

<b>Light Truck and Bronco Heater — Air Conditioning System</b>		<b>PART 36-61</b>	
<b>APPLIES TO F-100 THROUGH F-350 AND BRONCO</b>			
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**DESCRIPTION AND OPERATION**

The manual A/C-heater is an integral unit with the evaporator housing mounted to the engine side of the dash panel. The plenum and air intake is mounted under the instrument panel. The condenser is located ahead of the radiator.

The system can be operated with either fresh or recirculated air, depending on the positions of the control levers (Fig. 1).

1. With function control (lower) lever on VENT—all air is outside air regardless of the TEMPERATURE lever position.
2. With function control (lower) lever in all other positions—system operates on recirculated air with TEMPERATURE lever on COOL to about 1-1/2 inches toward WARM. Outside air is used from about 1-1/2 inches toward WARM to WARM position.

The controls are located in the upper center of the instrument panel. The controls consist of two horizontal sliding levers and a blower switch. The top sliding lever is the temperature lever which controls the air blend door, outside-recirc. door, and the water valve. The function control (lower) lever controls air distribution to the desired outlets, and is also the blower off switch, and the compressor switch. The blower switch is located to the left of the horizontal sliding levers. This switch controls the blower motor speed only, and will not shut the blower OFF.

Air is drawn into the system through the recirculating air door or the outside air door, through the evaporator core into the evaporator housing. From that point, air is pulled around and/or through the heater core to the blower. The diversion of air through or around the heater core is dependent on the temperature lever setting. From the blower motor, air is forced into the plenum and distributed to the floor, defrosters or registers, depending on the setting of the function control (lower) control lever. Fig. 1 shows the air flow for the various function control lever settings. Fig. 2 shows the effect the temperature lever has on air flow and the water valve.

**CONTROL OPERATION**

The eight-port vacuum selector (located in the control assembly) is operated by the function (lower) control lever (Fig. 3). The rubber diverter plate located in the selector directs vacuum or atmospheric pressures to the ports and then to the vacuum motors as required by the system. The eight-port selector also comes equipped with a low speed blower switch that is activated when the lever is moved to the VENT position on the control assembly. At this point the outside air door is opened and a forced air ventilation system is in operation. The switch remains closed through the remainder of the lever travel. The second switch on the selector activates the

compressor clutch in the A/C position only.

In series with the clutch switch is the thermostatic de-icing switch which senses the temperature of the evaporator core through a capillary tube inserted in the core fins. Should the temperature of the core fall below 20 degrees F, the clutch is deactivated and the core is protected from icing. The de-icing switch is again activated when the core temperature reaches 35 degrees F.

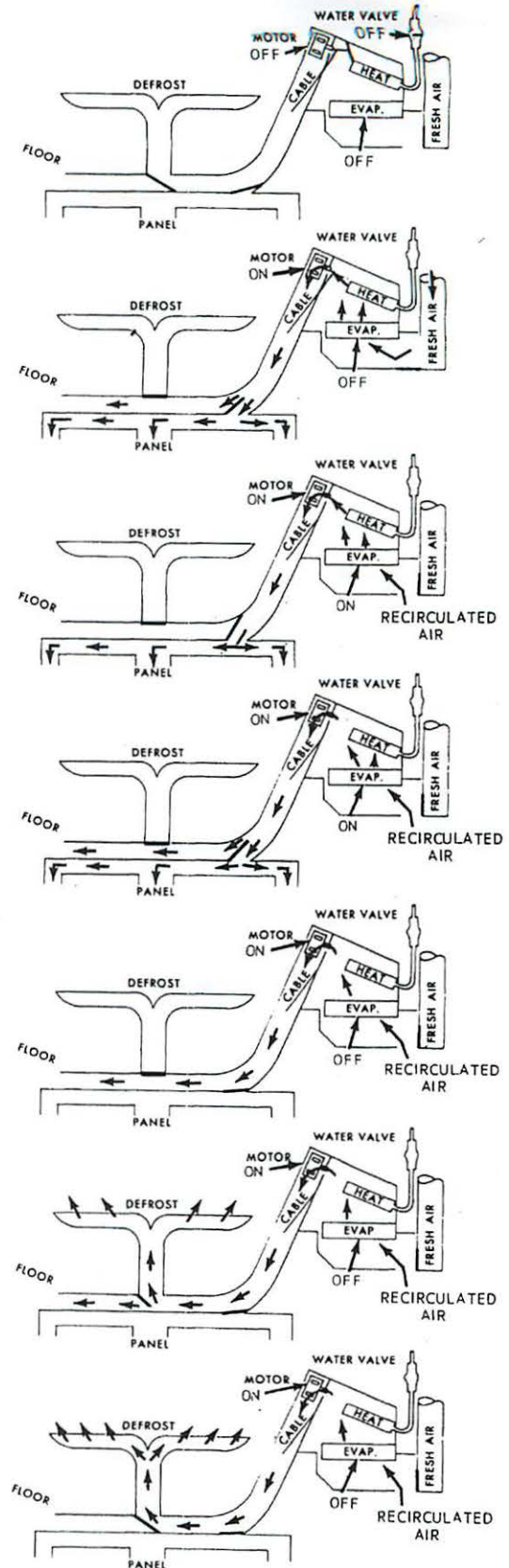
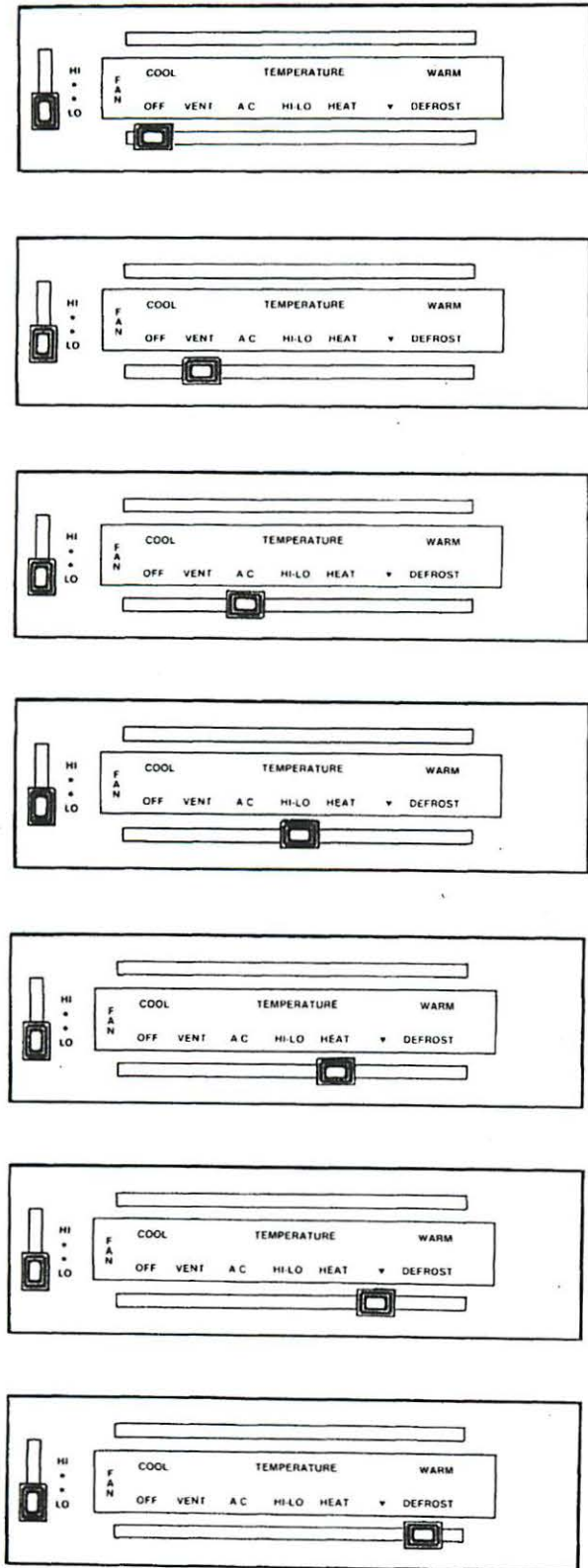
The three-port vacuum selector is also located on the control assembly and is operated by the temperature lever. The first 1/2 inch of travel changes the system to outside air. At 1 1/2 inch travel the water valve is opened.

