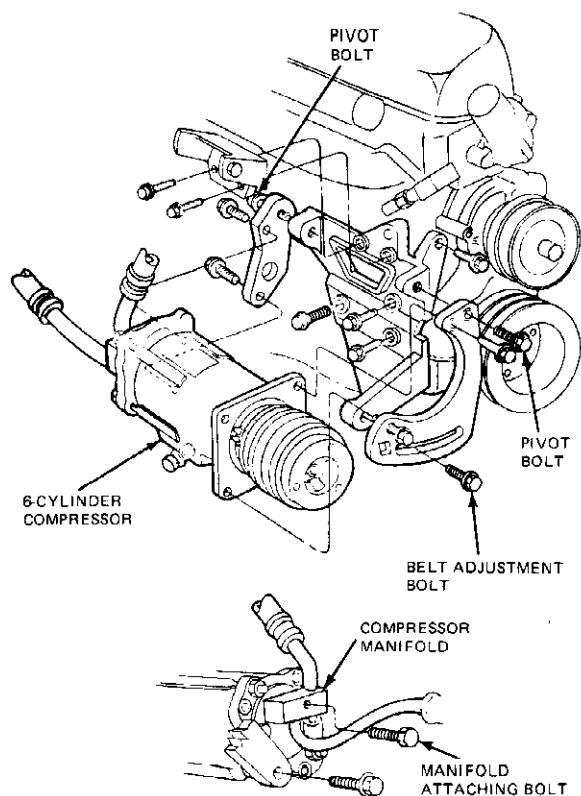
1976 GRANADA, MONARCH 302 & 351 CID 8-CYL. ENGINE WITH A/C

**FIG. 9 Combination Valve with 5.0L (302 CID) Engines**



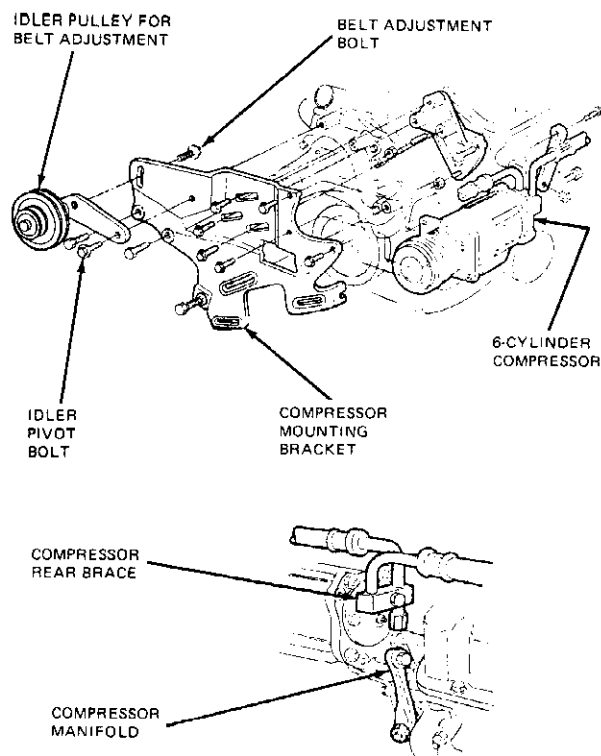
L2024-2D

FIG. 10 Vacuum System Components—Granada and Monarch



L2290-1A

FIG. 11 Compressor Installation—3.3L and 4.1L (200-250) CID Engine



L2291-1B

FIG. 12 Compressor Installation—5.0L (302 CID) Engines

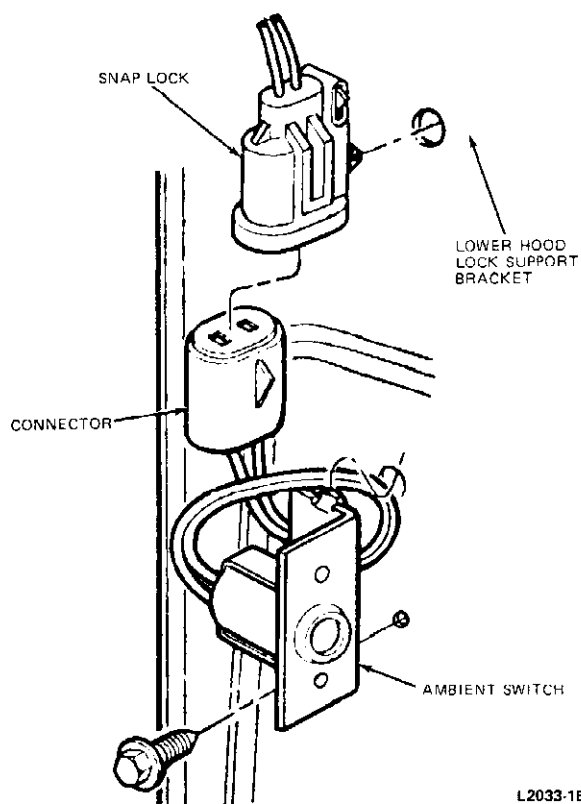


FIG. 13 Ambient Temperature Switch Installation

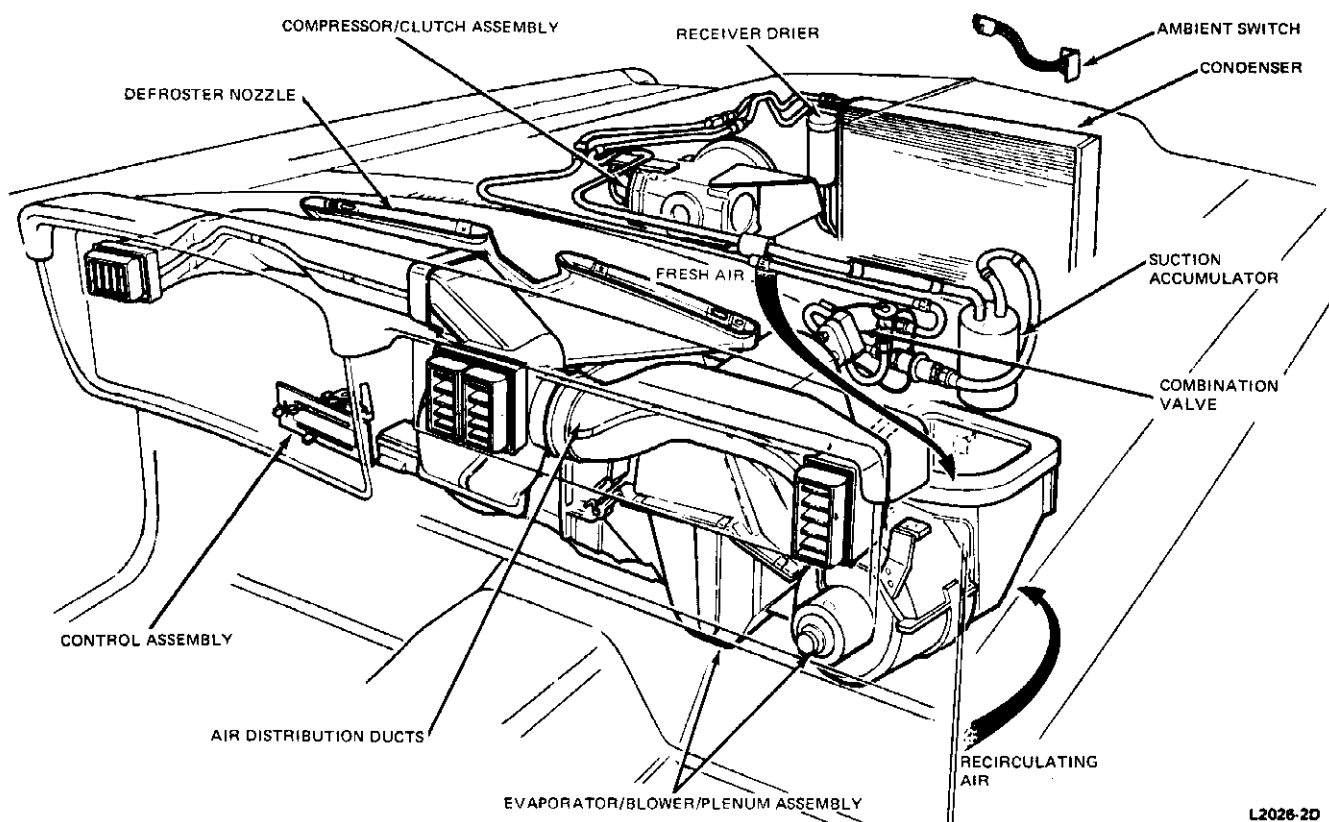
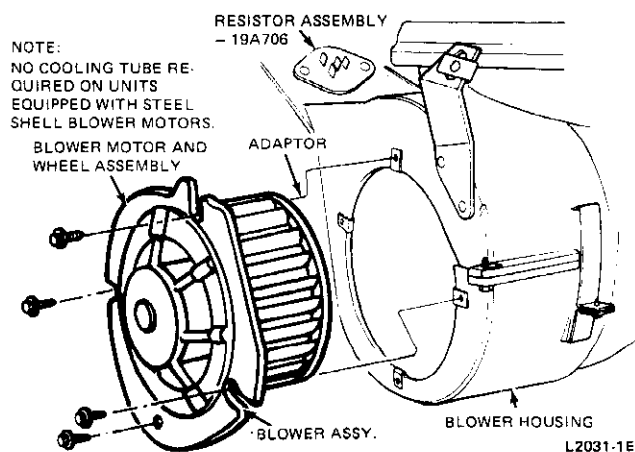
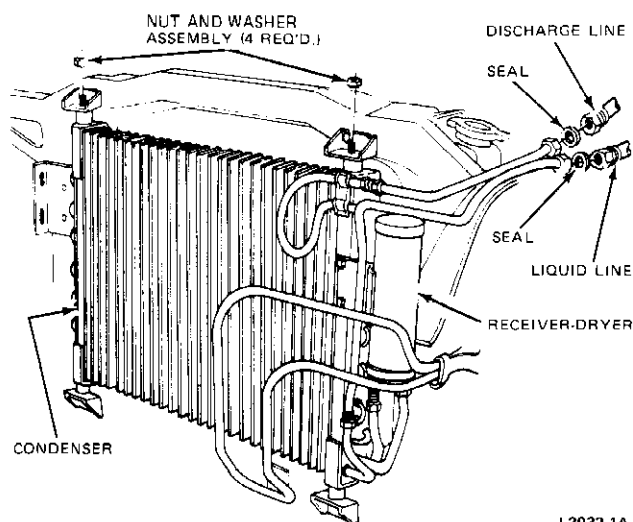


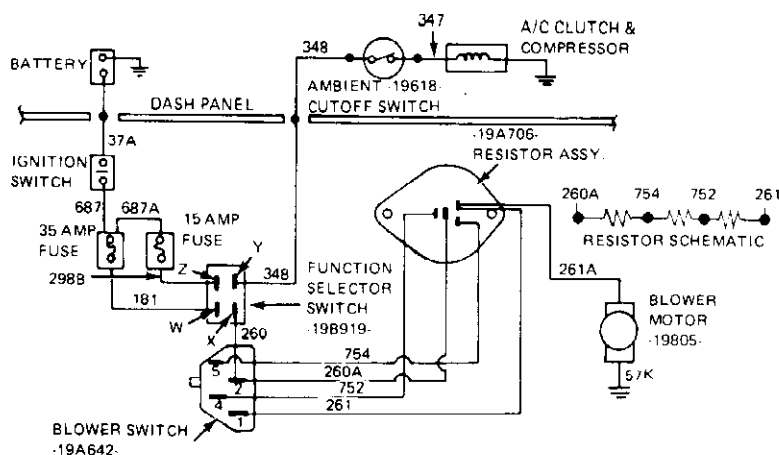
FIG. 14 A/C System Installation—Granada, Monarch



**FIG. 15 Blower Motor and Wheel Installation—
Granada and Monarch**



**FIG. 16 Condenser and Receiver Installation—
Granada and Monarch**



FUNCTION SELECTOR SWITCH - 19B919							
SWITCH SCHEMATIC	TERMINAL CONNECTIONS						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	DEFOG	DEFROST
X — W — Z —	None	W - X	W - X Y - Z	W - X	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH - 19A642			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	8	7.0 - 9.0
Med Low	2 - 5	11	9.0 - 11.5
Med High	2 - 4 - 5	20	11.5 - 13.0
High	2 - 1 - 4	25	13.0 - 14.8

CIRCUIT NO.	WIRE COLOR
37A	Yellow
57A	Black
181	Brown W/Orange Stripe
260A	Red W/Orange Hash
261A	Orange W/Black Stripe
347	Black W/Yellow Hash
348A	Lt. Green W/Purple Hash
687	Gray W/Lt. Blue Stripe
687A	Gray W/Lt. Blue Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash

FIG. 17 Manual A/C-Heater System Electrical Wiring Diagram and Continuity Test



SPECIFICATIONS

GRANADA AND MONARCH HEATER-A/C

Protection Device	Blower Motor A/C Clutch	35 Amp Fuse in Fuse Panel 15 Amp Fuse
Control Illumination		One 1 CP 161 Bulb
Ambient Temperature Switch		35 Minimum Opens 50 Maximum Closes

CL2017-2E

Ford and Mercury Heater — Air Conditioner System

**PART
36-41**

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION		REMOVAL AND INSTALLATION (Cont'd.)	
Split Case Assembly	41-1	Compressor Mounting	41-15
System Components	41-4	Condenser and Receiver	41-9
System Operation	41-1	Control Assembly	41-9
ADJUSTMENTS		Defroster Nozzles	41-9
Temperature Control Cable	41-9	Evaporator Core	41-13
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Air Door — Outside	41-9	Plenum Chamber	41-9
Air Conditioning Registers and Air Ducts	41-9	Vacuum Motors	41-9
Blower Motor and Wheel	41-15	SPECIFICATIONS	41-19

CL2346-2B

DESCRIPTION AND OPERATION

SPLIT CASE ASSEMBLY—INTEGRAL BLOWER

The split case assembly, as the name implies, is divided into several parts. The evaporator case, which houses the evaporator, heater core and blower assembly, is located on the engine side of the dash panel to the right of the centerline.

