

SECTION 11-B HEATER AND VENTILATION

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11-7 HEATER-DEFROSTER

a. Description

The heater-defroster, which utilizes outside air entirely is standard equipment on all series. The air inlet and blower assembly is mounted on the right front side of the cowl and it directs the incoming air to the heater core located under the right side of the instrument panel.

All air is circulated from the heater core through the main distribution duct. Front seat heating is achieved through slots and openings in the bottom of the main distribution duct. A rear seat heater distribution duct is connected to the main distribution duct and runs down the toe-board and along each side of the transmission tunnel to a point just underneath the front seat where it discharges equal heat to each side of the rear floor. A shut-off valve located in the adapter to floor duct, controls the amount of air to the rear floor. The distribution of the air from the heater core into the distribution duct to the windshield is accomplished by a valve within the main distribution duct which permits full heater distribution, defroster-heater distribution, and full defroster distribution.

Attached to the heater core and enclosed in the main heater distribution duct is the temperature control valve which regulates the flow of water through the heater core. Incoming water from the water manifold flows through the heater core when the temperature control valve is in the "Open" position, and returns to the suction side of the water pump.

Controls for the heater assembly are located on the instrument panel, to the right of the steering column.

These controls consist of four levers connected by wires to the heater control units.

The "Air" lever controls the opening of the outside air valve. Its position also controls blower speed through a three-speed blower switch.

The "Heat" lever controls the setting of the water temperature control valve from off to maximum heat. It thus controls heater core discharge air temperature.

The "Defrost" lever controls the amount of air to the windshield. The detent felt about 1/3 down in lever travel allows air from the coolest part of the heater core to pass to the windshield for upper level comfort on mild or sunny days.

The "Rear Heat" lever opens and closes the shutoff-valve located in the adapter to floor duct. It thus controls the amount of air to the rear floor.

b. Air Flow

Incoming air enters the cowl through the air inlet grille forward of the windshield reveal molding, and flows down into chambers on each side of the cowl. The air is drawn through the blower assembly on right side, and routed into the heater core through a manually operated valve. From the heater core the air flows directly into the main distribution duct.

Slots in the bottom of the duct direct warm air to the center and right side of the front seat and an opening at the left end of the duct directs warm air to the driver's side. Warm air is supplied to the rear seat through the duct which runs down the toe-board and along the transmission hump to supply equal heat to each side of the rear compartment.

A valve in the left end of the main distribution duct controls the directional flow of air to the defroster nozzles. When this valve is raised,