The system temperature is further modulated by the movement of the air blend door which controls the amount of cooled air that passes through or bypasses the heater core. The blend door is connected to the temperature lever by a cable assembly.

The low blower switch, as mentioned above, is located on the eight port selector. If higher blower speeds are desired, they can be obtained by activating the blower switch. This switch has four speeds, Low, two intermediate speeds and High. The blower can only be shut-off by moving the function (lower) lever to OFF.

Figs. 3 and 4 show the vacuum schematic for the system and the vacuum applications for the various function control lever positions.

AIR FLOW



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FIG. 1 Manual A/C-Heater Air Flow Chart-Function Control Lever Position

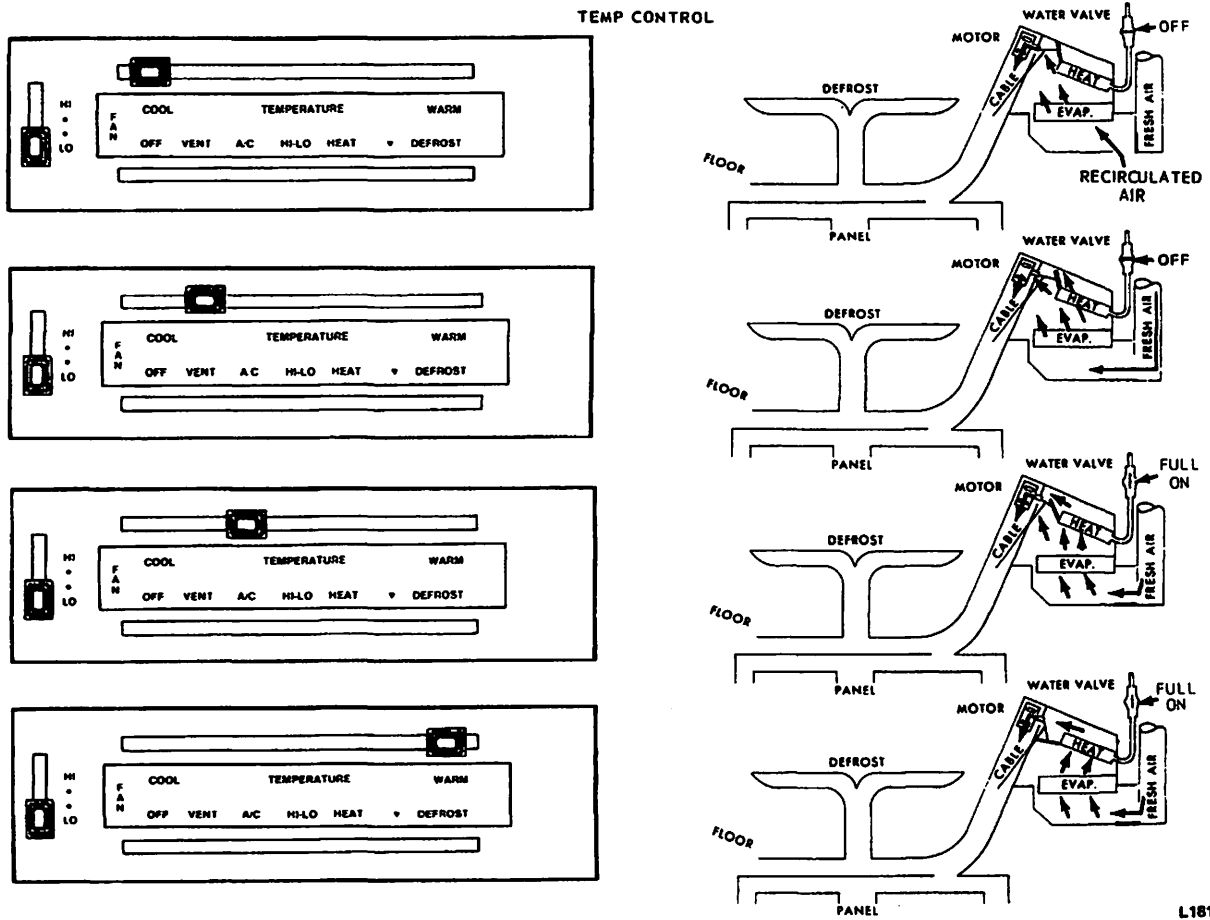
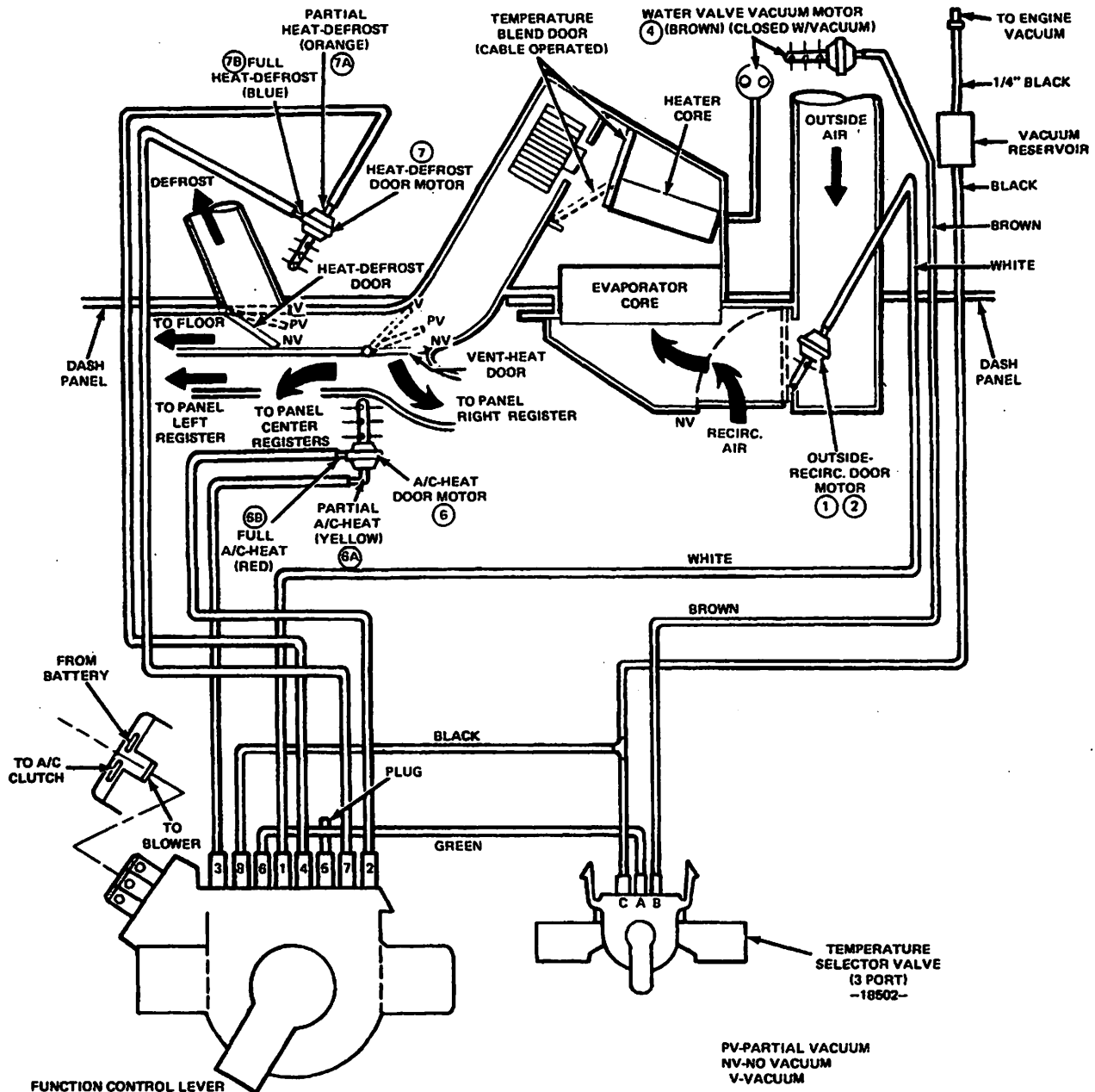