The blower motor and wheel is at the extreme right side of the case under the front fender.

It is necessary to cut out an access opening in the right front fender apron to service the blower motor and wheel assembly.

The evaporator and heater core are accessible by removing the covers on the evaporator case assembly.

The plenum chamber is located under the instrument panel. Openings in the dash panel allow air to flow from the evaporator case into the plenum. Air flow through the system can be seen in Fig. 1.

In a typical operation, air is drawn into the system by the blower motor and wheel either through the cowl fresh air intake or through the recirculating air door in the right cowl side panel. The air then passes through the evaporator and/or around the heater core into the plenum. From this point it is carried by ducts to the several air outlets—panel, floor and defroster.

The Ford and Mercury integral air conditioning and heating system uses outside air through the damper door in the upper cowl, or recirculated air through the recirculating air door in the right cowl side panel. The control assembly is located in the instrument panel to the right of the steering column.

All instrument panel registers on the Ford and Mercury operate in the same manner. Move the center register louvers outboard to close; the right register louvers inboard to close; the Ford left

outboard register louvers inboard, and the Mercury left outboard register louvers upward to close.

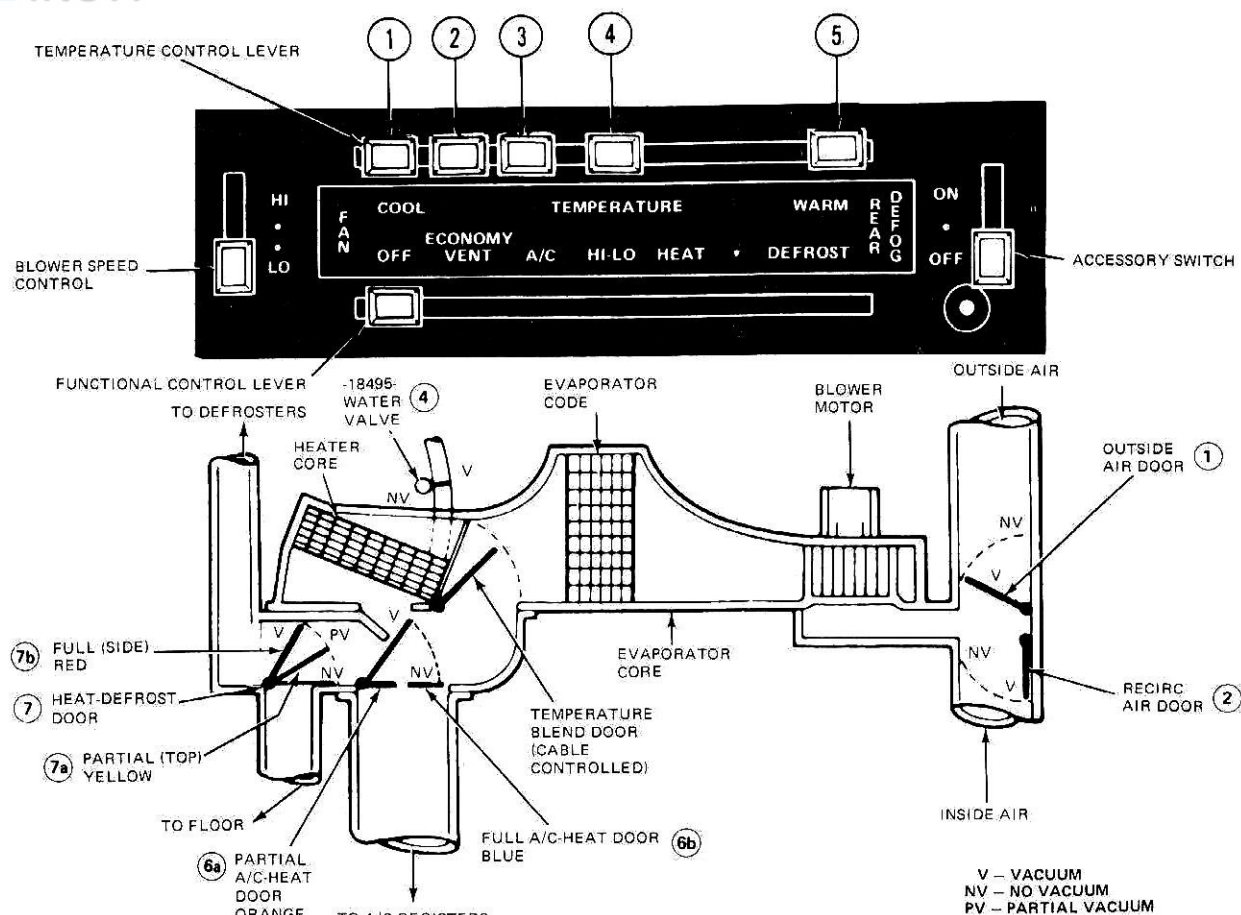
SYSTEM OPERATION (See Fig. 1)

Air is drawn into the system by the blower motor and wheel from the cowl air intake, through the outside air door or through the recirculating air damper door in the right cowl side panel with the mode function control lever in A/C and the temperature lever in COOL position. The air is then forced through the evaporator core, and when the temperature blend door is in the MAXIMUM COOL position, the air by-passes the heater core. The blend door is operated by a control cable. The A/C-Heat doors, in the air conditioning position (full vacuum) allows cooled air to be discharged through the four registers with a small percentage going to the floor.

With the function control lever in OFF position, the outside air door is closed (vacuum), the water valve is closed (vacuum) and no air passes through the system. The blower is ON in all positions, except OFF position.

In ECONOMY VENT position, the outside air door is open (no vacuum), the water valve is closed (vacuum), the A/C-Heat doors are open (full vacuum) and air is discharged through the panel registers. Move the temperature control lever to COOL position for maximum ventilation through the panel registers. The A/C compressor does not operate in ECONOMY VENT position.

In A/C position, the A/C-Heat doors are positioned in the same as ECONOMY VENT. When the temperature control lever is in the COOL position, the outside air door is closed (vacuum) and the recirculating air door is open (vacuum). Maximum A/C performance is obtained in this position. In the A/C position, all air



FORD AND MERCURY MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART								
FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM						
		OUTSIDE	RECIRC	WATER VALVE	A/C-HEAT		HEAT-DEFROST	
					PARTIAL	FULL	PARTIAL	FULL
OFF	Any Position	1	2	4	-	-	7a	7b
ECONOMY VENT	Any Position	-	-	4	6a	6b	7a	7b
A/C *	Cool - 1	1	2	4	6a	6b	7a	7b
	Cool - 2	1	2	-	6a	6b	7a	7b
	Cool - 3 Temp - 4	-	-	-	6a	6b	7a	7b
	Warm - 5	-	-	4	6a	-	7a	7b
HI - LO	Cool - 1	-	-	-	6a	-	7a	7b
	Cool - 2	-	-	-	6a	-	7a	7b
	Cool - 3 Temp - 4	-	-	-	6a	-	7a	7b
	Warm - 5	-	-	-	-	-	7a	7b
HEAT	Cool - 1	-	-	4	-	-	7a	7b
	Cool - 2	-	-	-	-	-	7a	7b
	Cool - 3 Temp - 4	-	-	-	-	-	7a	7b
	Warm - 5	-	-	-	-	-	7a	7b
(DEFOG) *	Cool - 1	-	-	4	-	-	7a	-
	Cool - 2	-	-	-	-	-	7a	-
	Cool - 3 Temp - 4	-	-	-	-	-	7a	-
	Warm - 5	-	-	-	-	-	7a	-
DEFROST *	Cool - 1	-	-	4	-	-	-	-
	Cool - 2	-	-	-	-	-	-	-
	Cool - 3 Temp - 4	-	-	-	-	-	-	-
	Warm - 5	-	-	-	-	-	-	-
VACUUM LINE COLOR CODE		WHITE	WHITE	GREEN	ORANGE	BLUE	YELLOW (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED.
 - NO VACUUM

K3476-2B

FIG. 1 Manual A/C Heater System Air Flow Schematic and Vacuum Control Chart

comes out the panel registers, except for a slight floor bleed.

In the HI-LO position, the partial A/C-Heat and full Heat-Defrost doors in the plenum chamber are open (vacuum) and air is discharged through the air conditioning registers and also through the air outlets in the lower plenum to the floor area. Air flow through the heater core is controlled proportionate to the setting of the temperature blend door that controls the warm and cool air as it enters the plenum chamber. The compressor is inoperative.

In HEAT position, the A/C-Heat doors restrict air to the registers (no vacuum), the heat-defrost door is in the heat position (full vacuum) and warm air is discharged through the plenum air outlets to the floor with some defrost bleed.

In the DEFOG position between HEAT and DEFROST, the heat-defrost door is in the mid-position (partial vacuum) and warmed air is discharged through the defrosters and lower plenum floor outlets. The A/C compressor is "on" in DEFOG and DEFROST.

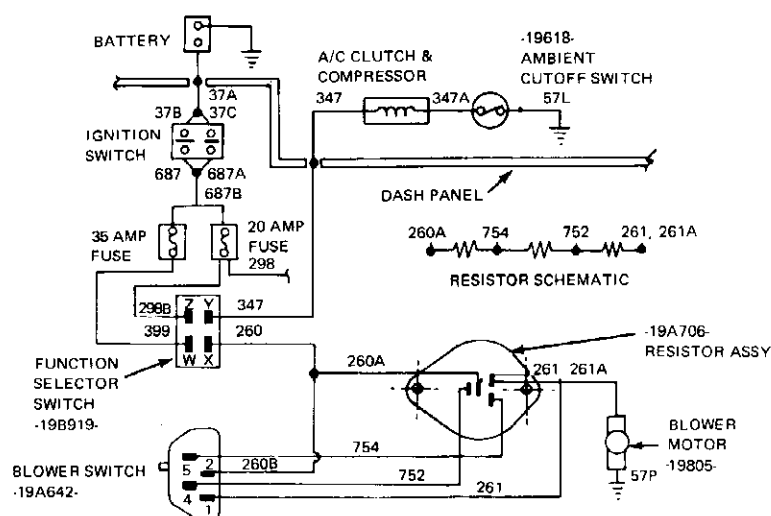
In DEFROST position, the A/C-Heat and heat-defrost doors are in defrost position (no vacuum) and air is discharged through the defrosters with some bleed air to the floor.

A four position blower switch and resistor assembly provides four blower speeds to control air volume. The master blower switch is mounted on the control assembly vacuum selector and is actuated when the function control lever is in all positions except OFF (Refer to Electrical Diagram, Fig. 2).

The air distribution plenum uses two A/C-Heat doors, operated by separate vacuum motors.

The blower motor is of a design, with flat block magnets located on the outside of the assembly (Figs. 3 and 17). Blower rotation is counterclockwise. Removal and installation of the motor requires cutting an access hole in the fender apron, as in previous years.

The blower and clutch circuits (Fig. 2) have been modified so that the compressor clutch is engaged in the Defog and Defrost positions as well as A/C. This



CIRCUIT NO.	WIRE COLOR
57P	Black
260A	Red W/Orange Hash
260B	Red W/Orange Hash
261A	Orange W/Black Stripe
298B	Purple W/Orange Hash
347	Black W/Yellow Hash
399	Brown W/Yellow Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash
37A	Yellow
37B-C	Yellow
687A	Grey W/Lt. Blue Stripe
687B	Grey W/Lt. Blue Stripe

SWITCH SCHEMATIC	FUNCTION SELECTOR SWITCH - 19B919-						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	DEFOG	DEFROST
	None	W - X	W - X Y - Z	W - X	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH - 19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	6	7.0 - 8.5
Med. Low	2 - 5	10	8.5 - 10.0
Med. High	2 - 4 - 5	17	10.0 - 12.5
High	2 - 1 - 4	28	12.5 - 14.8

FIG. 2 Manual A/C-Heater System Electrical Wiring Diagram and Continuity Test

feature gives the operator additional options for cooled air discharge other than the panel registers.

A six-cylinder compressor is now used on both car lines (Figs. 19 and 20).

The ambient air temperature switch closes on use above 50°F and opens at 35°F. min. and closes at 50°F. max. with a minimum differential of 3°F. between opening and closing temperature.

Posi-Grip vacuum hose retainers are removed and installed as shown in Fig. 12.

The Snap-Lock connectors used for positive wiring connector retention are removed as shown in Fig. 9.