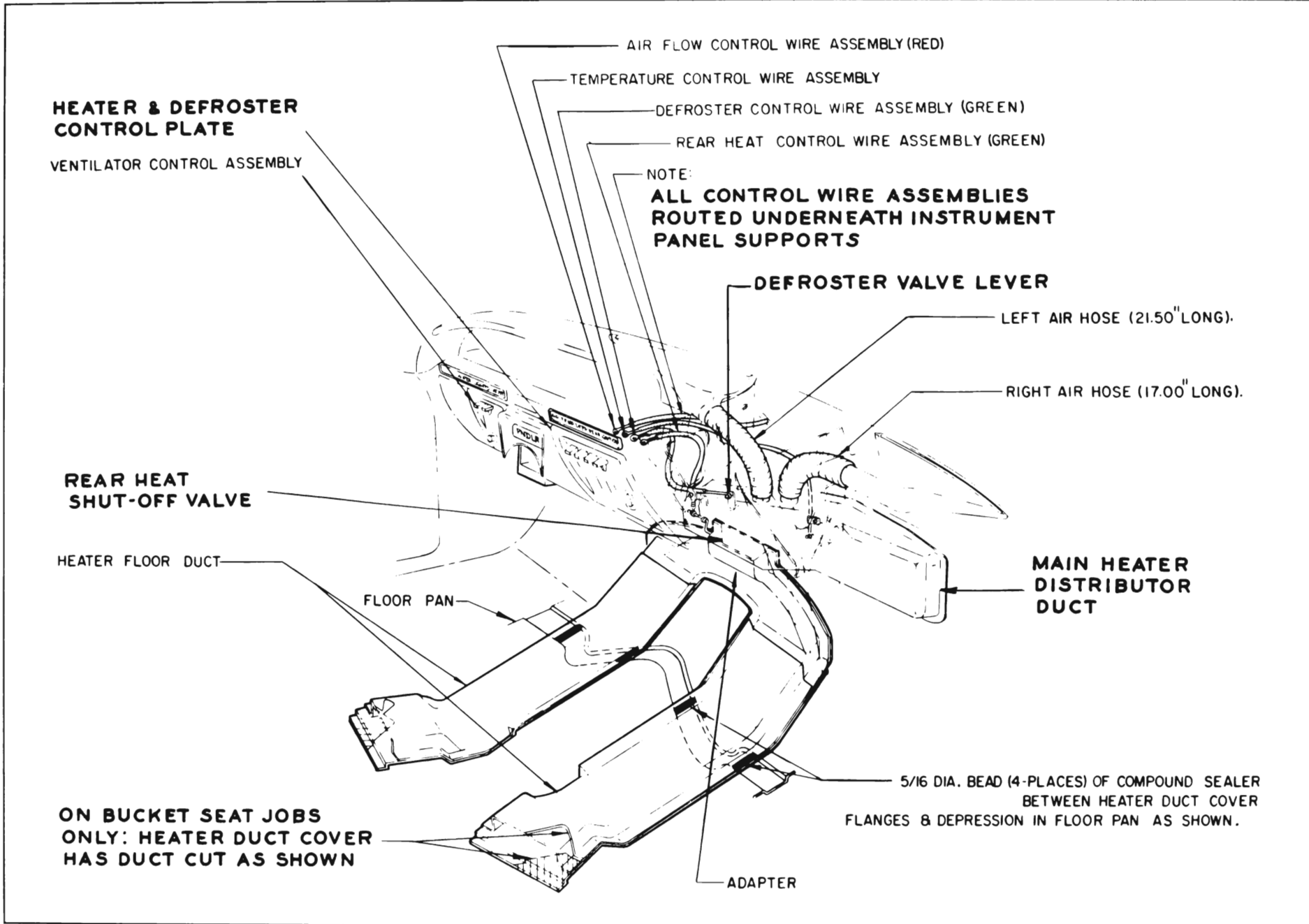


Figure 11-22—Heater-Defroster Air Distribution System

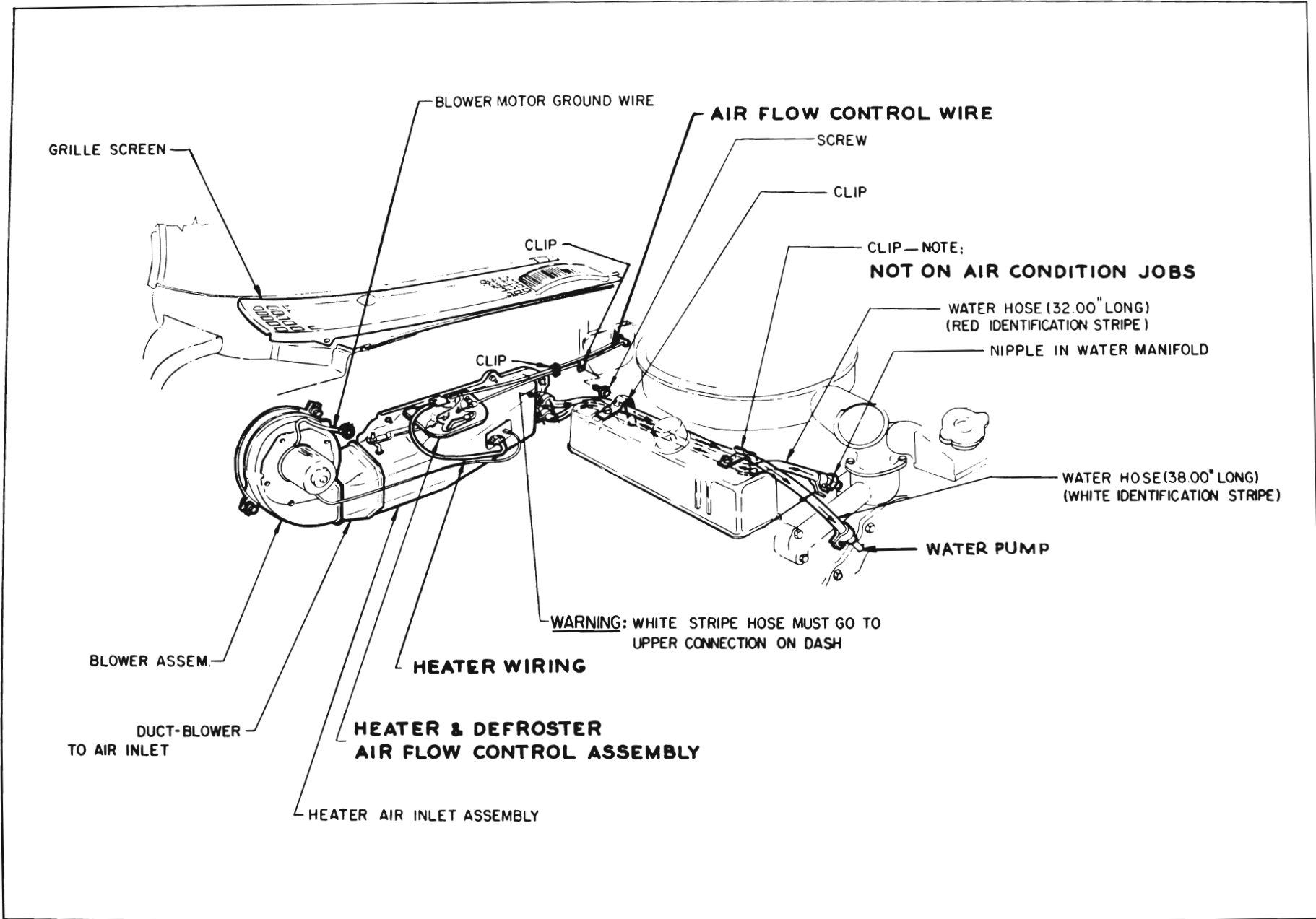


Figure 11-23—Heater Water Flow and Air Flow Control Assembly

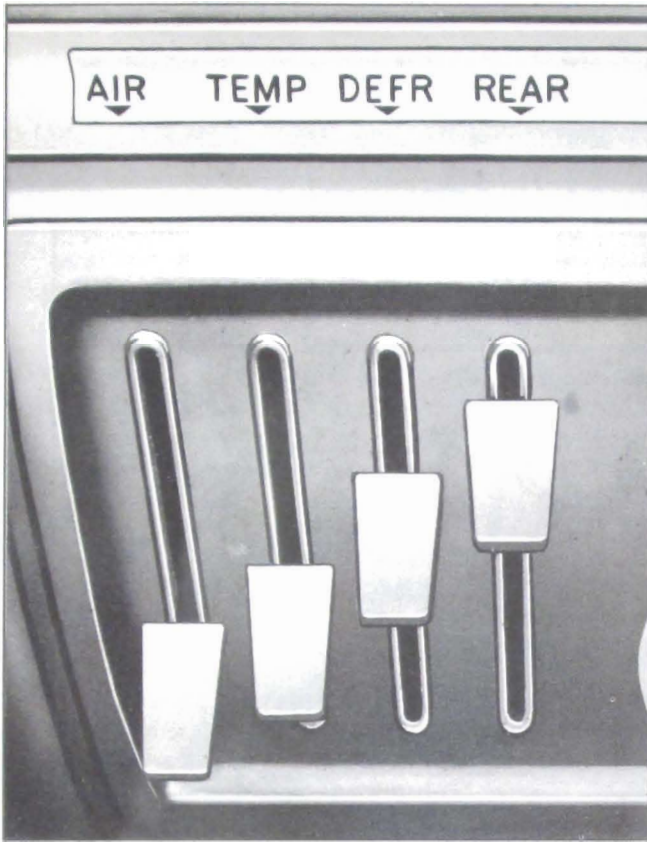


Figure 11-24—Heater-Defroster Control Levers

air will flow through the lower level in the passenger compartment only.

When the valve is in midposition, air flows to the windshield ducts and to the passenger compartment. When the valve is completely lowered the windshield defroster ducts receive all but a small amount of air from the heater core.

A dividing baffle in the heater main distribution duct, 1-1/4" down from the top of the core, provides a "cool air by-pass" to the defroster nozzles with the defroster valve in the partially open position. See Figure 11-25. A detent is built into the defroster valve to provide a "feel" of this position on the defroster lever.

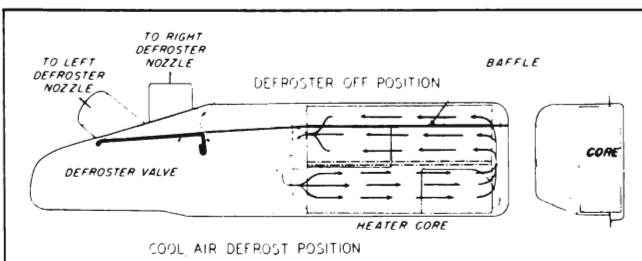


Figure 11-25—Defroster Baffle Location

c. Water Flow and Temperature Control Valve

The hot water flows from the engine water manifold to the lower pipe of the heater core.

The hot water flows through the core and out the upper hose directly to the suction side of the engine water pump. The core is of the "U" flow type. The water enters an inlet tank on the lower half of one end, flows through the core in the lower passages to another tank at the opposite end where the water flow is reversed to allow passage through the upper half of the core to an outlet tank. The lower fitting of the core is part of the temperature control valve which is mounted on the inlet tank of the core.

All water hoses and fittings are 3/4" diameter.

The heater temperature control valve controls the temperature of the heater air entering the passenger compartment by regulating the flow of hot water through the heater and defroster core. This flow of hot water is regulated automatically by the signal from a capillary tube stretched across the inner side of the heater-defroster core. As a result, for any selected setting of the heat range control, relatively constant heater air temperature will be maintained at all car speeds.

d. Operation

To place either unit in operation, the "Air Flow" lever must be moved down from off position to one of four other detent positions. Movement from the first detent from off position opens the outside air valve and allows ram air to enter car when it is moving. In the remaining three positions, the blower is turned on low, medium and high, in that order. The mechanical linkage and blower switch are mounted on the control assembly, on the air inlet assembly in the engine compartment. See Figure 11-26. To protect the control from dust, dirt and splash, they are covered by a plastic protective cover.

The "Air" lever bowden wire connects to a lever on the control assembly. The first movement mechanically opens the air valve. The blower switch is connected to the same lever and is rotated through the three blower speeds as the "Air Flow" lever is moved through the last three detent positions.

