

SECTION 11-B HEATER SYSTEM

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11-7 HEATER DEFROSTER DESCRIPTION AND OPERATION

a. Description

The heater system is an air-mix type system in which outside air is heated and then mixed in varying amounts with cooler outside air to attain the desired air temperature. The system consists basically of three parts: (1) the blower and air inlet assembly, (2) the heater assembly, and (3) the heater control assembly (see Figure 11-10). The operation of the system is as follows:

1. **Blower and Air Inlet Assembly**—The blower and air inlet assembly draws outside air through the outside air inlet grille located forward of the windshield reveal molding and channels the air into the heater assembly. The operation of the blower motor is controlled by a FAN switch on the heater control. The motor is connected in series with the three position FAN switch and also the blower resistor assembly (see Figure 11-11). A 20 amp fuse, located in the fuse block, is in series between the blower motor and the battery.

2. **Heater Assembly**—The heater assembly (see Figure 11-12) houses the heater core and the doors necessary to control mixing and channeling of the air. Air entering the heater assembly divides into two channels: (1) through the heater core and (2) through a by-pass around the

heater core. The ratio of the mixture of heated to unheated air is controlled by the temperature door. The outside air inlet door initiates the air flow through the heater assembly. The defroster door controls the amount of air deflected through the defroster system. The defroster door may be adjusted to deflect all air to the defroster outlet, all air to the floor outlet, or to both the defroster and floor outlets.

The heater core, located in the heater assembly, has water flowing through it at all times. Water flow through the heater core on the V-8 engine is from the rear of the intake manifold to the inlet port (lower) of the heater core, through the heater core, and from the outlet port (upper) of the heater core to the suction port of the water pump (see Figure 11-13). The routing of the water for the heater system on V-6 engines is similar to the V-8 routing, except that the flow begins at the right front of the intake manifold (see Figure 11-14). The heater assembly has fixed vane outlets to distribute air evenly throughout the passenger compartment.

3. **Heater Control Assembly**—The heater control assembly (see Figures 11-15 and 11-16) consists of three controls, namely the temperature control lever, air control lever, and FAN lever. The temperature control lever is connected by a control wire to the temperature door on the heater assembly, and regulates the ratio

of mixture between heated and unheated air—hence the temperature of the air. The temperature control lever has three detents: OFF, MED, and HOT. When the temperature control is in the OFF position the temperature valve is fully closed and prevents heated air from flowing through the system. When the temperature control is in MED position, the outside air flow is split and approximately one half of the outside air flows through the heater core and one half of the outside air flows around and by-passes the heater core. When the temperature control is in the HOT position the temperature valve is fully open and prevents outside air from by-passing the heater core.

The air lever of the heater control assembly regulates the positioning of two valves: the outside air door and the defroster door. The air lever has three positions: OFF, HTR and DEF. Positioning of the air control to the OFF position closes the outside air door and the defroster door. When the outside air door is closed, all air is blocked from passing through the heater assembly. When the air lever is moved to the HTR position, the outside air door is fully opened. Air is permitted to pass through the heater assembly and is directed to the floor of the car. Moving of the air lever to DEF position, opens the defroster door and channels the air to the defroster outlets. Locating of the air lever midway between HTR