SYSTEM COMPONENTS

Controls (See Fig. 4)

FUNCTION CONTROL (BOTTOM) LEVER

The function control lever actuates a 9 port vacuum selector that controls vacuum motors at the following doors: both A/C-heat doors, heat-defrost door, outside/recirc. air doors and the water valve and also controls the blower switch and activates the A/C clutch circuit in the A/C, DEFOG and DEFROST position. It will also activate the outside and recirculating doors to the outside air position, regardless of the temperature lever position, when in any position except A/C and ECONOMY VENT (Figs. 3 and 4).

A/C clutch operation is dependent upon an ambient temperature cut-off switch (Fig. 2) when the function control lever is in A/C, DEFOG and DEFROST position. The clutch will be off in all other lever positions and/or when the ambient temperature is below 35°F.

The blower motor runs at all times, except when the function control lever is in the OFF position. A separate four position, four speed blower motor switch is used to regulate the volume of airflow and cannot turn the blower off.

TEMPERATURE CONTROL (TOP) LEVER

The temperature lever actuates a control cable, which operates the temperature blend door and a 3 port vacuum selector that controls the outside air door, recirculating air door and water valve, via the 9-port vacuum selector valve which is actuated by the function control lever.

In the A/C position, the system operates in the recirculate (inside) air position when the temperature lever is in the COOL position. When the temperature lever has moved approximately one inch to the right from the extreme left (cool) position, the system operates in the fresh (outside) air position. The system will operate in the outside air position in the ECONOMY VENT, HI-LO, HEAT, DEFOG and DEFROST regardless of the temperature lever setting.

The water valve opens (hot water to heater core) when the temperature lever has moved approximately 1/2 inch to the right from the extreme left (cool) position. The water valve will close when the function control lever is in the OFF or ECONOMY VENT positions regardless of the temperature lever setting.

The blower switch is located at the left side of the control assembly.

The water valve is located in the engine compartment in the heater core inlet water hose near the dash panel (Fig. 3). The heater core outlet hose connects to the water pump.

Evaporator Case

The evaporator case assembly is located on the engine side of the dash panel to the right of the centerline. The blower motor and wheel is in the right side of the case under the right front fender (Fig. 5).

BY-PASS ORIFICE (BPO) EXPANSION VALVE REFRIGERANT SYSTEM

The By-Pass Orifice (BPO) Expansion Valve Refrigerant System was designed to improve the efficiency of the refrigerant system.

Its advantages are: Lower refrigerant system compressor loads and slightly improved fuel economy.

BY-PASS ORIFICE (BPO) EXPANSION VALVE

The By-Pass Orifice (BPO) Expansion Valve is the capillary tube type similar to those used on earlier refrigerant systems, except the tapered ball seat is slotted to prevent complete sealing of the liquid refrigerant inlet to the evaporator. The need for the external equalizer line is eliminated, as the BPO expansion valve is internally equalized through the passages around the push pins (Fig. 1). The slotted ball seat provides additional refrigerant and refrigerant oil flow to lubricate and cool the compressor, during minimum cooling requirement conditions, when the expansion valve is closed.

The By-Pass Orifice (BPO) Expansion Valve must regulate the flow of liquid refrigerant during cool-down (while the car exterior and evaporator core are cooling down). As the evaporator core temperature approaches 32°F., the Suction Throttling Valve begins to control refrigerant pressure.

SUCTION THROTTLING VALVE (STV)

The Suction Throttling Valve (STV) is the same used in current model refrigerant systems, except the equalizer line connection has been removed. Its purpose is to control suction pressure in the evaporator to prevent ice or frost from blocking the flow of air through the heat exchanging surfaces of the evaporator. Gauge pressure at sea level is specified at a minimum of 28.5 psi. The pressure reading is higher at higher altitudes because of gauge error, not because of a change in pressure inside the evaporator. Refer to the Pressure/Altitude Chart in Fig. 2.

Suction "throttling" starts when the compressor suction pressure decreases below the pressure setting of the valve. Compressor suction pressure can continue to drop but the evaporator pressure is held steady by the controlling or "throttling" action of the STV.

PRESSURE DIFFERENTIAL VALVE

A calibrated Pressure Differential Valve core is provided, in the liquid bleed line fitting, as a liquid refrigerant bleed circuit around the STV to assure oil return to the compressor when the STV is closed due to minimum heat loading of the A/C system. Refer to Fig. 2.

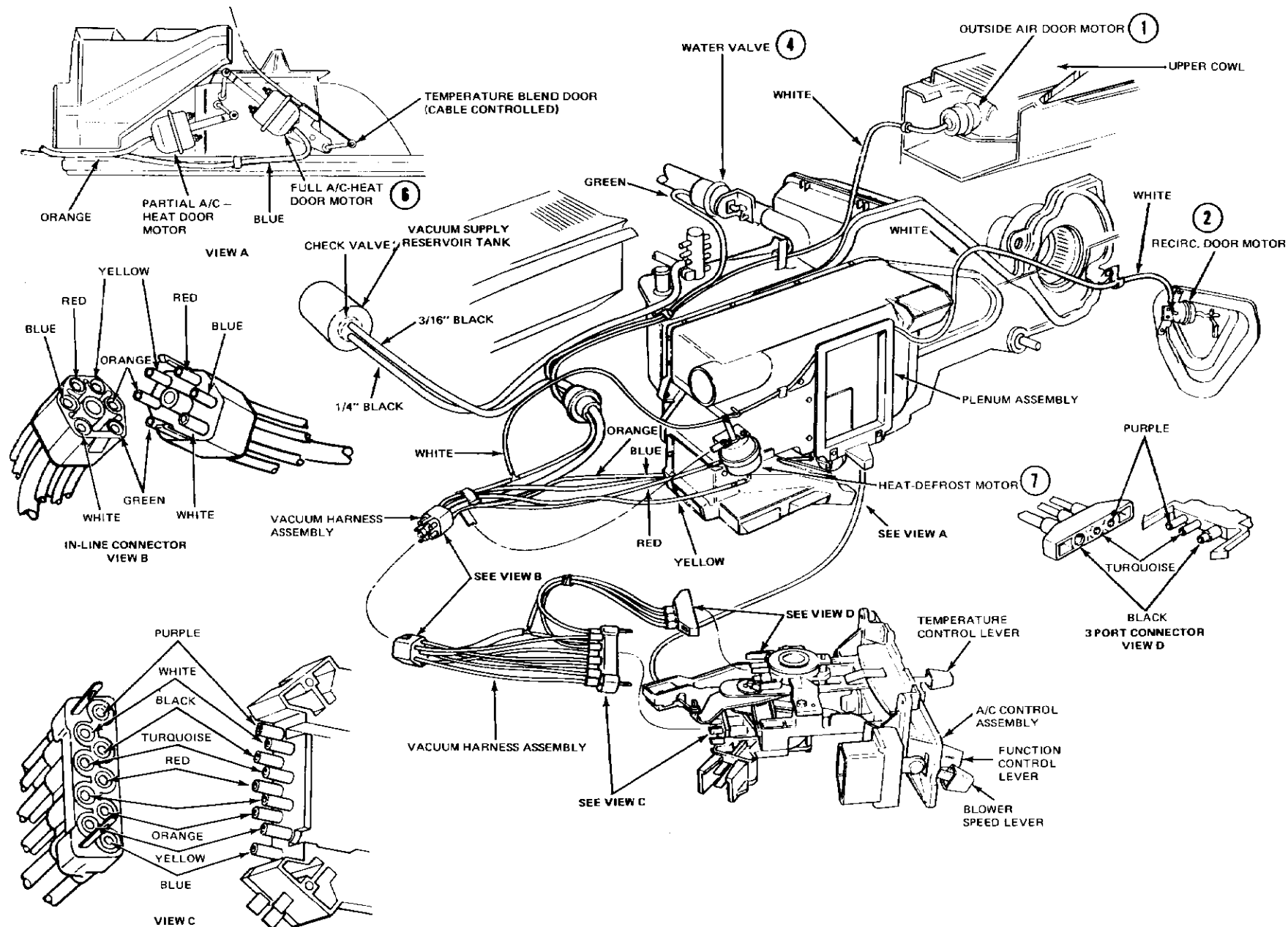
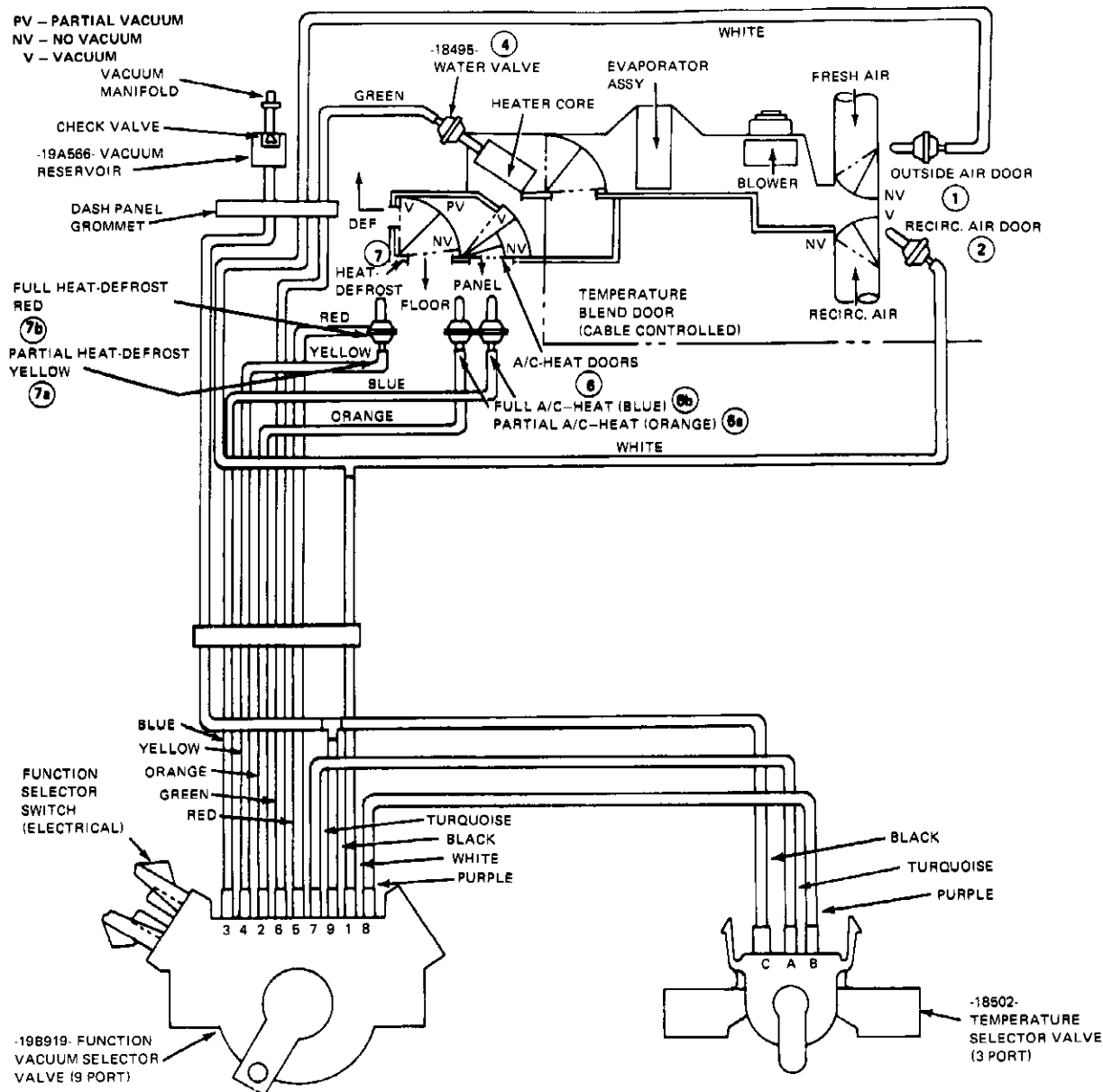


FIG. 3 Manual Heater—A/C System—Vacuum Controls Installation



PORT	FUNCTION	FUNCTION SELECTOR VALVE POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI-LO	HEAT	DEF (DEFOG)	DEFROST	
1	Outside - Recirc.	V		To 8					White 1-2
2	Partial A/C-Heat		V	V	V				Orange 6a
3	Full A/C-Heat		V	V					Blue 6b
4	Partial Heat-Defrost	V	V	V	V	V	V		Yellow 7a
5	Full Heat-Defrost	V	V	V	V	V			Red 7b
6	To Engine Water Valve	V	V	To 7	To 7	To 7	To 7	To 7	Green 4
7	From Temp. Valve Port A	Seal	Seal	To 6	To 6	To 6	To 6	To 6	Turquoise
8	From Temp. Valve Port B	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
9	Source Vacuum	V	V	V	V	V	V	V	Black

PORT	FUNCTION	TEMPERATURE SELECTOR VALVE LEVER POSITIONS				HOSE COLOR
		COOL		TEMPERATURE	WARM	
C	Source Vacuum	V	V	V	V	Black
A	Water Valve	V				Turquoise
B	Outside - Recirc.	V	V			Purple

FIG. 4 Manual A/C Heater System Vacuum Schematic and Selector Test

The Pressure Differential Valve is a Schrader type valve that has been calibrated to open at a pressure range of 10 to 20 psi. Its function is to by-pass oil laden refrigerant around the restriction formed when the STV is closed (due to reduced heat load on the A/C system) and thereby provide an assured oil return to the compressor. Under high heat loads this valve is closed, since ample refrigerant is moving through the compressor suction line back to the compressor. Substitution of a Schrader type service access valve core from one of the gauge port valves is not permitted and would result in compressor damage by oil starvation because the substituted valve core would never open.