FIG. 2 Manual A/C-Heater Air Flow Chart—Temperature Lever Position

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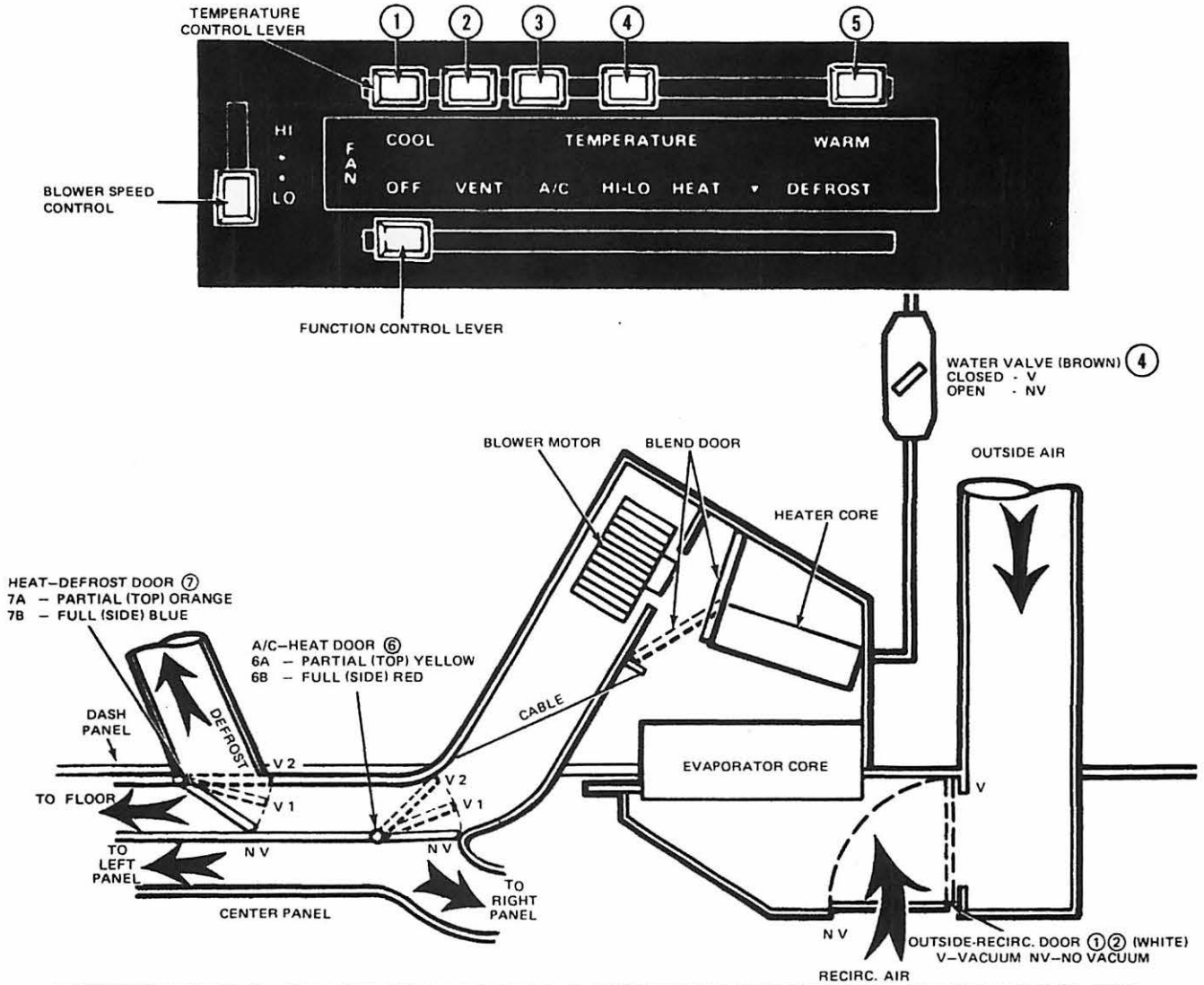


PORT	FUNCTION	FUNCTION SELECTOR VALVE POSITIONS							HOSE COLOR
		OFF	VENT	A/C	HI-LO	HEAT	(DEFQ)	DEFROST	
1	Outside-Recirc.	V			To 6	To 6	To 6	To 6	White 1-2
2	Full A/C-Heat			V					Red 6B
3	Partial A/C-Heat		V	V	V				Yellow 6A
4	Partial Heat-Defrost		V	V	V	V	V		Orange 7A
5	Sealed	Seal	Seal	Seal	Seal	Seal	Seal	Seal	
6	To Temp Port A	V	V	To 1	To 1	To 1	To 1	To 1	Green 4
7	Full Heat-Defrost	V	V	V	V	V	V	V	Blue 7B
8	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	Black
A	Outside-Recirc. Door	V		V	Green
B	Water Valve	V	V		Brown

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



**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	-	-	-	-	7b
VENT	Any Position	-	-	6a	-	7a	7b
	Cool - 1	1-2	4	6a	6b	7a	7b
A/C *	Cool - 2	-	4	6a	6b	7a	7b
	Cool - 3 Temp - 4	-	-	6a	6b	7a	7b
	Warm - 5	-	-	6a	6b	7a	7b
HI - LO	Cool - 1	1-2	4	6a	-	7a	7b
	Cool - 2	-	4	6a	-	7a	7b
	Cool - 3 Temp - 4	-	-	6a	-	7a	7b
HEAT	Warm - 5	-	-	6a	-	7a	7b
	Cool - 1	1-2	4	-	-	7a	7b
	Cool - 2	-	4	-	-	7a	7b
▽ (DEFOG)	Cool - 3 Temp - 4	-	-	-	-	7a	7b
	Warm - 5	-	-	-	-	7a	7b
	Cool - 1	1-2	4	-	-	7a	-
DEFROST	Cool - 2	-	4	-	-	7a	-
	Cool - 3 Temp - 4	-	-	-	-	7a	-
	Warm - 5	-	-	-	-	7a	-
VACUUM LINE COLOR CODE		WHITE	BROWN	YELLOW (TOP)	RED (SIDE)	ORANGE (TOP)	BLUE (SIDE)