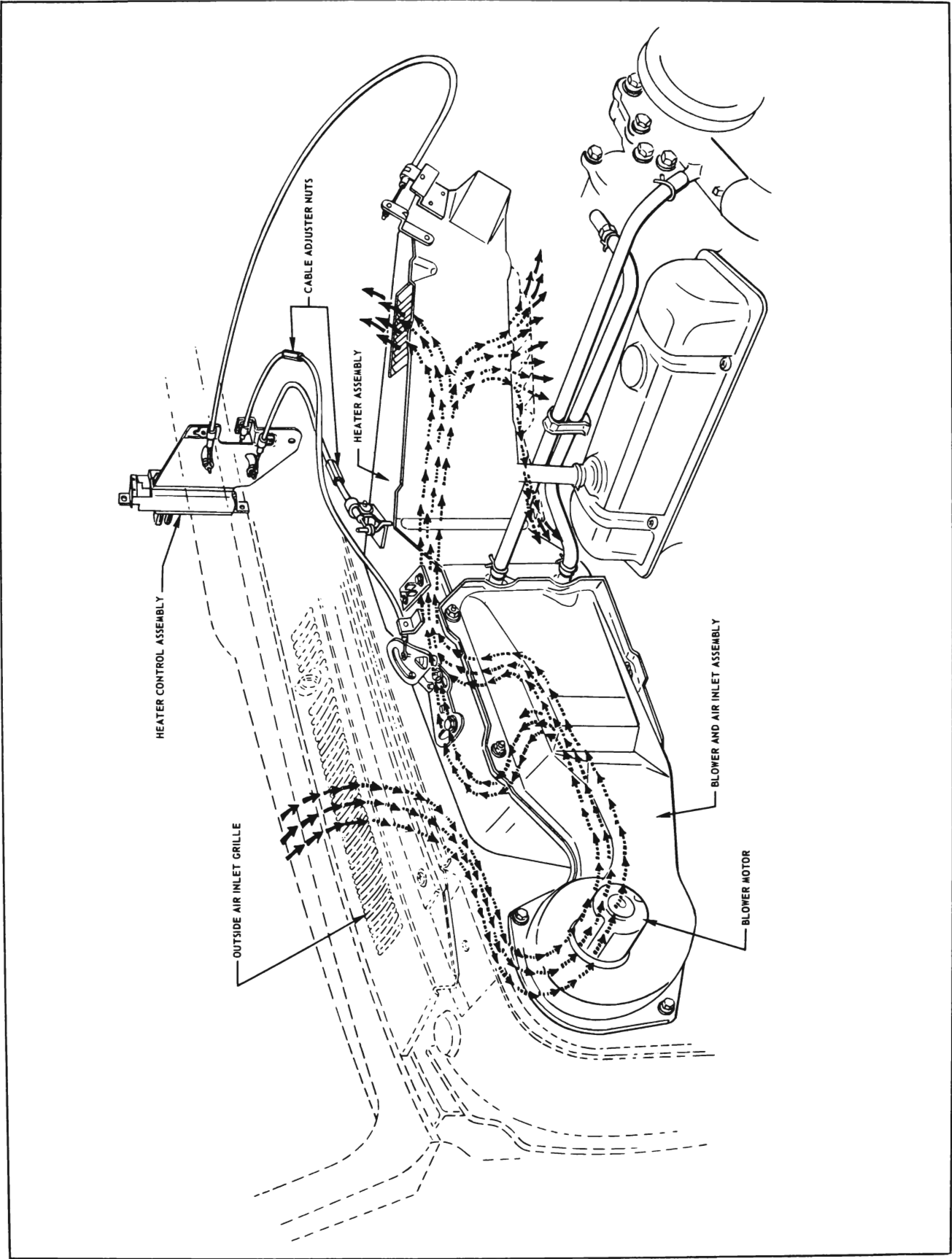


Figure 11-10—Heater System - 4000, 4100 & 4300 Series

and DEF positions causes the air to be routed to both the defroster outlets and the floor outlets.

The FAN lever operates a four-position switch. A two resistor blower resistor assembly is connected in series between the blower motor and the switch, and serves to reduce the speed of the motor. When the FAN lever is positioned fully to the left, the blower motor is off. Movement of the lever to the right provides low, medium and high blower speeds. A 180° F. thermostat is provided as standard equipment on all series cars. The thermostat is located under cylinder water outlet (thermostat housing). See Figures 11-13 and 11-14.

b. Operation

The heater system is completely controlled by the air, temperature and FAN levers located on the instrument panel. These levers should be operated as follows:

1. Air Lever—The air lever opens and closes heater system doors for channeling or routing of outside air through the system. If channeling of the air flow to the floor is desired, move air lever from OFF position to HTR position. Any downward movement beyond the HTR detent increases air flow to the defroster nozzles and decreases flow to floor. If maximum defrosting is desired, push air lever to full down (DEF) position.

2. Temperature Lever—If heating of the outside air flowing through the heater system is desired, the temperature lever is moved downward. Depending on the position of the temperature lever, mildly warmed to hot air can be obtained. As the lever is moved downward, heated air passing through the heater core is diluted in gradually decreasing amounts with unheated outside air which by-passes the heater core. Full downward position ducts all outside air through heater core.