The calibrated Pressure Differential Valve Core is supplied installed in the liquid bleed line fitting of the Suction Throttling Valve and is not serviced separately.

INSPECTION AND ASSEMBLY REQUIREMENTS

O-ring seal surfaces must be free of dirt, lint, burrs and scratches.

All O-rings must be lubricated with clean refrigerant oil immediately prior to installation.

NOTE: At any time a hose or component connection leak is observed, tightening the connection will only stop the leak temporarily. To correctly repair the leak, the connector fitting must be separated, cleaned and a new O-ring installed. The O-ring and connector surfaces should be lubricated with clean refrigerant oil prior to assembly.

REFRIGERANT FLOW

1. Liquid refrigerant from the receiver/drier enters the high pressure liquid line fitting of the By-Pass Orifice (BPO) Expansion Valve.
2. During stabilized (vehicle shutdown) conditions, the pressure on the bottom of the Expansion Valve diaphragm rises above the pressure on the top of the diaphragm, closing the valve.
3. When the system is started, the pressure on the bottom of the diaphragm drops rapidly, allowing the valve to open and spew liquid refrigerant to the lower evaporator tube where it begins to vaporize.

4. The compressor suction draws the vaporized refrigerant out of the top of the evaporator at the outlet (top) tube where it passes, and the temperature is transferred to the bulb of the capillary tube which is clamped tightly on the tube.
5. Gas pressure in the capillary tube drops when cooled and the expansion valve starts to close. Its pressure rises with evaporator superheat and opens the expansion valve, allowing more refrigerant to flow.
6. Pressure differences, between the evaporator and compressor, force the Suction Throttling Valve control piston further into the valve cylinder. This allows the refrigerant to escape out of the internal side slots of the STV and enter the housing, or suction side, of the Suction Throttling Valve.
7. As the system operates, the temperature (and pressure) in the evaporator core begins to drop. If operating conditions (ambient temperature, vehicle speed, blower speed) permit the temperature of the core to approach the freezing point, the reduced pressure in the evaporator core allows the STV piston to move back and partially cover the side slots. This action "throttles" or restricts refrigerant flow through the STV and maintains the evaporator core pressure of 28.5 psi. This pressure for R-12 corresponds to a temperature of 32°F. The evaporator core is therefore kept above the temperature at which it would freeze the condensed moisture on its surface.
8. The liquid bleed line circuit parallels the Suction Throttling Valve. The Pressure Differential Valve, in the circuit (no replacement part available), starts to open when the suction pressure in the STV housing is 10 psi less than the evaporator pressure. It will fully open when the suction pressure is 20 psi less than the evaporator pressure.
9. The bottom of the pressure sensing diaphragm (on top of the expansion valve) internally senses the evaporator pressure through the internal passages around the ball and plate assembly push pins. As evaporator pressure is increased, the diaphragm flexes upward pulling the push pins away from the

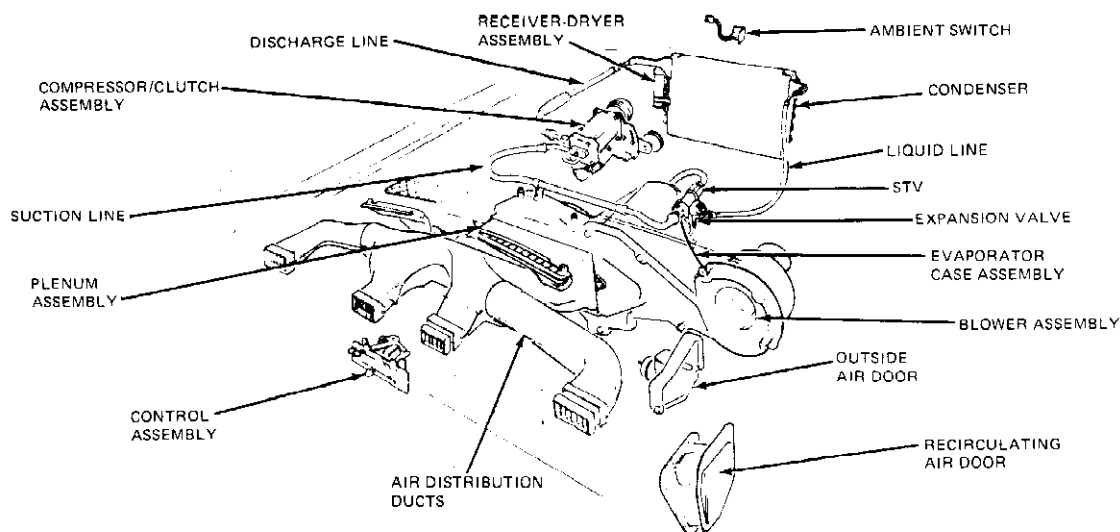
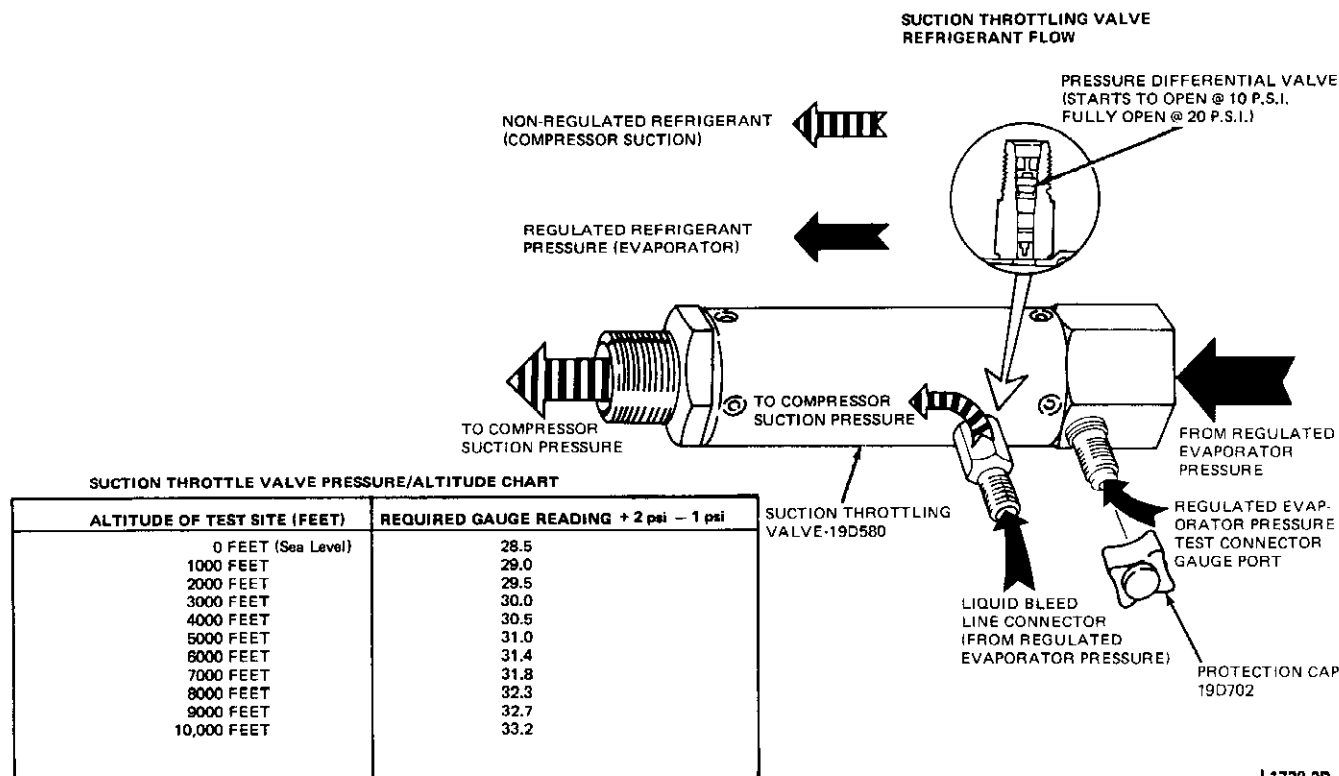


FIG. 5 Manual Heater—A/C System—Installation

ball and plate assembly. The expansion valve spring forces the ball onto the slotted tapered seat and the liquid refrigerant flow is reduced. As the pressure is reduced, due to the restricted refrigerant flow, the diaphragm flexes downward again opening the expansion valve to provide the required controlled pressure and refrigerant flow condition.

10. Gas in the capillary tube bulb produces the required pressure on the top of the pressure sensing

diaphragm. As the cool refrigerant passes through the evaporator outlet tube, the temperature is transferred to the bulb of the capillary tube and the gas above the diaphragm will contract and allow the expansion valve spring to close the expansion valve. When heat from the passenger compartment is absorbed by the refrigerant, it will cause the gas in the capillary tube to expand and the push pins will again force the expansion valve to open, allowing more refrigerant to flow so that more heat can be absorbed.



L1720-2D

FIG. 6 By-Pass Orifice Type Suction Throttling Valve and Pressure Altitude Chart

ADJUSTMENTS

TEMPERATURE CONTROL CABLE ADJUSTMENT

1. Loosen the cable housing attaching screw at the plenum bracket.
2. Move the temperature control lever to maximum COOL position.
3. Adjust the cable at bracket on plenum by sliding cable flag in bracket groove until the temperature door crank arm is in the full right position. Tighten the cable screw at the plenum bracket.

REMOVAL AND INSTALLATION

PLENUM CHAMBER

The plenum chamber is located under the instrument panel. Two rectangular openings in the dash panel allow air to flow from the evaporator case into the plenum. It is necessary to remove the instrument panel to remove the plenum (see Figs. 5 and 7).

DEFROSTER NOZZLES

The defroster nozzles are accessible by removing the instrument panel pad and loosening the Y-brace forward of the cluster to remove the left nozzle. Remove two defroster-to-panel mounting screws and one defroster-to-defroster duct attaching screw to remove each nozzle. Separate each air duct from the defroster nozzles and remove the nozzles upward through the instrument panel pad opening.

VACUUM MOTORS

The outside air damper door vacuum motor can be serviced by removing the cowl air intake screen under the hood (Fig. 8) and the recirculating air door motor by removing the right cowl trim panel. The vacuum controlled water valve is readily accessible in the engine compartment. (Refer to Fig. 3.) The A/C-Heat door vacuum motors and heat/defrost door motor on the bottom and left side of the plenum do not require removal of the instrument panel pad to gain access to

the motors. Refer to Fig. 9 for removing vacuum and electrical connectors.

CONDENSER AND RECEIVER ASSEMBLY

The condenser and receiver assembly is mounted to the radiator support with four ISO-mounts and is serviced by removing the radiator and sliding the condenser rearward through the radiator support (Fig. 10).

AIR CONDITIONING REGISTERS AND AIR DUCTS

Air Ducts

To remove the register air ducts, it is necessary to remove the instrument panel pad and instrument panel (refer to Figs. 11 and 12).

Register Louvers

With reference to Fig. 13, pry on the end pivot with thin blade to separate the pivot from pivot hole and pull the barrel assembly rearward from register housing.

The barrels can only be installed one way because of the sizes of the two pivots and retaining holes.

CONTROL ASSEMBLY

1. Remove A/C control knobs and accessory switch knob.
2. Remove applique covering the control assembly.
3. Remove the ash tray and ash tray support assembly.
4. Remove four (4) screws from face of control assembly.
5. Remove temperature control cable from control head.
6. Disconnect the vacuum harnesses from vacuum selectors.
7. Disconnect the electrical wiring connectors from blower switch, vacuum switch and illumination bulb.
8. Remove control head from rear of instrument panel.

To install, reverse the above procedure and adjust the temperature cable for proper output.