\* COMPRESSOR CLUTCH ENGAGED WHEN EVAPORATOR TEMPERATURE IS ABOVE 34° F.  
 - NO VACUUM

FIG. 4 Manual A/C-Heater System Air Flow Schematic and Vacuum Control Chart—F-100—F-350 and Bronco

## ADJUSTMENTS

### AIR BLEND DOOR

The only adjustment necessary is the air blend door. This door is connected to the temperature (upper) control lever by a Bowden cable. To adjust, loosen the cable clamp screw (Fig. 5). Move the temperature control lever to the extreme left "cool position" and hold in that position. Then, rotate the air blend door

crank to the extreme forward position (Fig. 5), and tighten the cable clamp screw.

The loop of the Bowden cable is assembled to the door crank with the pigtail pointing away from the crank elbow. The cable flag is assembled to the bracket with one screw.

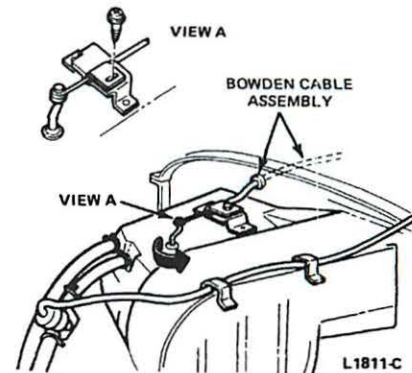


FIG. 5 Air Blend Door Cable Adjustment

## REMOVAL AND INSTALLATION

### COMPRESSOR AND DRIVE BELT

Refer to Part 36-30 for Removal and Installation procedures.

### HEATER CORE AND/OR BLOWER MOTOR

#### Removal (without discharging system)

1. Disconnect the battery cable, remove the carburetor air cleaner and partially drain the coolant system.
2. Remove the heater hoses from the heater core.
3. From under the hood, remove A/C hose support bracket from the cowl (one screw). See Figs. 6 and 7.
4. Remove the insulation tape from the expansion valve and sensing bulb. Then remove the cover plate and seal from the evaporator housing at the expansion valve (two screws).
5. Remove the glove box liner and remove the A/C duct by pulling from the instrument panel register and releasing the clip at the plenum.
6. Disconnect the right cowl fresh air inlet vacuum hose from the fresh air door vacuum motor.
7. Remove the evaporator rear housing from under the instrument panel. Then, remove the fresh air inlet tube from the evaporator rear housing (4 nuts and 1 bolt) and install one upper nut to retain evaporator housing-to-dash after rear housing is removed.
8. Disconnect wires from the de-icing switch and pull capillary tube out of evaporator core. Remove the de-icing switch mounting plate (four screws) and remove the plenum.
9. Remove two screws retaining plenum-to-dash (above transmission tunnel) and two screws to evaporator case and remove the plenum.

10. Install a piece of protective tape on "A" pillar inner cowl panel, at lower right corner of instrument panel.
11. Then, remove the lower right instrument panel-to-"A" pillar bolt and lower the center instrument panel brace, bolt and nut.
12. Position the instrument panel rearward and install the "A" pillar bolt to hold the panel in the rearward position.
13. Remove four evaporator retaining screws (Fig. 8).
14. Position the evaporator away from the case and secure it rearward and upward. Remove evaporator sealing grommet.
15. Remove heater core (3 screws retaining 2 plates).
16. Remove A/C-heat door (snaps off).
17. Remove A/C-heat door arm support (2 screws) and pivot arm retainer (1 screw).
18. Remove blower motor (2 screws) and remove blower wheel.