If heat is desired, the "Heat" lever is moved down from the off position to control the heater

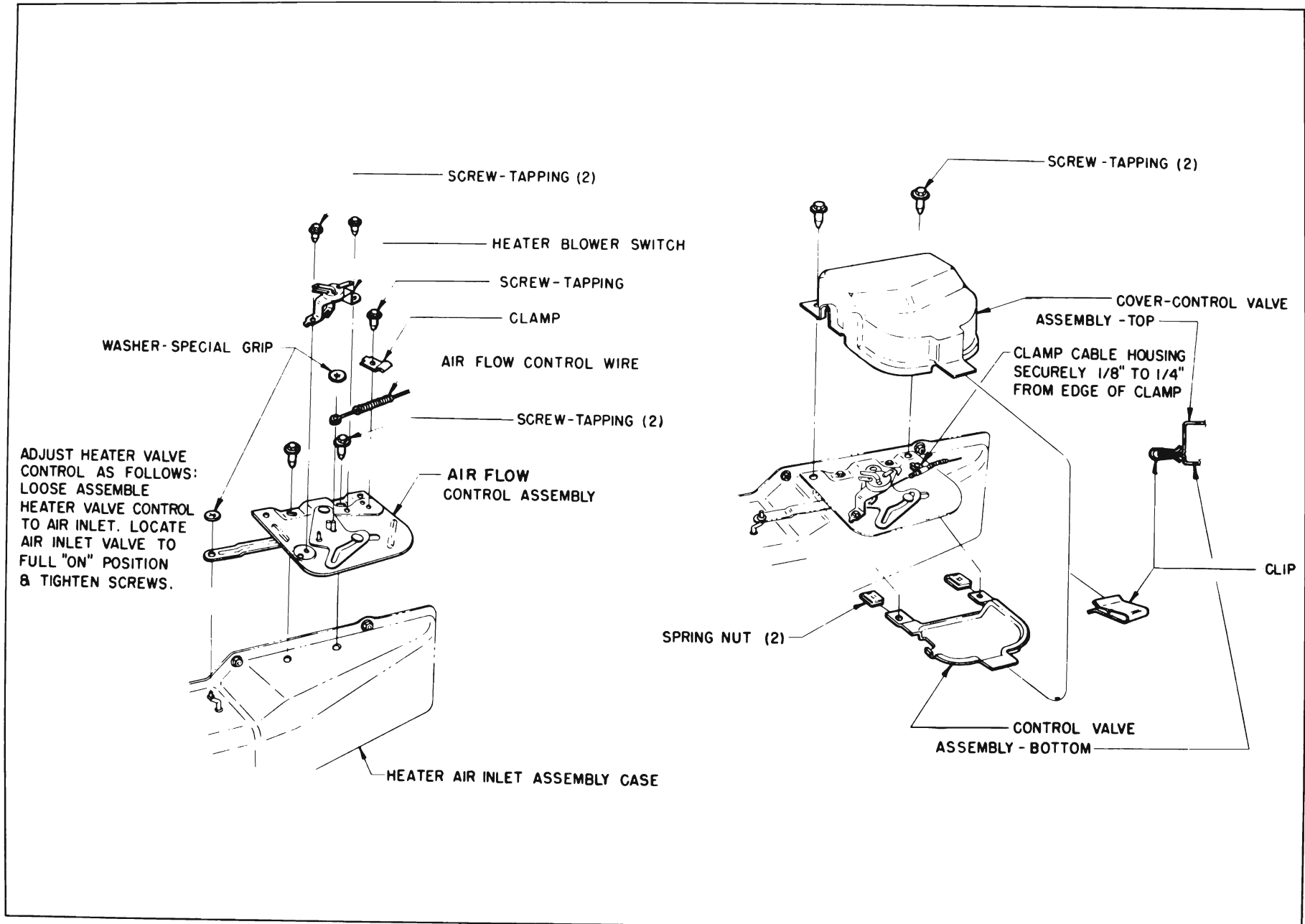


Figure 11-26—Air Flow Control Assembly

core discharge air temperature. This lever is connected through a bowden wire to the heater water temperature control valve.

The "Defrost" lever may be positioned in any position from off to full air flow to the defroster nozzles. A detent located in the first portion of the "Defrost" lever travel indicates the position for "cool air by-pass" to the defroster nozzles.

The "Rear Heat" lever controls the air valve located in the floor duct connector, below the heater main distribution duct. When in the fully open position, more air flow is directed to the rear floor than to the front floor.

11-8 HEATER-DEFROSTER ON AIR CONDITIONER CARS

a. Description

The heating system on air conditioner equipped cars is similar to the standard unit, except that a larger housing is used having two valves opened and closed by 4 vacuum operated diaphragms. These valves, the outside-recirculating air valve and the heater-evaporator

air valve direct the incoming air into the blower and into either the evaporator housing or the heater core. Operation of the vacuum diaphragms and air valves are explained in Section 11-C, paragraph 11-15.

The air flow on the air conditioned equipped cars is the same once the air enters the heater distribution duct, but because of a different housing and cowl assembly the lead-in of air is different. Air conditioner-heater equipped cars use the same water flow as heater jobs.

b. Air Flow

The incoming outside air enters the car forward of the windshield reveal molding, and flows into the cowl assembly. It then flows through an opening between the cowl and the upper right side of the blower and air valve housing. From the inlet air chamber of the cowl, the air flows through the cowl and blower assembly. From the blower assembly the air is routed downward and out into the heater core through an opening in the lower right side of the housing. See Figure 11-27. Once the air enters the heater main distribution duct,