OUTSIDE AIR DOOR ASSEMBLY (See Fig. 8)

Removal

1. Raise hood and remove left screen from cowl top panel. View A.

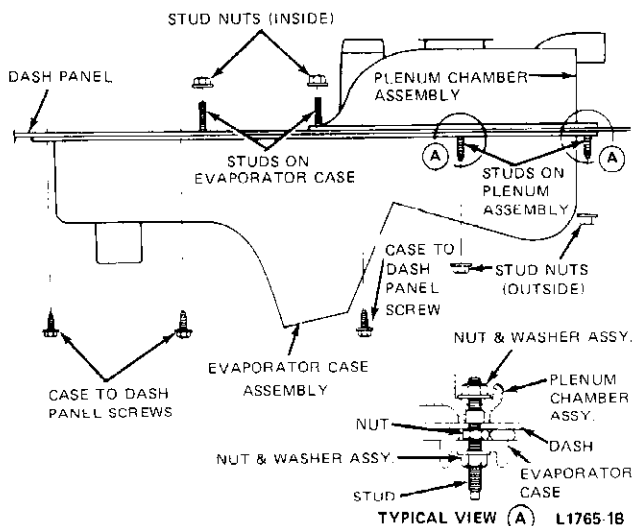


FIG. 7 A/C Heater System Dash Panel Attachments

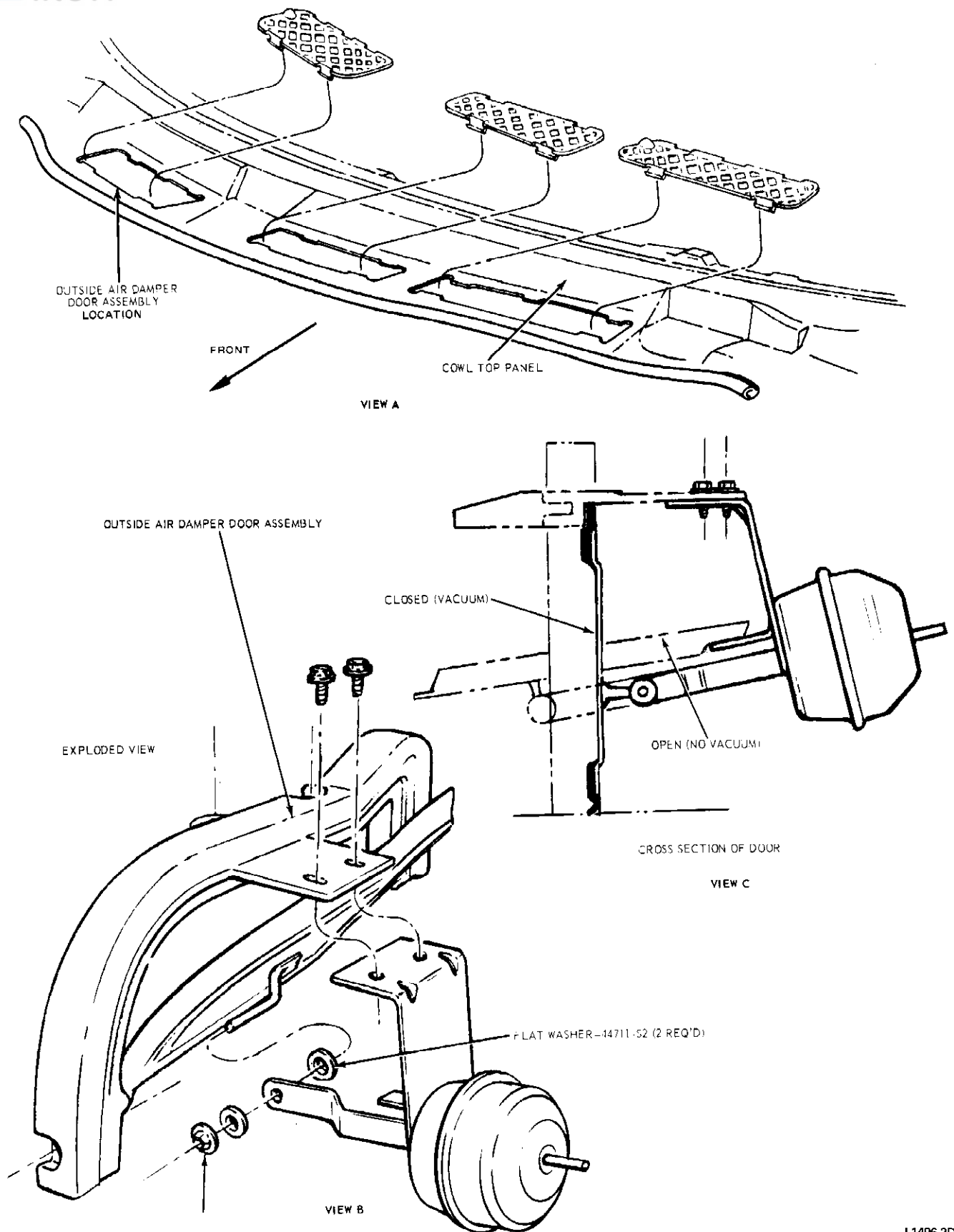


FIG. 8 Outside Air Door Assembly

L1496-2D

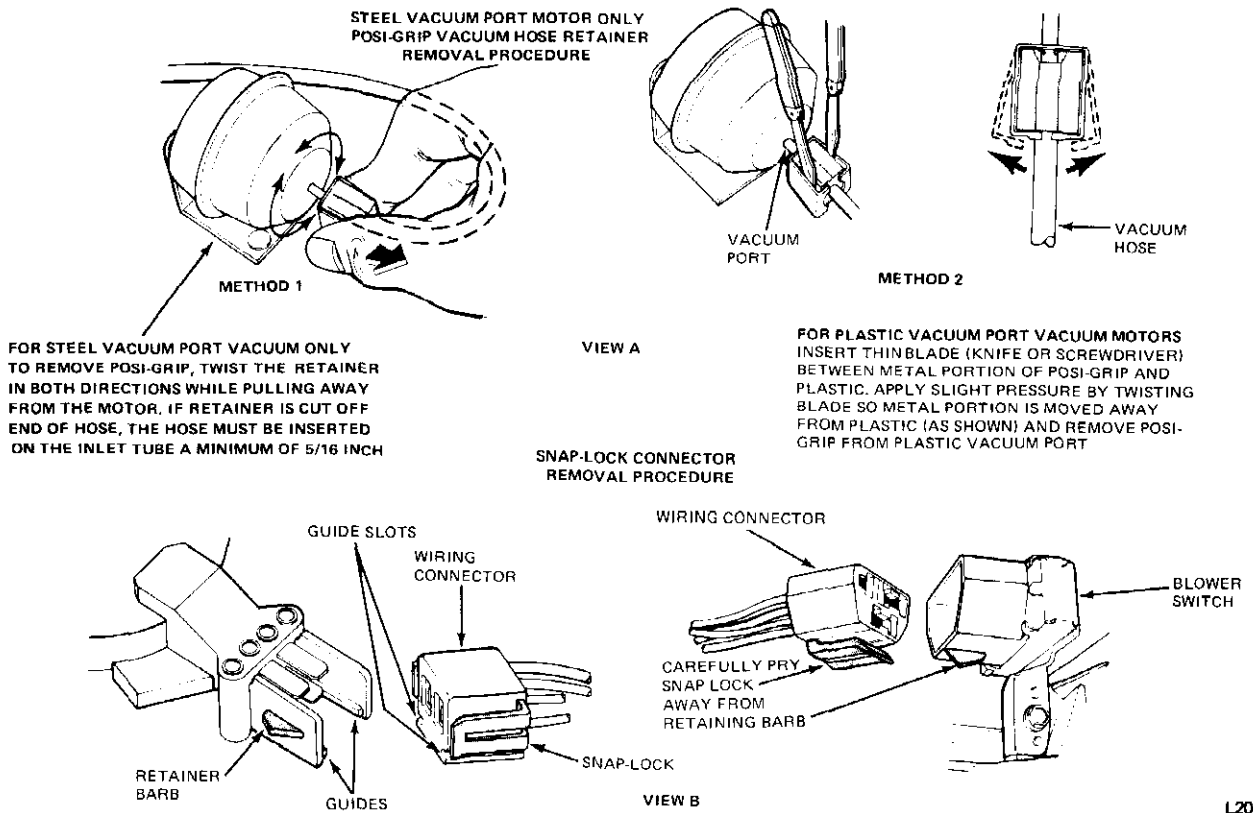


FIG. 9 Removing Vacuum and Electrical Connectors

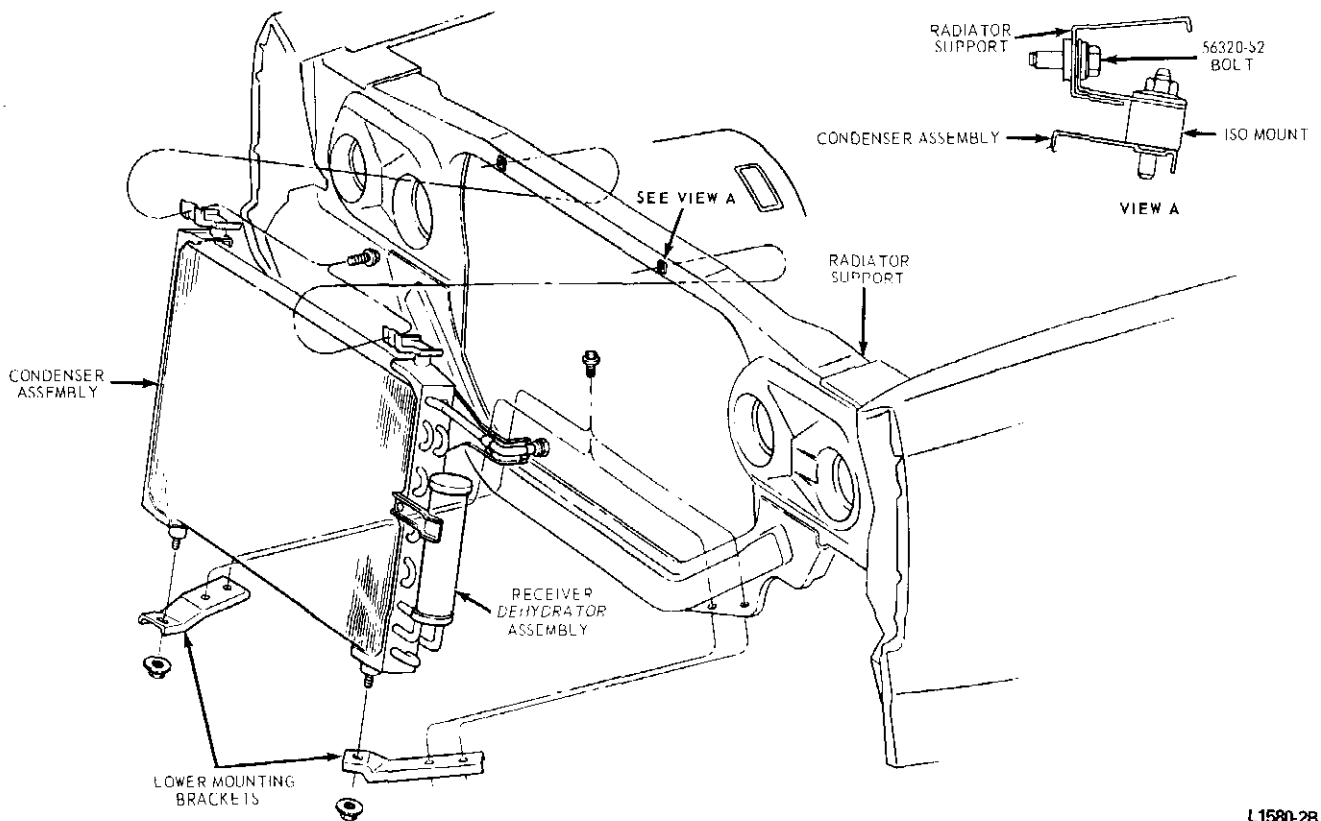
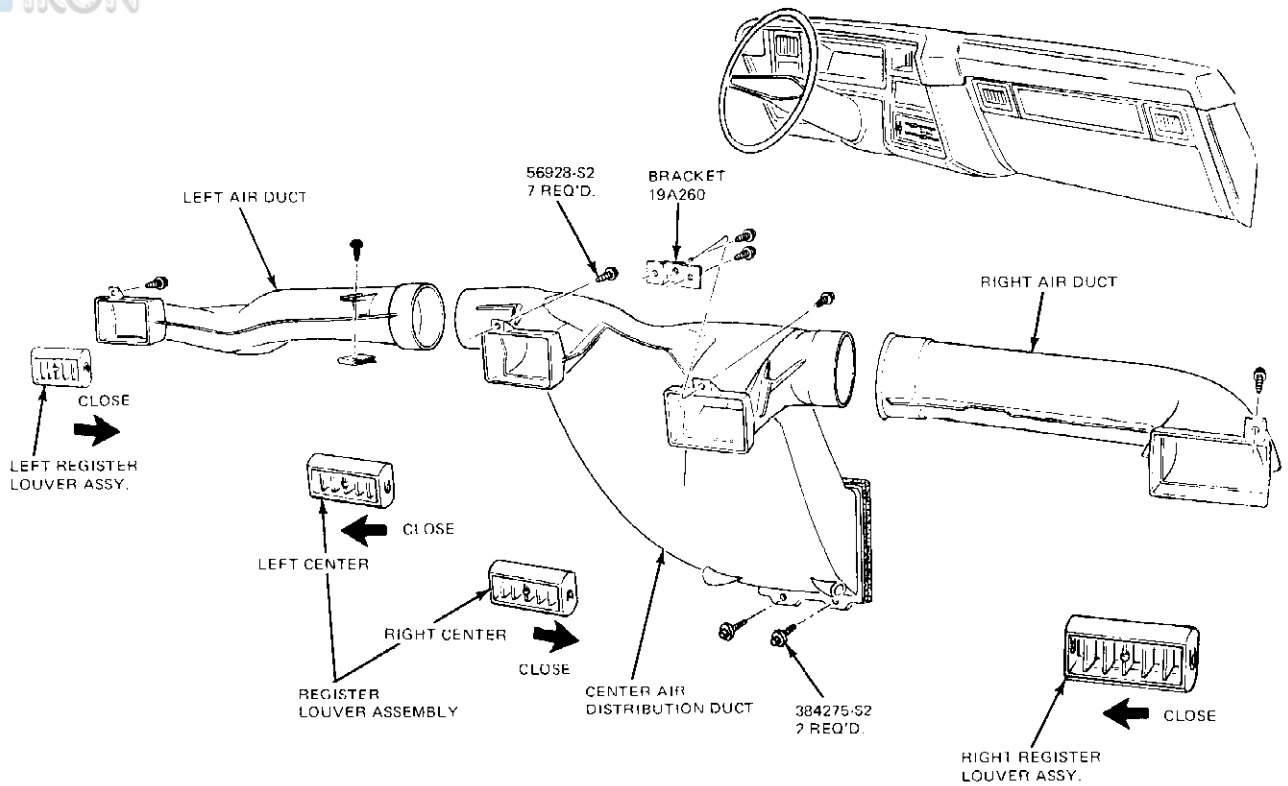