#### Installation

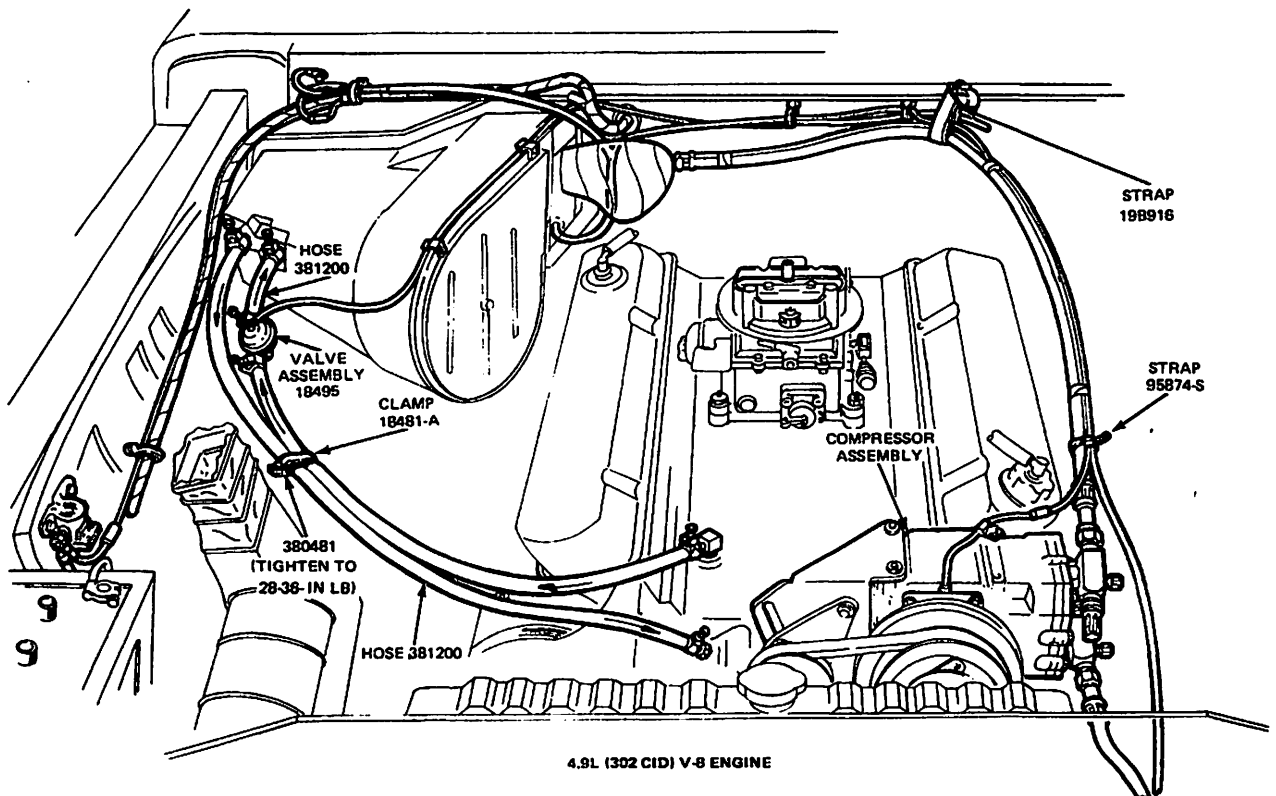
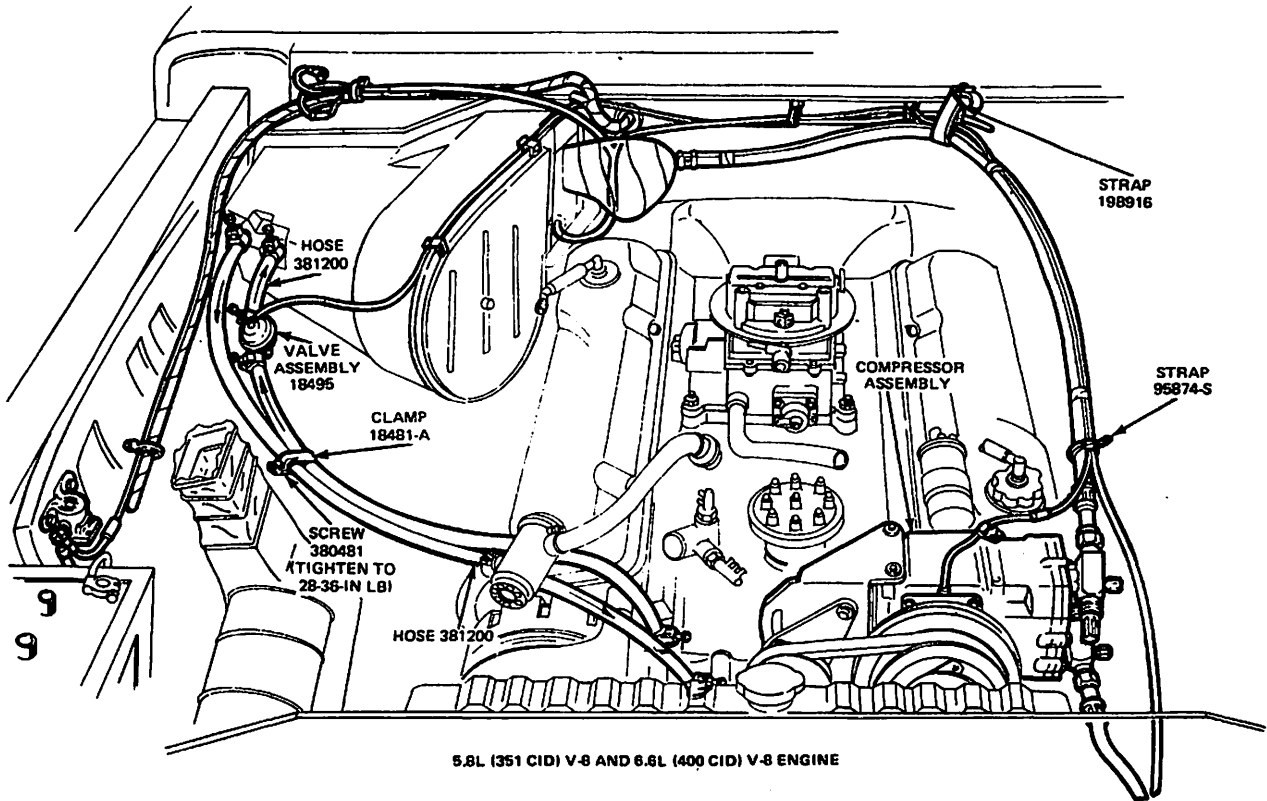
1. Transfer blower wheel to blower motor and panel assembly.
2. Install door arm pivot retainer (1 screw) and door arm support (2 screws).
3. Install A/C-heat door (snaps on).
4. Install heater core.
5. Remove the retainer that held the evaporator away from the case, install evaporator and tube sealing grommet.
6. Install the plenum (4 screws).
7. Install the de-icing switch mounting plate, install de-icing switch capillary tube back into evaporator core and position blower wire grommet.
8. Connect blower and de-icing switch wires.

9. Remove upper evaporator case retaining nut and install the evaporator outlet (4 nuts and 1 bolt). Then, position the air inlet bellows.
10. Connect the right cowl fresh air inlet vacuum hose to the fresh air door vacuum motor.
11. Reposition the instrument panel, install the retaining bolts and remove the protective tape at the "A" pillar inner cowl panel, lower right corner of instrument panel.
12. Install the right A/C duct assembly and install the glove box liner.
13. Install seal and cover plate to the evaporator case at the expansion valve.
14. Install insulation tape over the expansion valve and sensing bulb.
15. Install the A/C hose support bracket-to-cowl.
16. Connect heater hoses to the heater core assembly.
17. Fill cooling system, install the carburetor air cleaner and connect the battery cable to the battery.
18. Check blower motor operation.

### EVAPORATOR CORE

#### Removal

1. Disconnect the battery cable and remove the carburetor air cleaner.
2. Discharge the refrigerant from the A/C system. Refer to Part 36-30.
3. Remove the A/C hose support from the cowl (Fig. 7).
4. Remove the insulation tape from the expansion valve and sensing bulb. Then, remove the cover plate and seal from the evaporator housing at the expansion valve.
5. Remove the glove box liner and the right A/C duct. Pull the duct from the register and plenum chamber.



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FIG. 6 Heater and A/C Hose Routings—4.9L (302 CID) V-8, 5.8L (351 CID) V-8 and 6.6L (400 CID) V-8 Engines