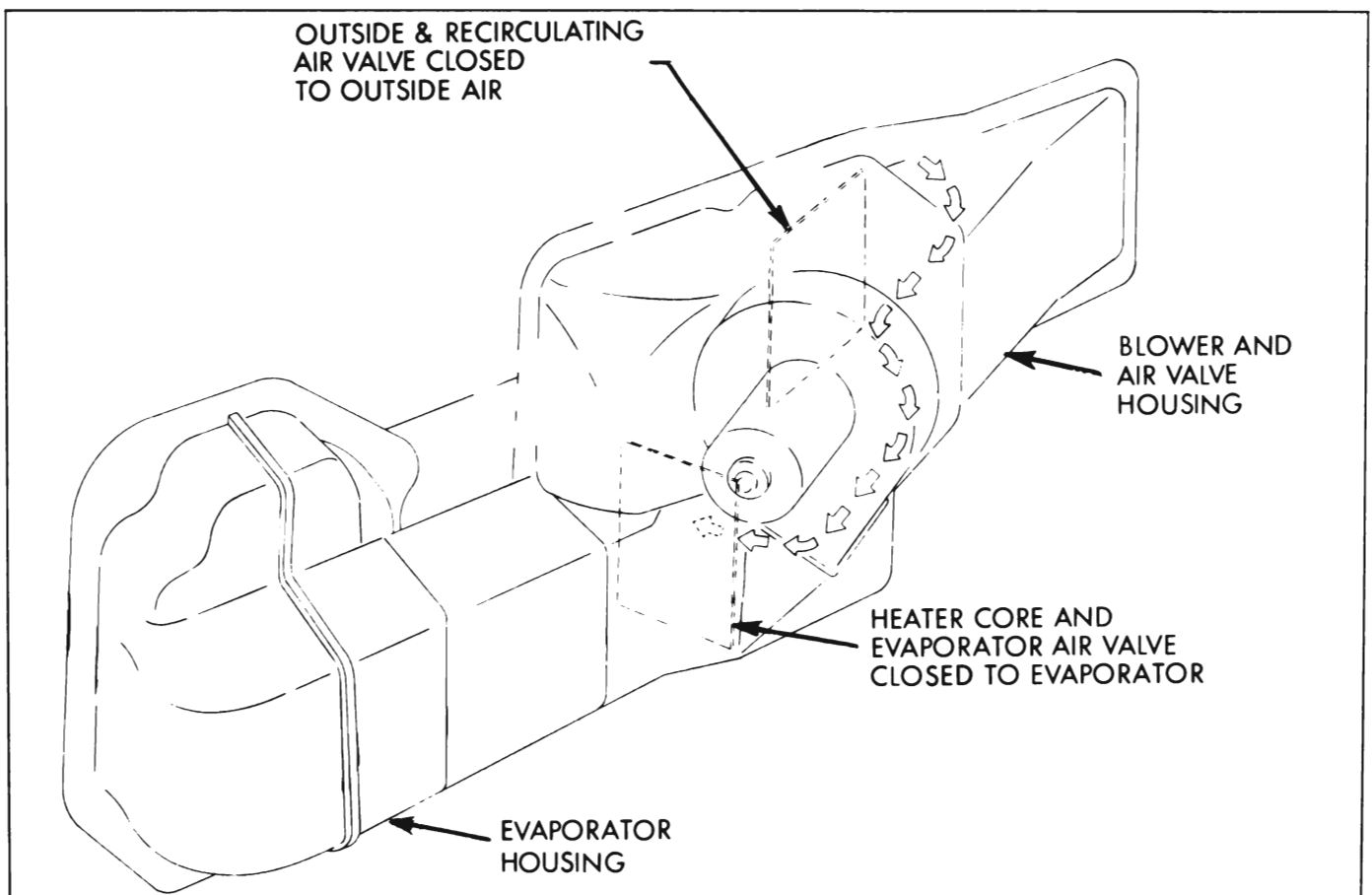


Figure 11-27—Air Valves in Released Position

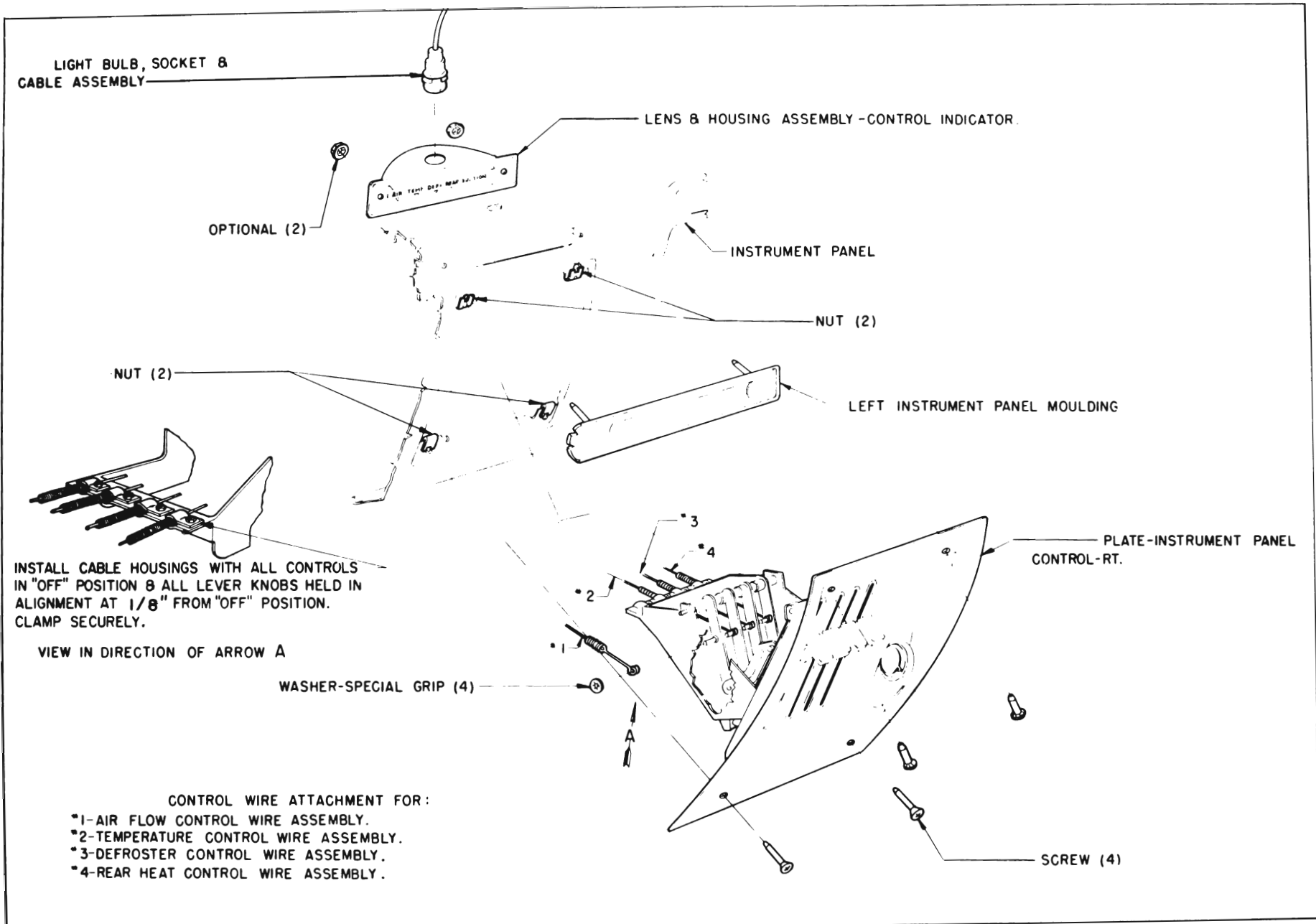


Figure 11-28—Control Lever and Wire Installation

the air flow becomes the same as that of the heater.

11-9 HEATER-DEFROSTER SERVICE PROCEDURES

For adjustment of heater "Air" lever and replacement of vacuum diaphragms on air conditioner equipped cars, refer to Section 11-C, paragraph 11-16.

a. "Air", "Defrost" and "Rear Heat" Control Wire Adjustment

Access to the lever end of the control wires is gained by lowering the right instrument panel control plate. The wires are adjusted by clamping the upper ends of wire housings with levers 1/16" from off position and the control unit or valves in the fully off position. See Figure 11-28.

b. Temperature Control Valve Wire Adjustment

The temperature control valve is operated by a lever through a sheathed operating wire. To insure full range of temperature control, the valve must act as the stop at both ends of lever travel. Since the operating wire is of fixed length with loops at each end, full range of operation is obtained by clamping the operating wire sheath in proper location on the "Defrost" control lever and the temperature control valve assembly as follows:

1. Connect operating wire to control lever and clamp end of sheath flush with edge of clamp. Move "Heat" lever to 1/8" of extreme off position.

2. Turn temperature control valve all the way clockwise until the valve lever hits tab. This is the extreme off position. Connect