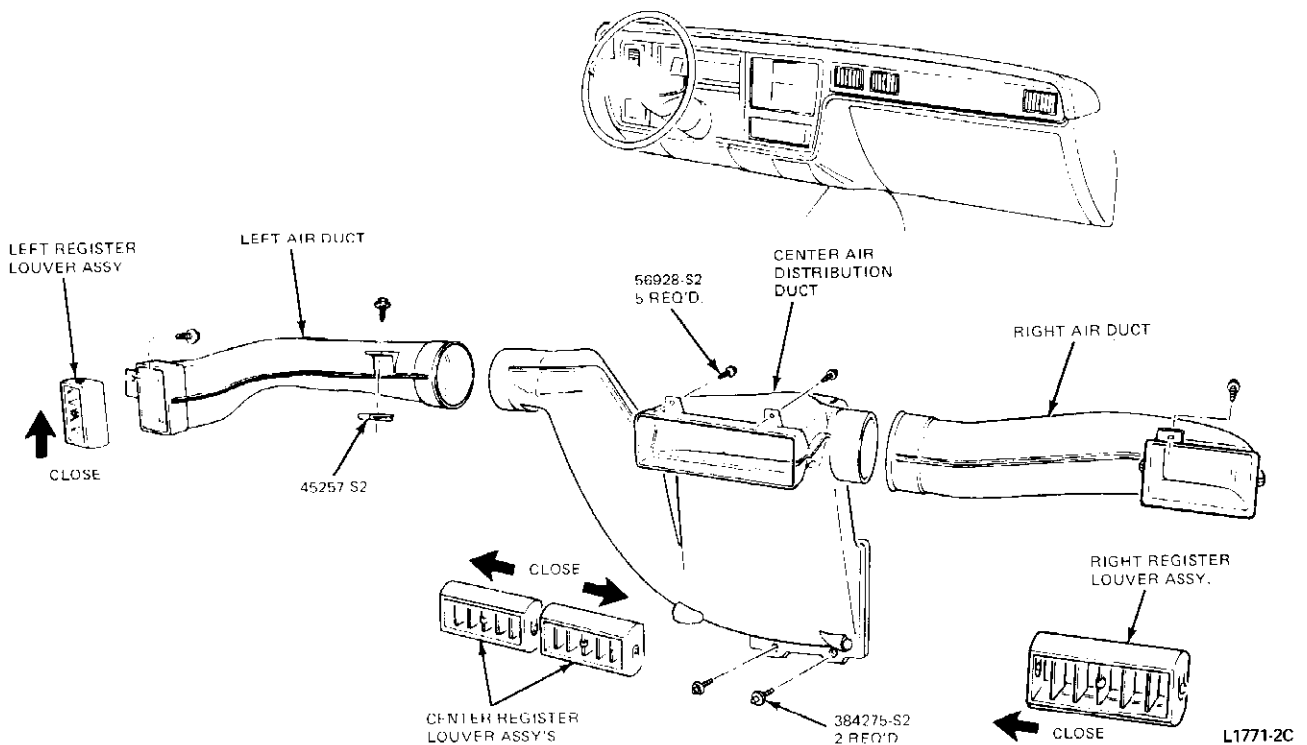
FIG. 10 Condenser and Receiver Assembly

2. Disconnect vacuum hose from outside air door vacuum motor.
3. Remove two (2) vacuum motor mounting plate screws. View B.
4. Remove two (2) air door to top cowl mounting screws.
5. Carefully remove spring clip and two flat washers from door crank arm and remove vacuum motor.



L1770-2C

FIG. 11 Ford Air Ducts and Registers



L1771-2C

FIG. 12 Mercury Air Ducts and Registers

6. Move air door assembly inboard and rotate door and frame assembly carefully to clear opening in cowl top panel.

Installation

1. Carefully insert air door and frame assembly into position in cowl top panel.
2. Install motor shaft on door crank arm as shown in View B.
3. Align air door frame mounting holes with two screw holes in cowl top panel.
4. Install air door frame mounting screws. Do not tighten screws.
5. Install vacuum motor mounting plate screws.
6. Tighten air door frame mounting screws.
7. Connect vacuum hose to motor.
8. Install cowl screen.

EVAPORATOR CORE (See Figs. 14 and 15)

NOTE: Observe Safety Precautions as outlined in Part 36-31.

1. Discharge refrigerant system (Part 36-32).
2. Disconnect suction line from STV and cap suction line and STV.
3. Disconnect liquid line from expansion valve and cap valve and liquid line.
4. Remove insulation tape from expansion valve capillary bulb. Disconnect capillary bulb from suction tube (2 clamps-2 screws).
5. Remove STV clamp (1 screw).
6. Remove liquid line support clamp (1 screw).

7. Remove four (4) right to left cover flange screws.
8. Remove five (5) cover to case mounting screws from left (inboard) cover and remove cover.

NOTE: A bead of rope sealer between the two covers must be replaced during installation.

9. Remove five (5) cover to case mounting screws from right (outboard) cover.
10. Pull evaporator core and right cover diagonally forward away from case.
11. Disconnect oil return line from STV.
12. Disconnect STV from evaporator core.
13. Remove right cover from core.
14. Disconnect expansion valve from evaporator core tube.
15. Remove core mounting gasket.

To Install, reverse the above procedure. Make sure all new O-ring seals are liberally lubricated with the specified refrigerant oil and the O-rings and expansion valve capillary bulb are positioned properly in their respective locations.

Evacuate and charge the refrigerant system with 4-1/4 plus 1/4 lbs, minus 0 lbs, of Refrigerant-12 (Part 36-32).

HEATER CORE (See Fig. 16)

1. Drain engine coolant.
2. Disconnect heater hoses from core tubes.
3. Remove heater core cover plate and gasket (7 screws).

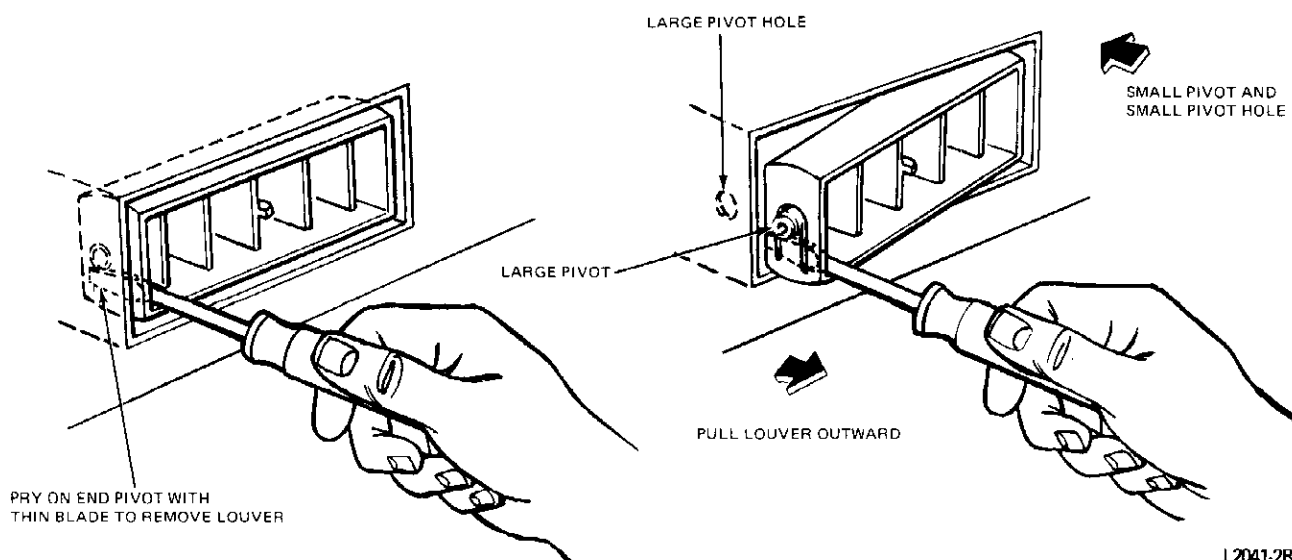
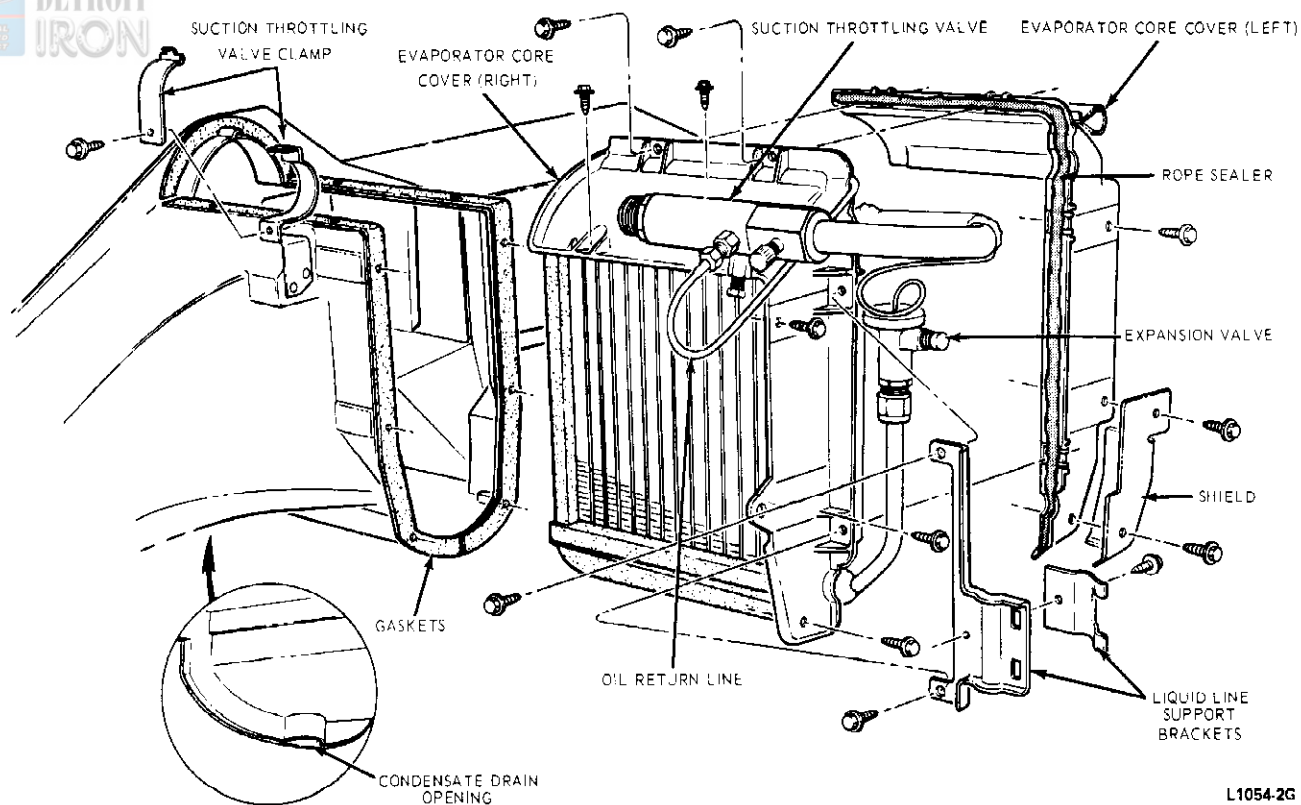
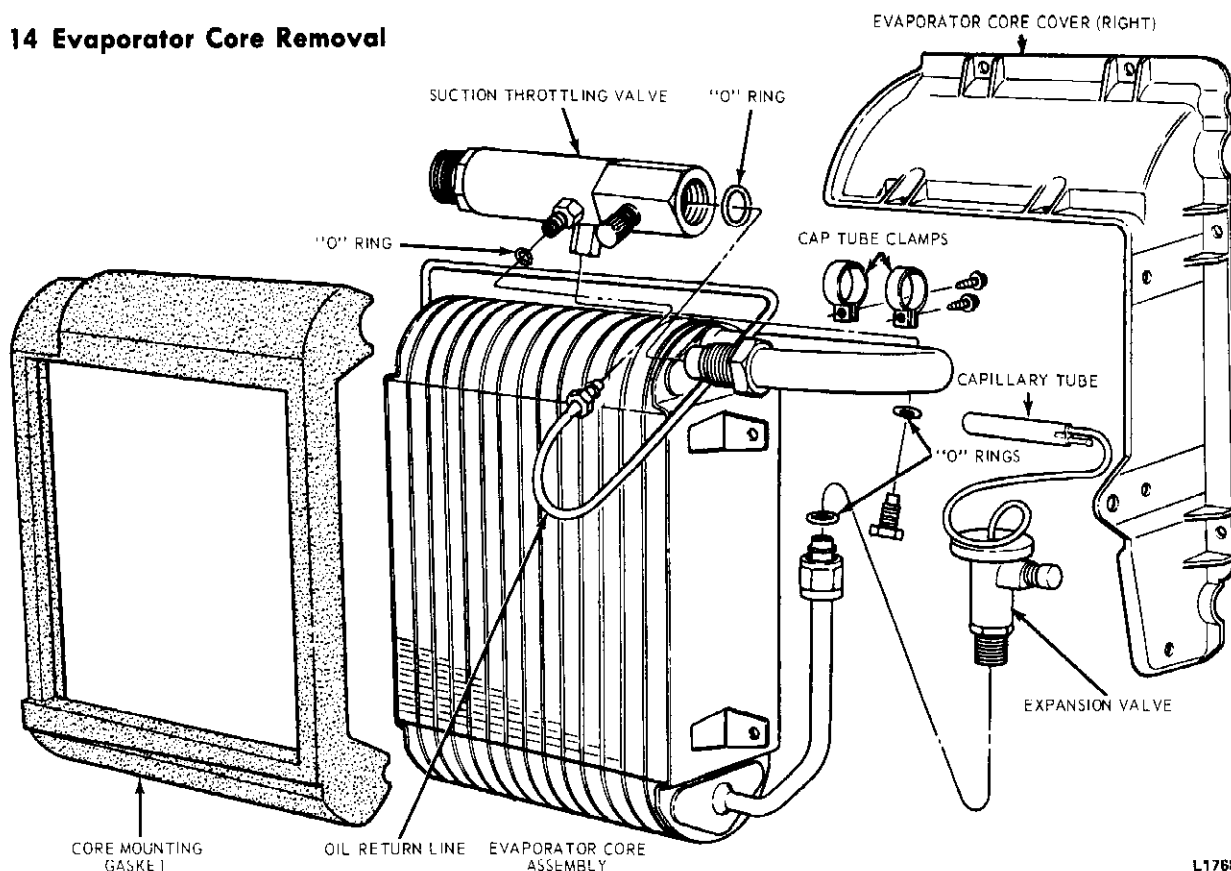