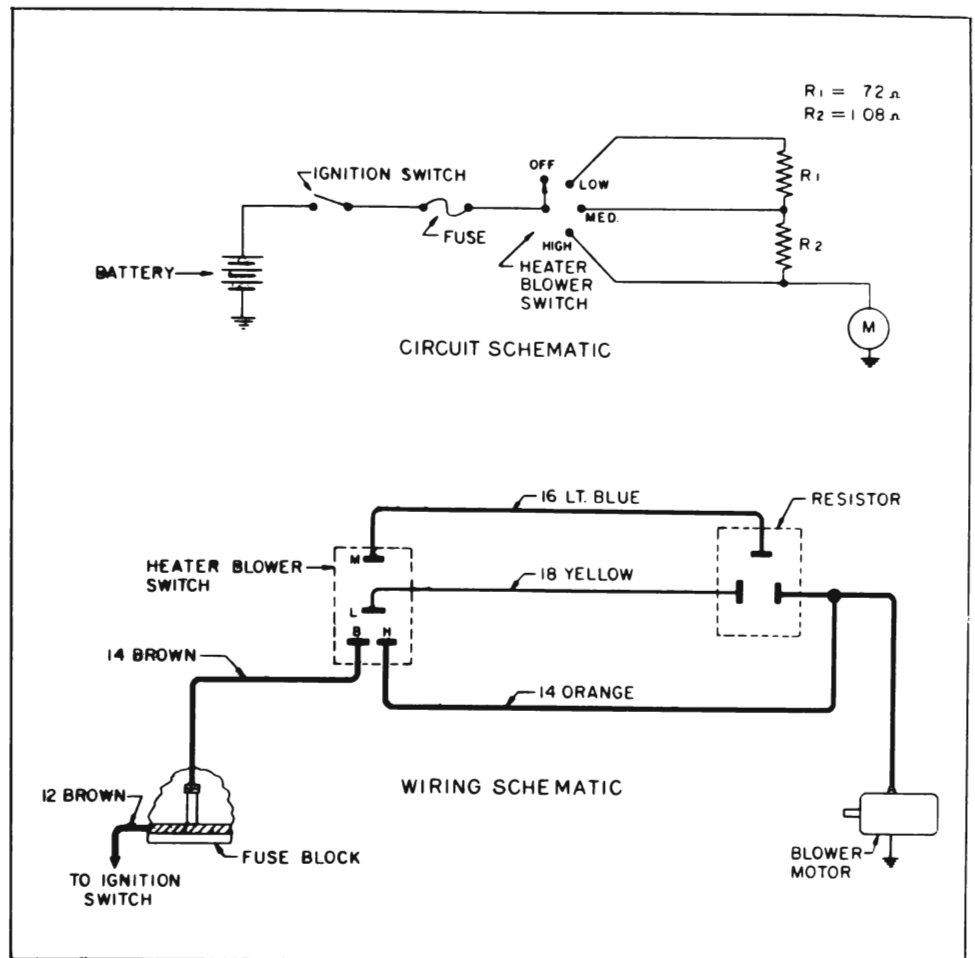


Figure 11-11—Heater System Wiring Diagram and Schematic

3. FAN Lever—To turn blower on move FAN lever to the right. There are three detents which provide low, medium and high blower speeds. Ram air (air flowing through system without assist from blower fan and caused by forward movement of car) is available whenever air lever is in HTR or DEF positions.

11-8 HEATER-DEFROSTER SERVICE PROCEDURES

a. Adjustment of Air Control Lever, Outside Air Door, and Defroster Door

NOTE: It is suggested that the control wires regulating the air lever, outside air door and defroster door be adjusted when: recommended springback of 1/8

to 3/16 inch of air control lever in OFF position not present, heater assembly has been removed, or when outside air and/or defroster doors do not open sufficiently to permit maximum air flow.

The following adjustment procedure is based on the assumption that all control wires involved are completely disconnected. Minor after installation adjustments of the air lever may be accomplished by rotation of the control wire adjuster nut, without disconnecting the control wires. However, if satisfactory results are not obtained, the following complete adjustment procedure is recommended.