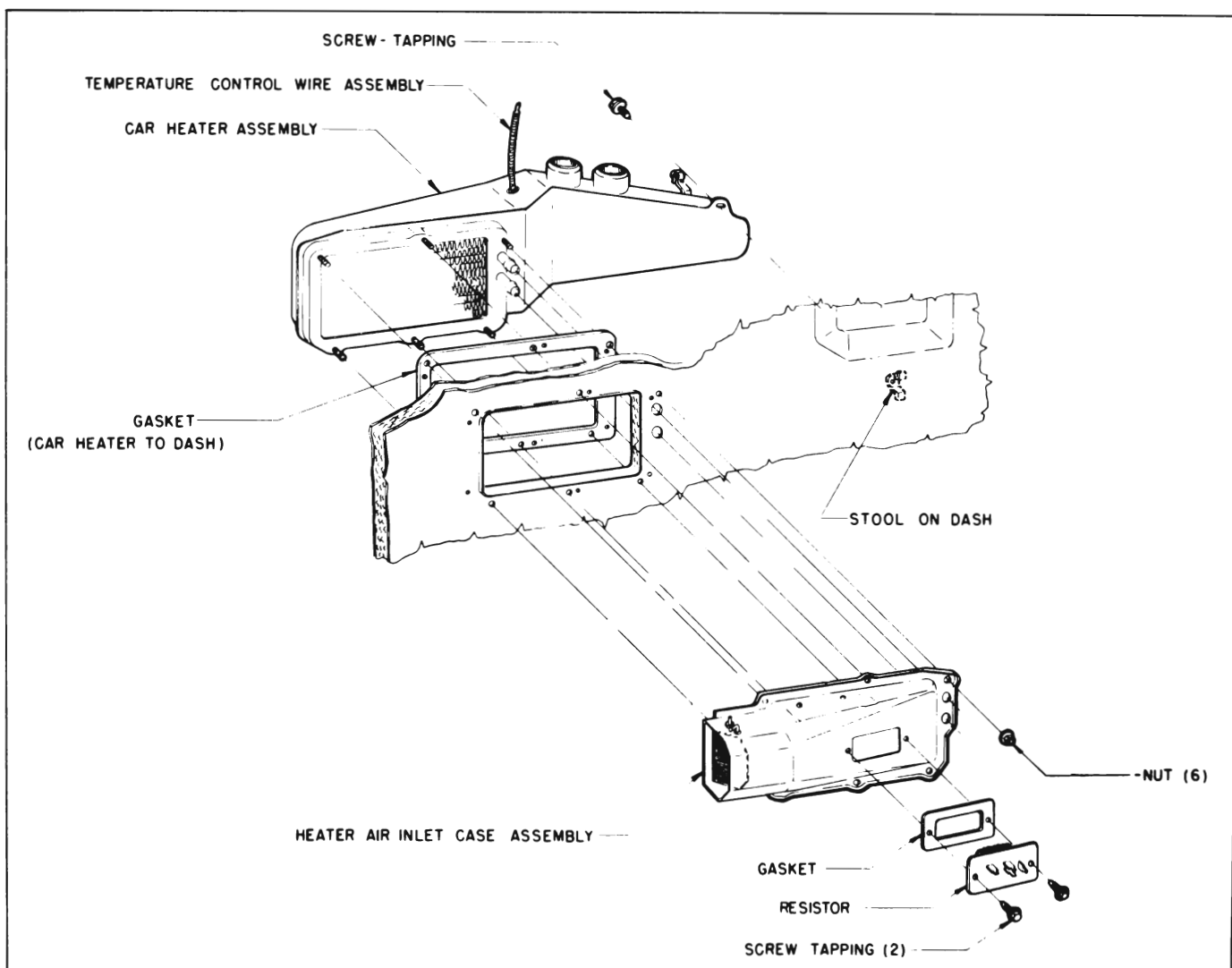


Figure 11-29—Heater Installation

operating wire to post on valve and clamp the sheath to valve assembly.

3. Operate the control lever through full range to make certain that the valve provides the stop at both ends. Valve lever must hit tab at both ends of travel.

c. Removal of Heater Core and Heater Temperature Control Valve

1. Disconnect heater inlet and outlet water hoses.

2. Remove nuts on front of dash retaining air inlet assembly and car heater assembly to dash.

3. Remove cover plate on rear face of car heater assembly and disconnect control cable to temperature control valve.

4. Disconnect control cable to defroster valve lever at top of case.

5. Remove heater floor pan ducts and adapter between floor ducts and heater assembly. See Figure 11-22.

6. Remove screw at left end of car heater assembly and pull assembly away from dash.

(Take care not to spill coolant out of core onto carpet.)

7. Remove right end of heater case by removing sheet metal screws on flange of assembly. (It is advisable to have assembly on bench to prevent spillage of engine coolant on front carpet.)

8. Remove sheet metal retaining screws located under flange gasket holding core and valve assembly to car heater assembly mounting plate. At this point the heater temperature control valve may be removed from core.

CAUTION: When handling capillary coil of temperature control valve make sure that valve lever is in the open position. This is necessary to prevent damage to control mechanism. Always handle capillary with care.

9. For installation -- reverse process. Make certain that "O" ring seal between valve flange and core mounting seat is in place to prevent coolant leakage. Pressure check core and valve assembly prior to installation. Also, make sure that capillary coil is reinstalled at same location at core as removed one was.

11-10 HEATER-DEFROSTER TROUBLE DIAGNOSIS

COMPLAINT AND CAUSE	CORRECTION
a. <u>Insufficient Heating</u>	
1. Incorrect operation of controls.	1. Advise operator of correct operation of controls.
2. Outside air ventilators in cowl side panels not closed.	2. Check operation and adjustment of vent control wires.
3. Low engine coolant level.	3. Fill radiator to proper level. Fully open temperature control valve and run engine to clear air lock.
4. Failure of engine cooling system to warm up.	4. Check radiator cap and engine thermostat. Check for foreign material in thermostat. Replace if required.
5. Kinked heater hose.	5. Remove kink or replace hose.
6. Foreign material obstructing water flow in heater core.	6. Remove foreign material.
7. Temperature control valve improperly adjusted.	7. Adjust "Heat" lever control wire.
8. Defective temperature control valve.	8. Replace.
9. Heater outside air valve not open.	9. Check operation of valve and adjustment of "Air" control lever wire.
10. Blower inoperative.	10. See subparagraph d.
11. Heater hoses improperly installed.	11. See Figure 11-23.