FIG. 13 Removing Louver Assemblies



L1054-2G

FIG. 14 Evaporator Core Removal



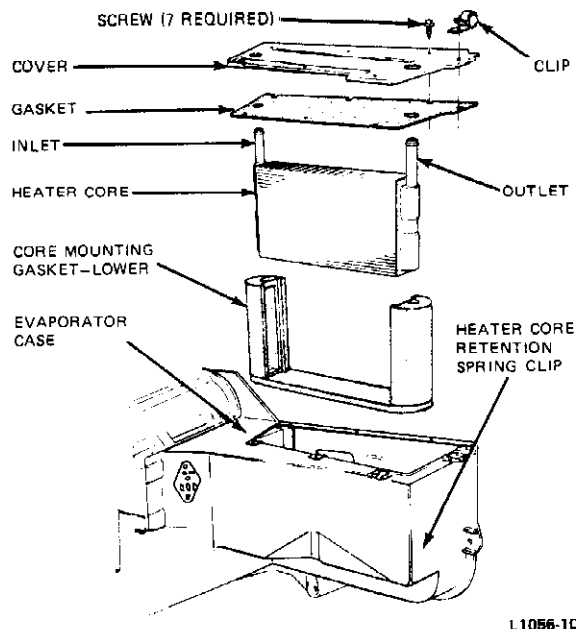
L1768-2C

FIG. 15 Evaporator Core Disassembly

4. Pull heater core and mounting gasket up out of case.
5. Remove core mounting gasket.

Reverse the procedure to install core and check coolant level.

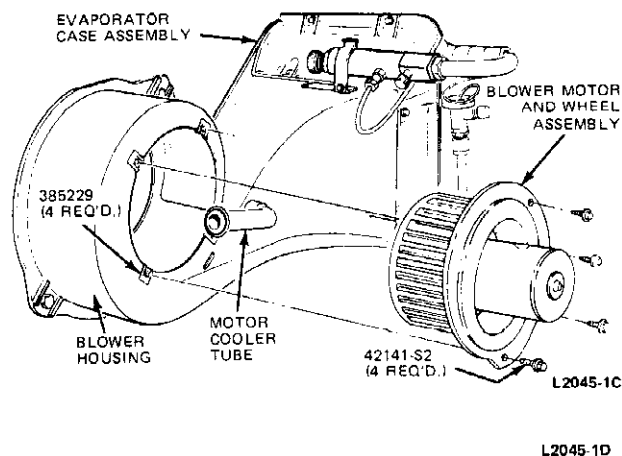
During core installation, make sure core and gasket seat firmly in case.



L1056-1D

FIG. 16 Heater Core Removal**BLOWER MOTOR AND WHEEL ASSEMBLY (FIG. 17)**

1. Disconnect the ground cable from the battery.
2. Remove the right front tire and wheel assembly.
3. With reference to Fig. 18, locate the access opening area shown and clean this area of the apron.
4. Drill a 1-inch hole tangent to the centerline of the bead using the drill dimple provided in the apron 1/2 inch from the centerline of the bead.
5. Cut out the access opening along the centerline of the bead with aircraft snips. Smooth any rough metal edges.
6. Working through the access opening in the apron, remove the blower motor cooling tube from the motor.
7. Disconnect the blower motor connector from the wiring harness.
8. Remove four (4) blower motor mounting plate screws and carefully move the motor and wheel assembly forward out of the evaporator case through the access hole.
9. Procure a cover plate (Part No. D3AZ-18A475-A).

**FIG. 17 Blower Motor and Wheel**

10. Position cover plate over access opening and drill eight (8) 1/8-inch holes in apron, using the 8 holes in the cover as a template. Protect the evaporator case with a metal shield during drilling operation to prevent damage to the case.
11. Apply rope sealer to the motor mounting plate and install blower motor and wheel as an assembly.
12. Replace the blower motor cooling tube in the cooling hole in the motor.
13. Reconnect the blower motor connector.
14. Reconnect battery ground cable and check function of blower motor.
15. Apply rope sealer to perimeter of the access cover and position the cover on the apron. Install cover with eight (8) 357903-S8 screws self-tapping round washer head (8-15 x 1/2 inch).
16. Replace tire and wheel assembly.

COMPRESSOR MOUNTING

All compressor-to-engine mounting braces and support brackets, idler clutch pulley and belt drive arrangements are shown in Figs. 19 and 20 Figs. 21 and 22 shown hose routings for the 5.8L, 6.6L and 7.5L (351, 400 and 460 CID) engines.