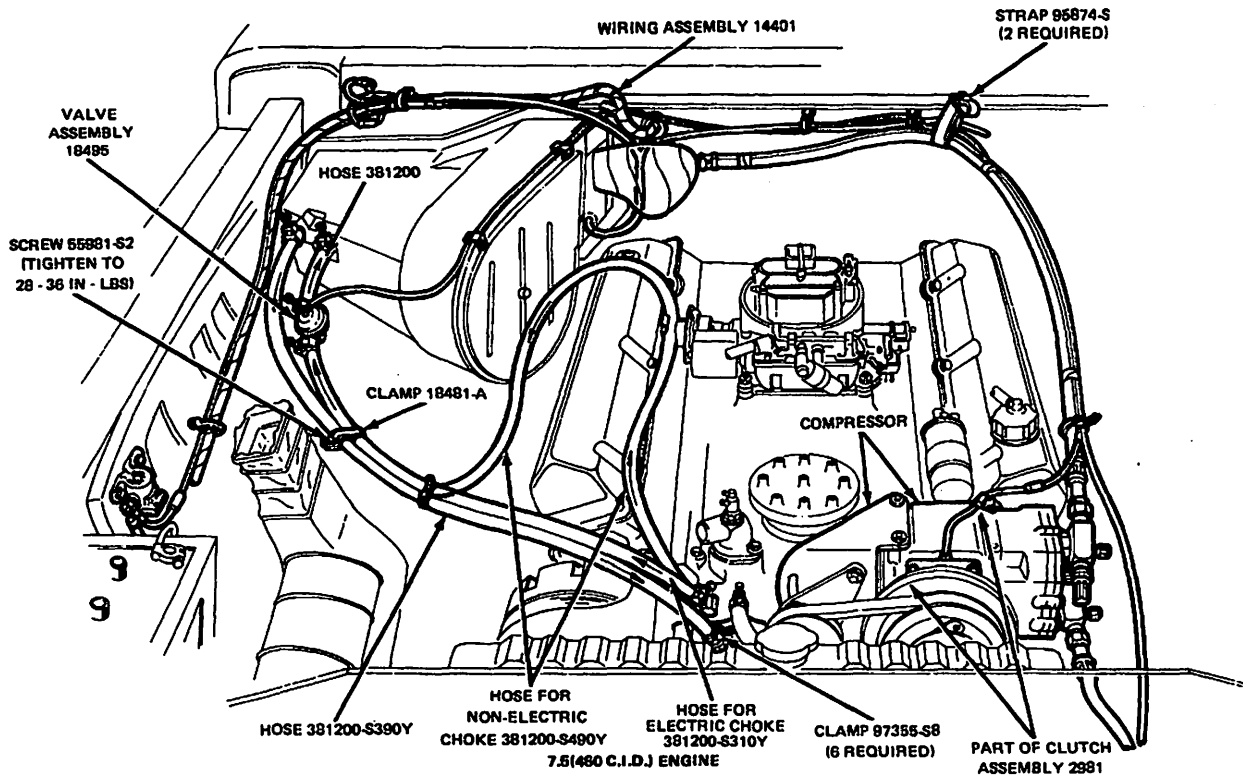


FIG. 7 Heater and A/C Hose Routings—7.5L (460 CID) V-8 Engine

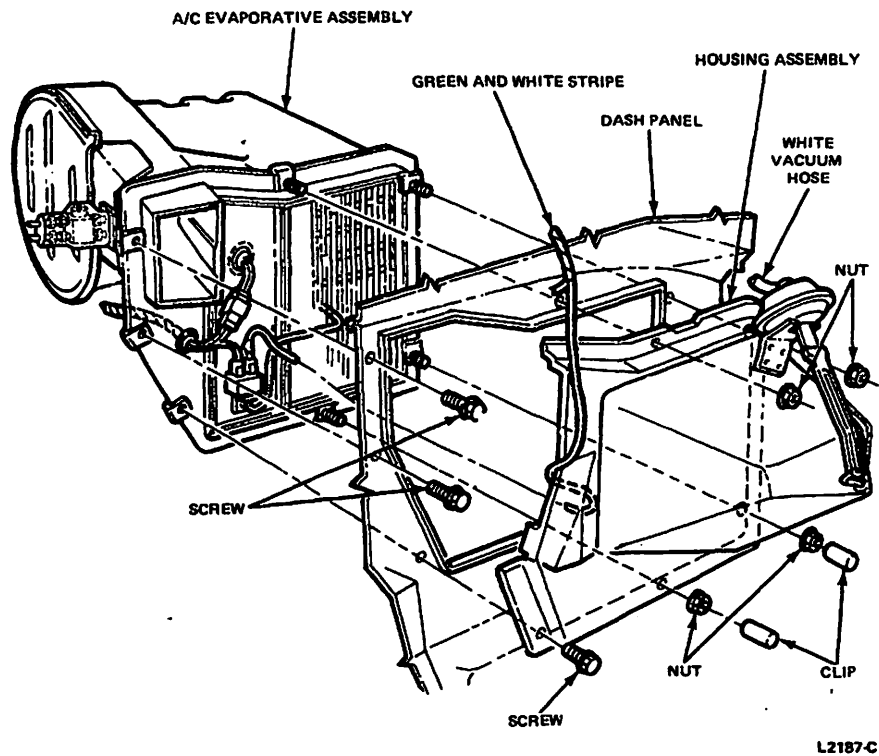


FIG. 8 Evaporator Rear Housing Removal



6. Disconnect the vacuum hose from the fresh air-recirc. door vacuum motor (Fig. 9).
7. Remove evaporator rear housing from dash panel and fresh air inlet boot (Fig. 8). Install one upper nut to retain evaporator front housing to dash after rear housing is removed.
8. Remove the de-icing switch and de-icing switch mounting plate (Fig. 8). Push wire grommet out of mounting plate.
9. Remove plenum from evaporator front housing and lower plenum down (Fig. 10).
10. Remove the expansion valve from the evaporator core (Fig. 7).
11. Remove four screws attaching evaporator core to housing and remove core.

#### **Installation**

1. Position core to evaporator housing and install attaching screws.
2. Connect the expansion valve to the evaporator core.
3. Install the plenum and de-icing switch. Connect the blower and de-icing switch wires.
4. Install the evaporator rear housing and connect the fresh air inlet boot to the housing.
5. Connect vacuum hose to the fresh air door vacuum motor.
6. Install the right A/C duct and glove box liner.
7. Install the seal and cover plate on the evaporator housing at the expansion valve.
8. Install the A/C hose support on the cowl.
9. Evacuate, charge and leak test the air conditioning system as outlined in Part 36-30.
10. Install the insulation tape on the expansion valve and sensing bulb.
11. Install the carburetor air cleaner.
12. Connect the battery ground cable, and check the system operation.

#### **EXPANSION VALVE**

##### **Removal**

1. Remove the carburetor air cleaner.
2. Discharge the refrigerant from the A/C system. Refer to Part 36-30.
3. Remove the A/C hose support from the cowl (Fig. 7).
4. Remove the insulation tape from the expansion valve and sensing bulb, and

remove the expansion valve from the evaporator core tubes and refrigerant lines.

##### **Installation**

1. Connect the expansion valve to the evaporator core tubes and the refrigerant lines. Clamp the expansion valve sensing bulb to the evaporator inlet tube.
2. Leak test, evacuate, and charge the A/C system as outlined in Part 36-30.
3. Install the insulation tape on the expansion valve and sensing bulb.
4. Install the A/C hose support at the cowl.
5. Install the carburetor air cleaner, and check the operation of the A/C system.

#### **DE-ICING SWITCH**

##### **Removal**

1. Disconnect the battery ground cable.
2. Remove the glove box liner and the right A/C duct. Pull the duct from the register and release the clip at the plenum for duct removal.
3. Disconnect the vacuum hose from the outside-recirc. door vacuum motor (Fig. 7).
4. Remove the evaporator rear housing from the dash panel and the fresh air inlet boot (Fig. 8). Install one upper nut to retain evaporator front housing to dash after rear housing is removed.
5. Disconnect de-icing switch wires, pull sensing tube from evaporator core, and remove two switch attaching screws.

##### **Installation**

1. Install de-icing switch screws, connect wires, and insert sensing tube 3 to 3 1/2 inches into evaporator core. Be sure sensing tube is placed in notch of housing as shown in Fig. 8.
2. Install the evaporator rear housing and connect the fresh air inlet boot to the housing.
3. Connect the vacuum hose to the outside-recirc. door vacuum motor.
4. Install the glove box liner and the right A/C duct.
5. Connect the ground cable to battery and check operation of A/C system.

#### **CONTROL ASSEMBLY**

1. Remove the instrument cluster as outlined in Group 33 of this manual.
2. Remove four screws attaching the control to the mounting plate.

3. Disconnect the wire connectors, vacuum connectors, and cable assembly from the control (Fig. 11). Then, remove the control assembly.
4. To install, position the control assembly near the instrument panel and connect the wire connectors, vacuum connectors, and cable assembly to the control. The pigtail of the cable wire must be up as shown in Fig. 11, and the cable must be routed over the vacuum hoses.
5. Install four screws attaching control to mounting plate.
6. Install the instrument cluster as outlined in Group 33, and check operation of heater-A/C system.