11-10 HEATER-DEFROSTER TROUBLE DIAGNOSIS (Cont'd)

COMPLAINT AND CAUSE	CORRECTION
b. <u>Inadequate Defrosting</u>	
1. Outside air valve not open.	1. Check operation of valve and adjustment of "Air" control lever.
2. Defroster valve in heater distributor not operating properly.	2. Check operation of valve and adjustment of "Defrost" control lever wire.
3. Air hose missing or disconnected.	3. Inspect and correct.
4. Obstructions in defroster outlets at windshield.	4. Remove obstruction.
5. Blower inoperative.	5. See subparagraph d.
c. <u>Too Warm in Car</u>	
1. Defective temperature control valve.	1. Replace.
2. Incorrect operation of controls.	2. Advise operator of correct operation of controls.
3. Loose "Heat" control wire.	3. Adjust wire.
d. <u>Blower Inoperative</u>	
1. Blown fuse.	1. Replace 30 amp blower fuse on fuse block.
2. Defective motor.	2. Replace.
3. Open circuit.	3. Check wiring connections on blower switch and resistor. Locate open circuit and correct.
4. Defective switch.	4. Replace.
e. <u>Inadequate Air to Rear Floor</u>	
1. Shut-off valve in heater adapter not operating properly.	1. Check operation of valve and adjustment of "Rear Heat" control lever wire.
2. Foreign materials obstructing flow of air out of floor duct.	2. Check for objects blocking outlets of duct. Make sure passages in duct are completely open.
f. <u>Miscellaneous</u>	
1. Control levers not lined up.	1. Adjust control wires.
2. Heater "gurgle".	2. Fill radiator to proper level. Fully open temperature control valve and run engine to clear air lock.

11-11 OUTSIDE AIR VENTILATION

a. Description

Ventilation outlets in each cowl kick pad provide for outside air circulation directly to the passenger compartment. The control levers for the vents on non-air conditioner cars are located on the instrument panel to the left of the steering column.

Air conditioner equipped cars have only the left ventilator which is controlled by a push-pull bowden wire located at lower left of instrument panel.

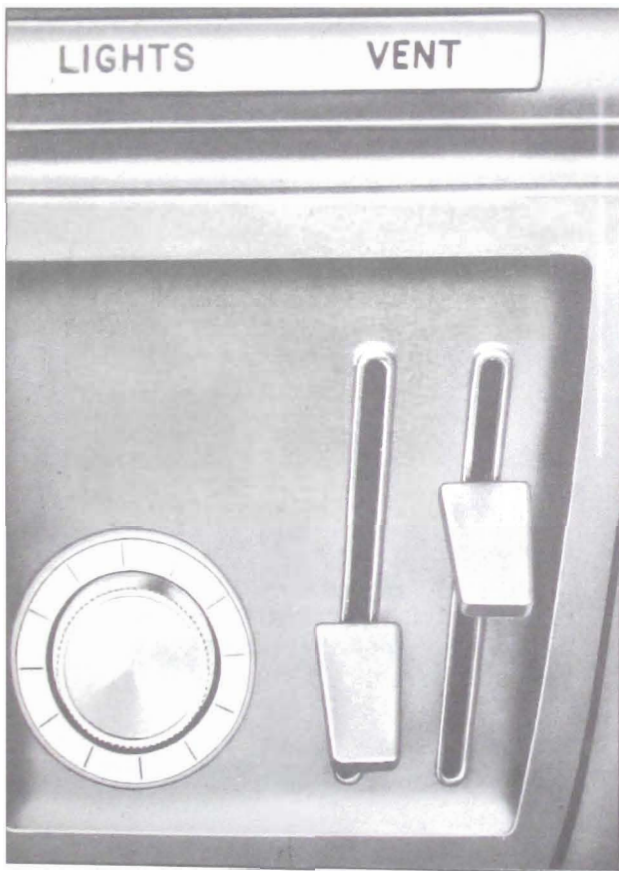


Figure 11-30—Vent Controls

b. Air Flow

For outside air ventilation, the air flow is directed from the inlet grille forward of the windshield to the chambers on the sides of the cowl. From here the air enters the car through the inlets on the kick pads. Incoming air can be directed at the inlets to provide maximum passenger comfort.

Water drawn through the air intake scoops is separated from the air stream in the cowl side chambers by baffles and by centrifugal force which throws the water toward the outer wall and allows drainage at the bottom of the chamber.

c. Control Wire Adjustment

On cars equipped with the lever type vent controls, the control wires are adjusted in the same manner as the heater control wires (par. 11-9). A spring clamp is mounted on control lever assembly to keep levers locked in off position.

To adjust the push-pull type vent control, set vent knob $1/8$ " from full off position, fully close vent valve and clamp sheath of control wire.

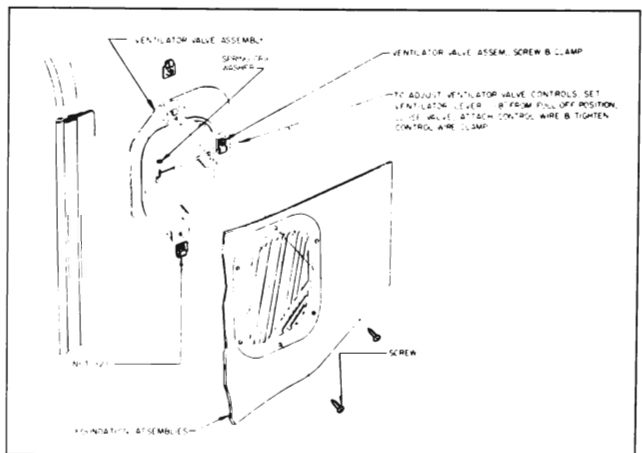


Figure 11-31—Ventilator Valve Assembly