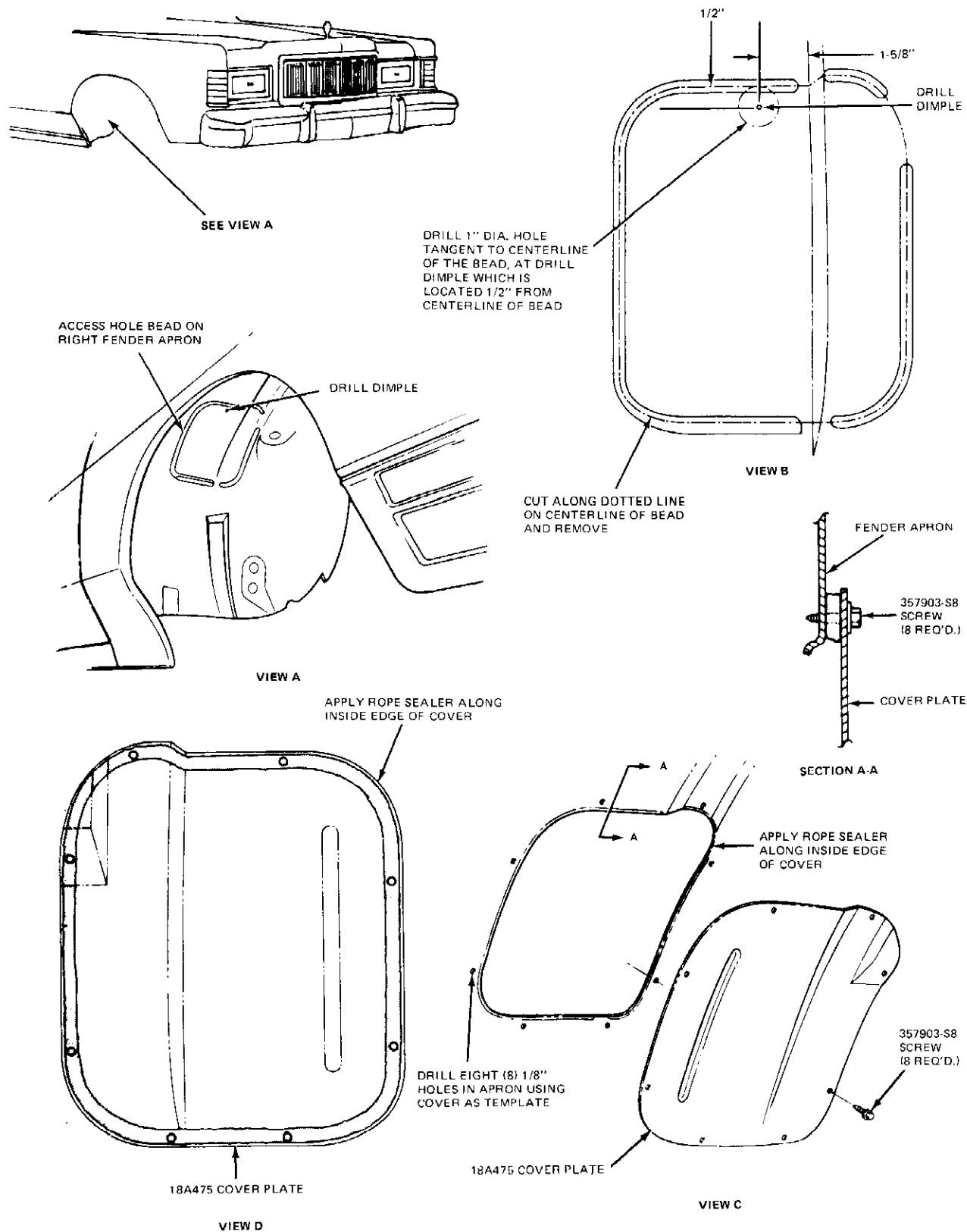


FIG. 18 Blower Access Hole in Fender

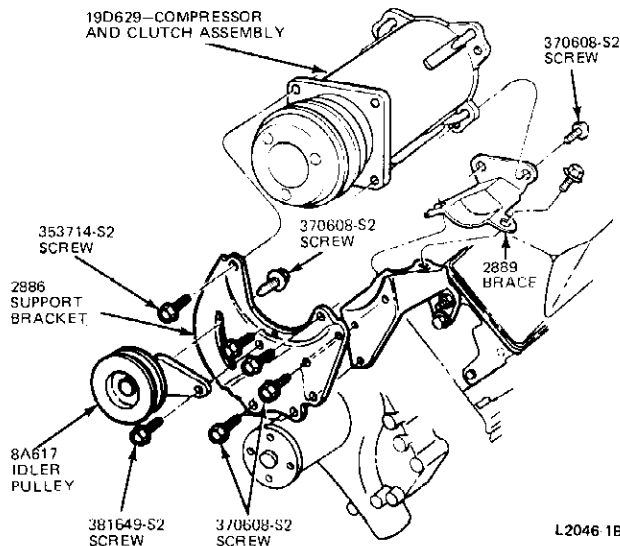


FIG. 19 Compressor Installation—5.0/5.8L (302/351W CID) Engines

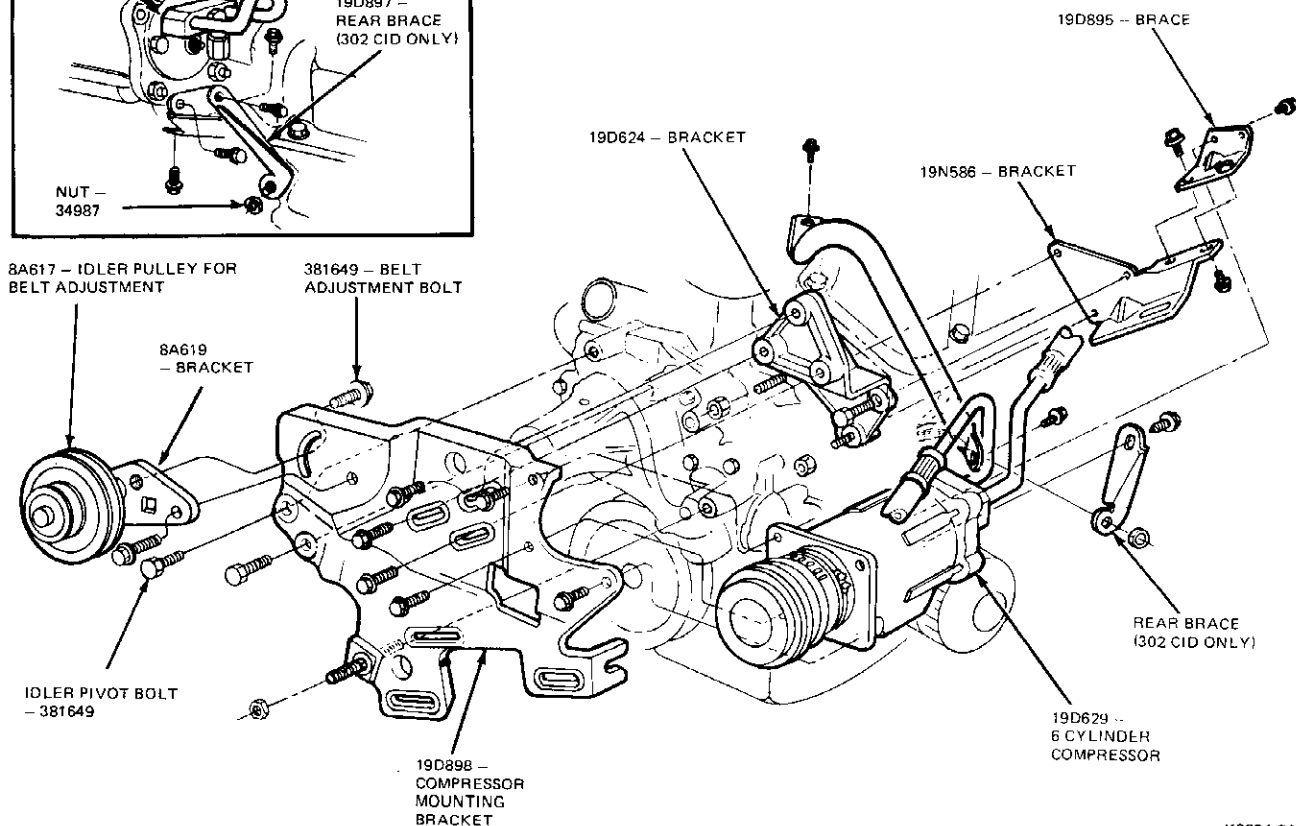
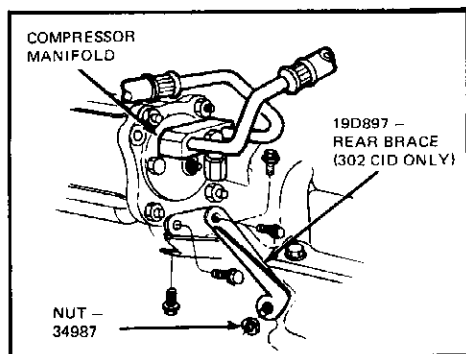
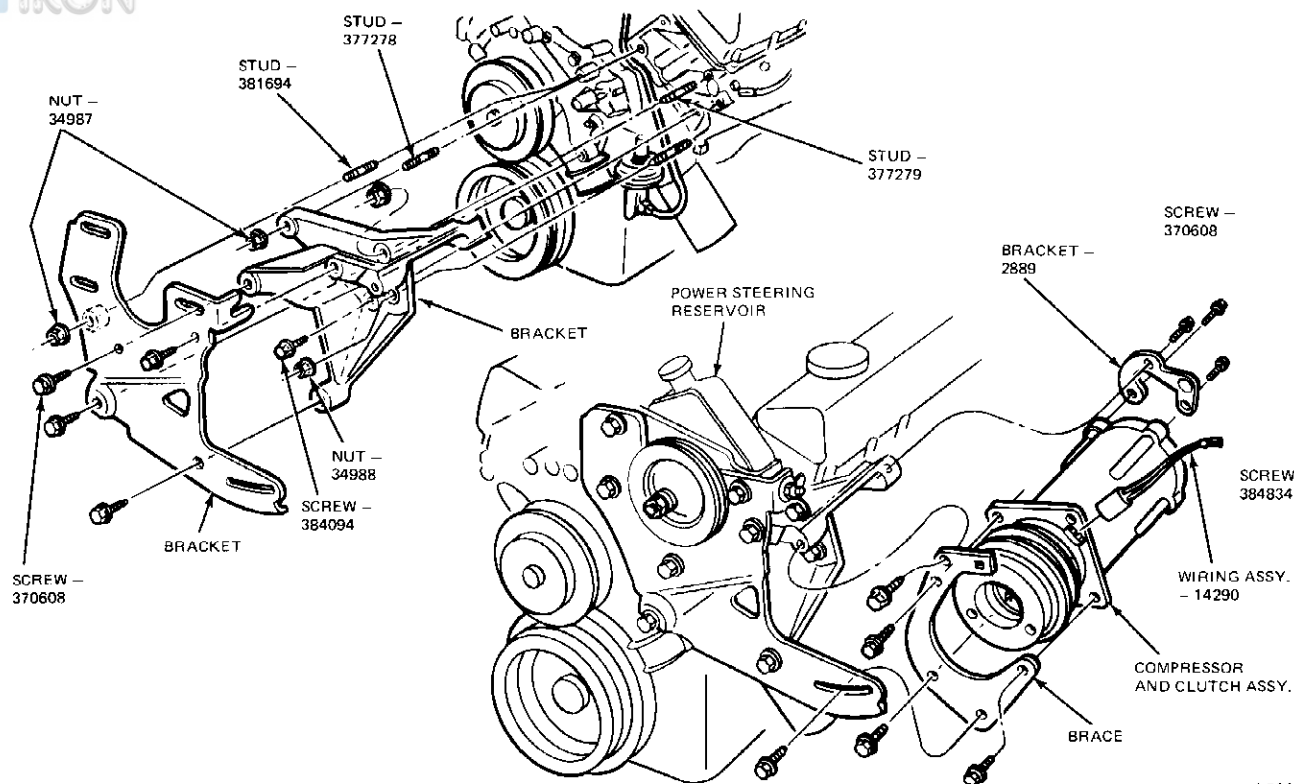


FIG. 20 Compressor Installation—5.8/6.6L (351M/400 CID) Engine

K3694-2A



L2048-2D

FIG. 21 A/C and Heater Hose Routing—7.5L (460 CID) Engine

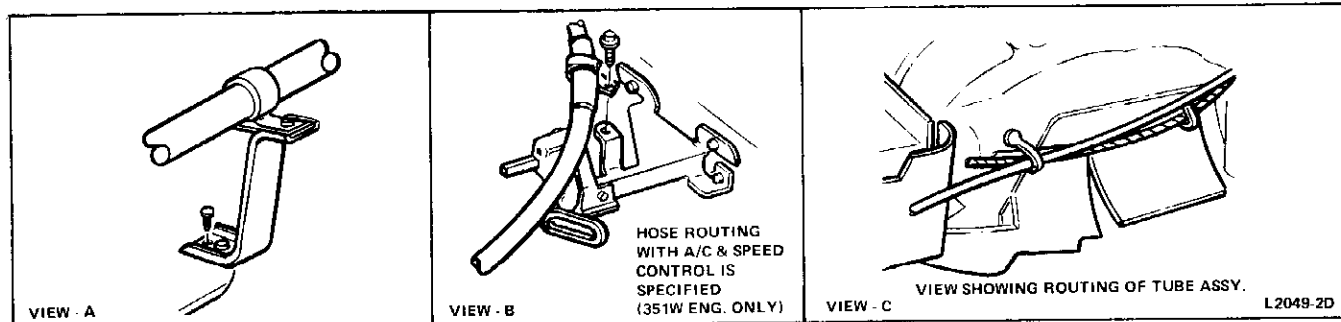
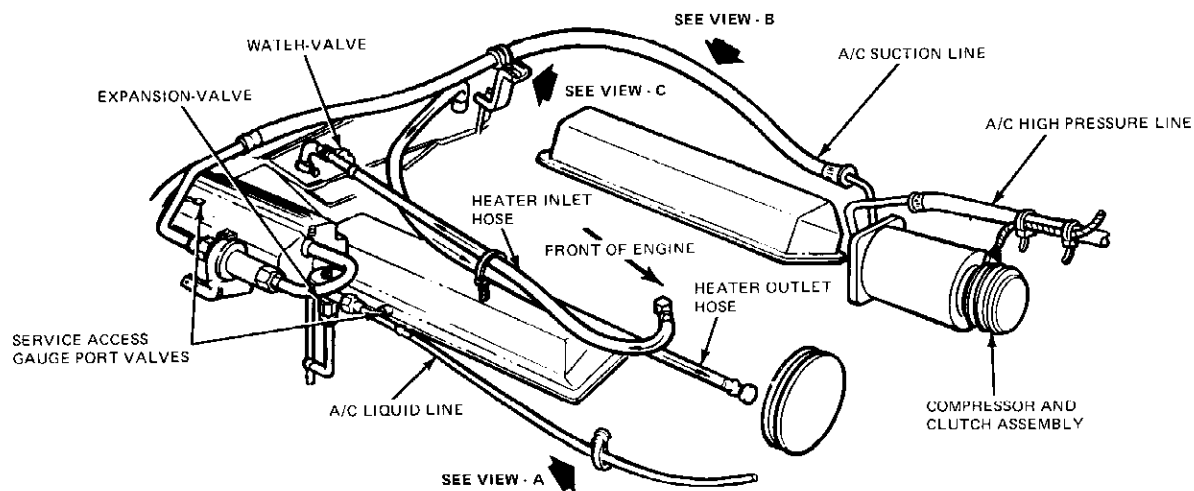


FIG. 22 A/C and Heater Hose Routing—7.5L (460 CID) Engine

SPECIFICATIONS

FORD AND MERCURY MANUAL A/C-HEATER

Protective Device — 35 amp. fuse (blower) located in fuse panel. — 20 amp. fuse (clutch) located in fuse panel.	Blower Motor Current Draw @ 12.8 Volts —
Control Illumination — One 1 CP 161 bulb.	Low 6.0 amps.
Rear Defog Jewel Lamp — One .5 CP — D3AB-18C622-AA Lamp and Wiring Assembly	Medium Low 12.0 amps.
Clutch Current Draw @ 12.8 Volts — 3.75 amps.	Medium High 16.0 amps.
Ambient Switch: Opens 35°F min. Closes 50°F max. 3°F minimum differential between opening and closing temperatures.	High 24.0 amps.
	Refrigerant Charge — $4\frac{1}{2} \pm \frac{1}{8}$ lbs. (R-12)
	Compressor: Displacement — 12.6 cubic inch
	o Oil Capacity — Frigidaire — 10.5 oz.
	o 5.0L (302 CID) — 1.50:1 o 6.6L (400 CID) — 1.53:1
	o 5.8L (351W CID) — 1.50:1 o 7.5L (460 CID) — 1.53:1
	o 5.8L (351M CID) — 1.53:1

CL2050-2C

Fairmont and Zephyr Heater - Air Conditioner System

PART
36-43

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS		REMOVAL AND INSTALLATION	
Compressor Drive Belt	43-19	Air Inlet Duct	43-25
Temperature Control Cable	43-19	A/C-Defrost Door	43-33
DESCRIPTION AND OPERATION		A/C-Defrost Door Vacuum Motor	43-33
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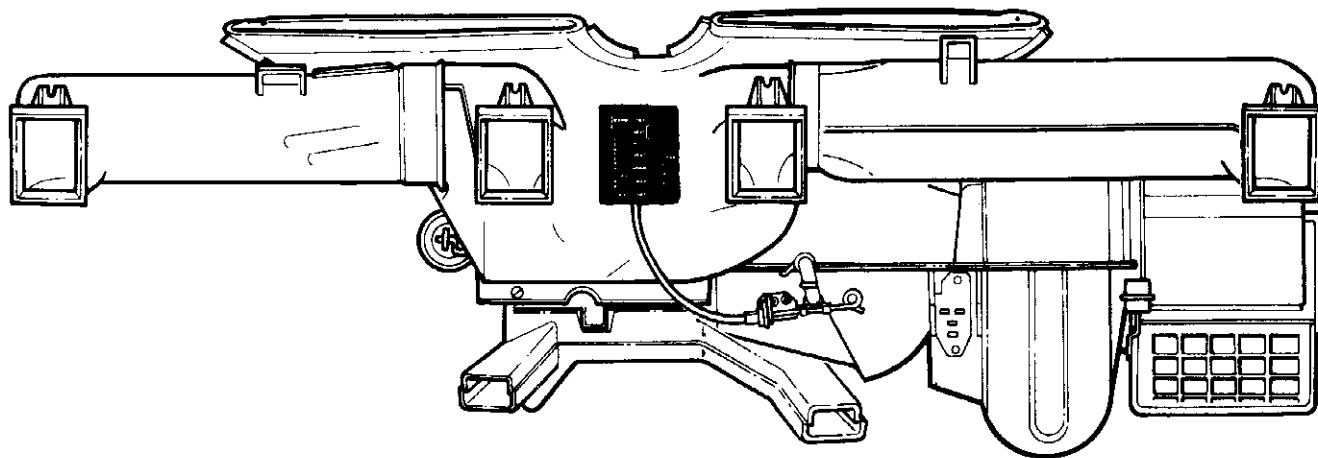
DESCRIPTION AND OPERATION

SYSTEM OPERATION

The Manual A/C-Heater System is shown in Fig. 1. During system operation, air is drawn directly into the system by the blower motor and wheel from the cowl air intake, independent of the temperature lever position, in all function control lever settings except OFF and MAX A/C. In the MAX A/C position, air flow is from inside the vehicle through the recirculation duct. The air is then forced by the blower through the evaporator core and, depending on the setting of the

TEMPERATURE lever, is forced through and/or around the heater core into the plenum. The air is then directed to the floor, defroster nozzles or the instrument panel registers depending on the position of the function control lever.

The volume of air flow through the system is controlled by a four position blower (FAN) switch. The blower (FAN) switch, used in conjunction with the resistor assembly, provides four blower speeds to control air flow through the A/C-heater assembly. The blower can be shut OFF only by moving the function control lever to OFF.



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FIG. 1 Manual A/C—Heater System

SYSTEM AIR FLOW

The A/C-heater system air flow schematic and vacuum control chart is shown in Fig. 2. This chart shows the possible air flow routes and door positions. The

vacuum control chart gives the vacuum applications for the different positions of the function and temperature control levers.