#### **CONDENSER AND/OR RECEIVER**

##### **Removal**

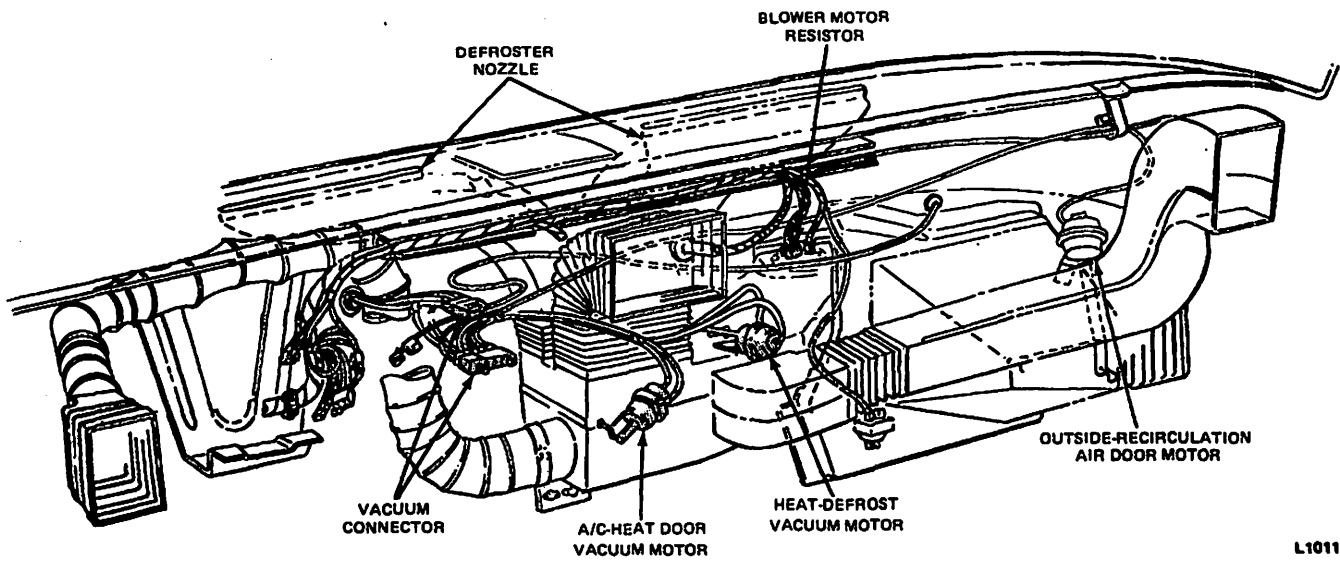
1. Discharge the refrigerant from the A/C system. Refer to Part 36-30.
2. Remove the hood latch support (5 screws).
3. Disconnect the refrigerant lines at the receiver drier and condenser (Fig. 12).
4. Remove the condenser and receiver attaching bolts (Fig. 12), and remove the condenser and receiver drier.
5. Separate the receiver drier from the condenser for replacement, if necessary.

##### **Installation**

1. Assemble the condenser and receiver.
2. Install the condenser on the radiator support and connect the refrigerant lines.
3. Install the hood latch support.
4. Leak test, evacuate, and charge the air conditioning system as outlined in Part 36-30. Then, check the system operation.

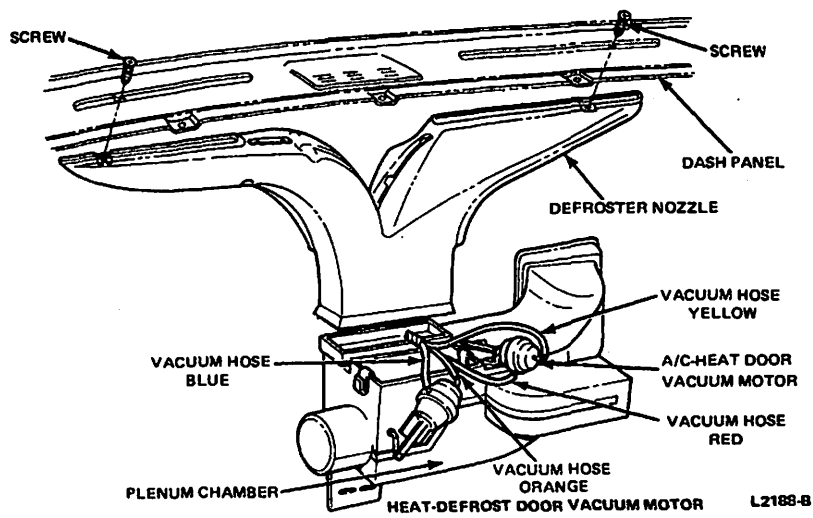
#### **REGISTERS**

1. Insert a thin blade or ice-pick through the louvers and carefully pry the tabs (upper and lower) away from the housing to allow the pivots to clear housing. Then, pull louver assembly out of register housing (Fig. 13). Remove both louvers from center register assembly.
2. To remove register housing, pry four lock tabs (2 on each side) inward and pull register housing from instrument panel. The duct must be disengaged from the register housing for removal of the housing.



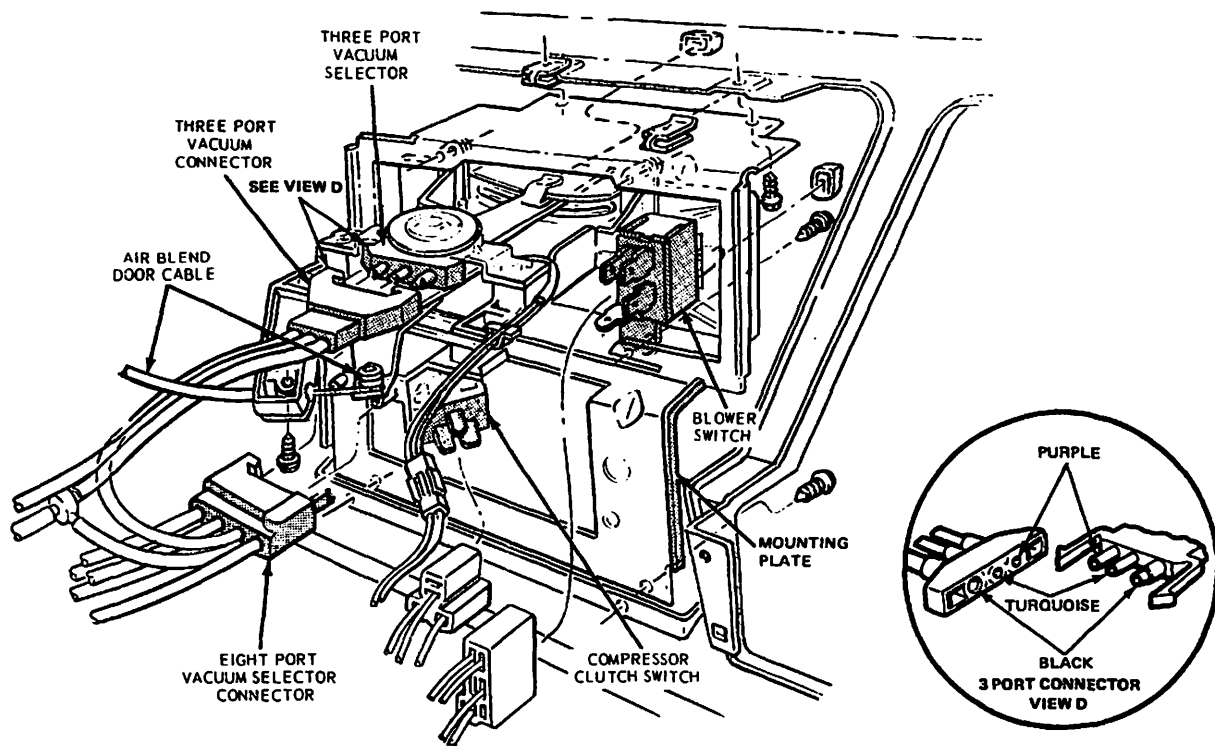
L1011-E

FIG. 9 Heater-A/C Installation



L2188-B

FIG. 10 Manual A/C-Heater Control Connections Heat-Defrost Door Vacuum Motor



L1818-C

FIG. 11 A/C Heater Control Assembly Connections

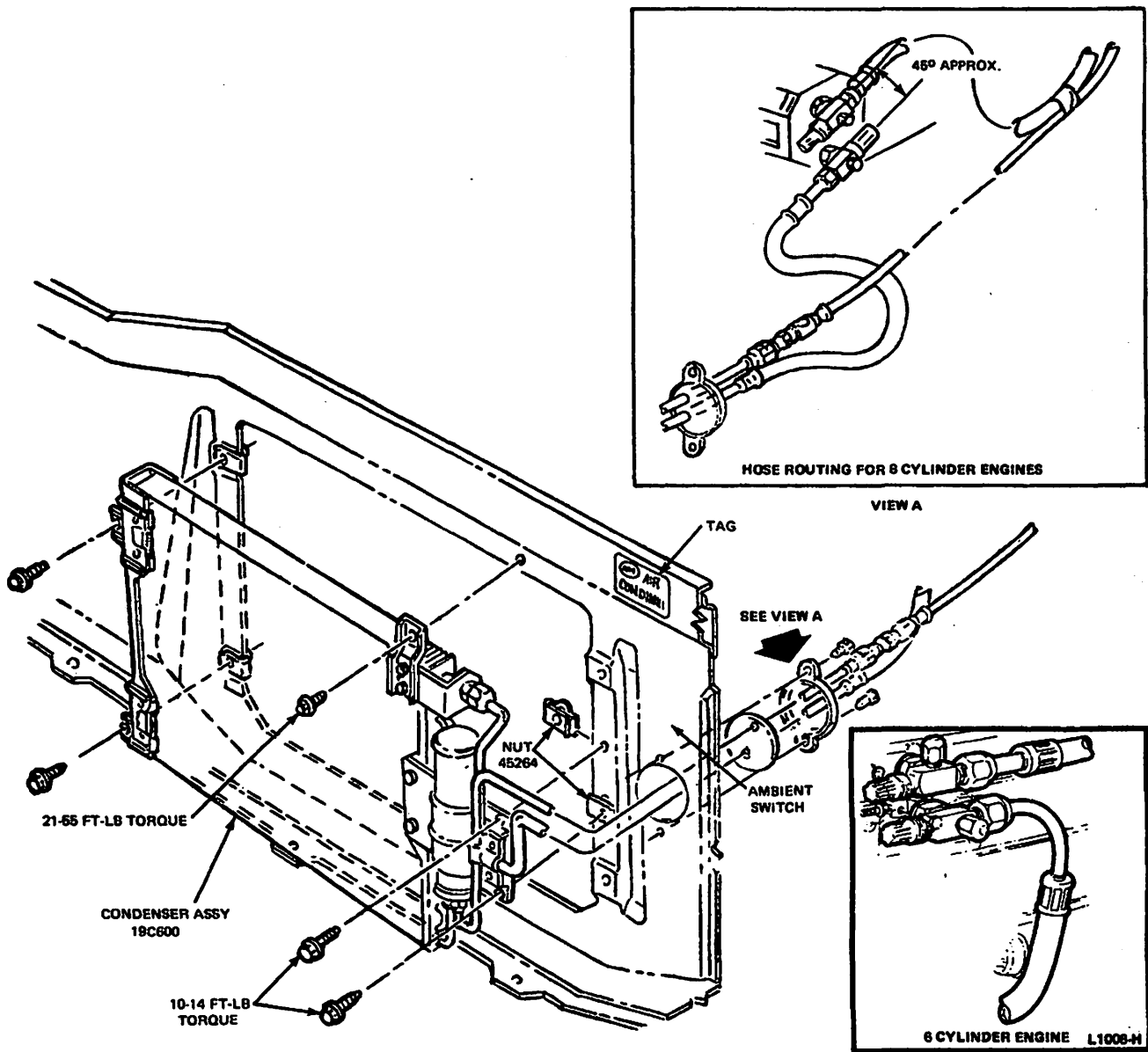


FIG. 12 Condenser and Receiver Drier Installation, 635 sq. in. Shown—Typical 505 sq. in.

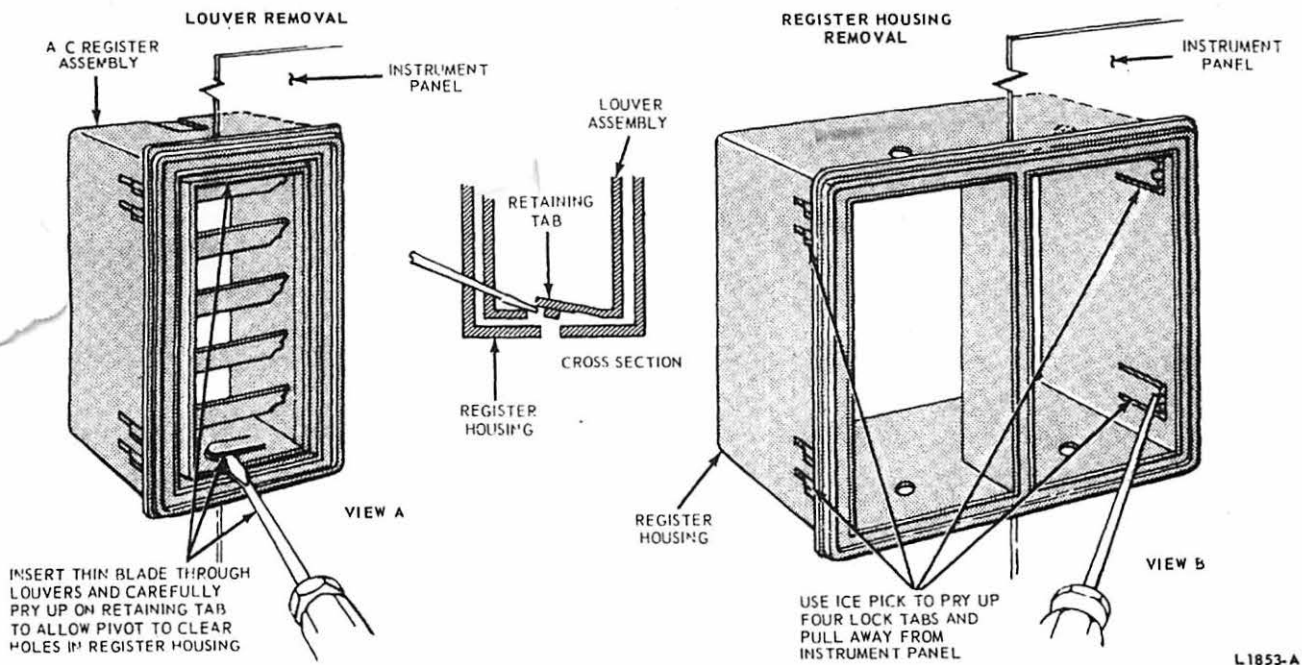


FIG. 13 Instrument Panel Register Removal