1. Attach outside air door and defroster door control wires to respective pins on heater control assembly.

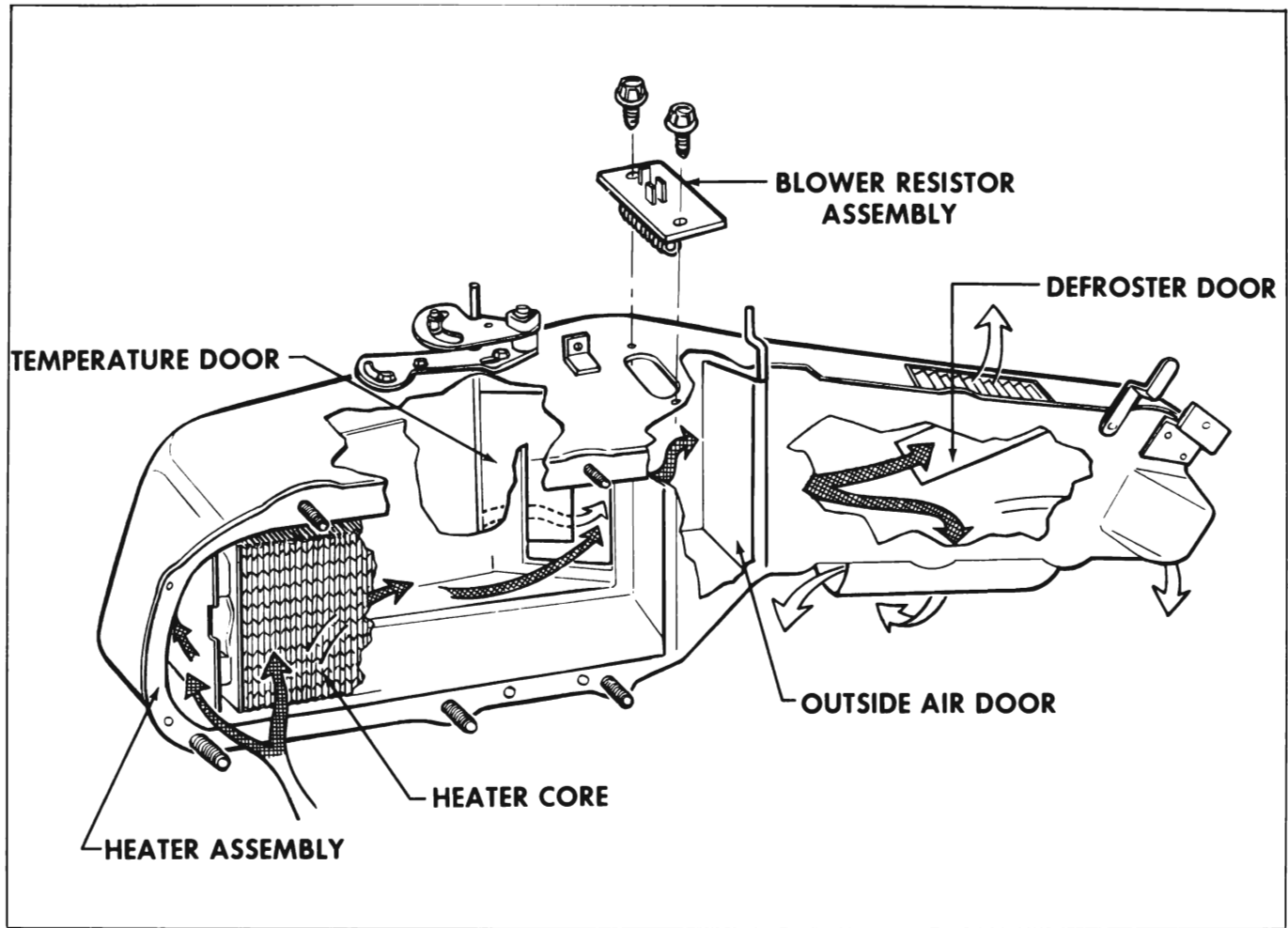


Figure 11-12—Heater Assembly

2. Loosely assemble defroster control wire to lever of defroster door.

3. Place air control lever in OFF position, hold defroster door closed (to the left), and tighten clamp securing defroster control wire to heater assembly.

4. Secure outside air control wire to lever of outside air door.

5. Insure that the air control lever is in the OFF position and rotate the control wire adjuster nut until: approximately 1/8 to 3/16 inch springback is obtained when air control lever is in OFF position.

NOTE: After adjustment is completed, check that 1/16 inch clearance exists between outside air

inlet door control pin and end of slot (see Figure 11-16) when AIR control lever is in off position.

NOTE: The air control lever will lock in the mid (HTR) position if less than 1/8 inch springback occurs. The outside air door will not fully open if more than 3/16 inch springback exists.

b. Adjustment of Temperature Control Lever and Temperature Valve

NOTE: It is suggested that the control wire regulating the temperature lever and door be adjusted when recommended springback is not present, heater assembly has been removed, or

when temperature door does not open sufficiently to permit maximum heating of air.

The following adjustment procedure is based on the assumption that temperature control wire is completely disconnected. After installation adjustment may be accomplished by rotation of the control wire adjuster nut, without disconnecting the control wire.

1. Attach temperature control wire to respective pin on heater control assembly and to lever of temperature door on heater assembly.

2. Position temperature lever to OFF and rotate control wire adjuster nut until a slight springback occurs.

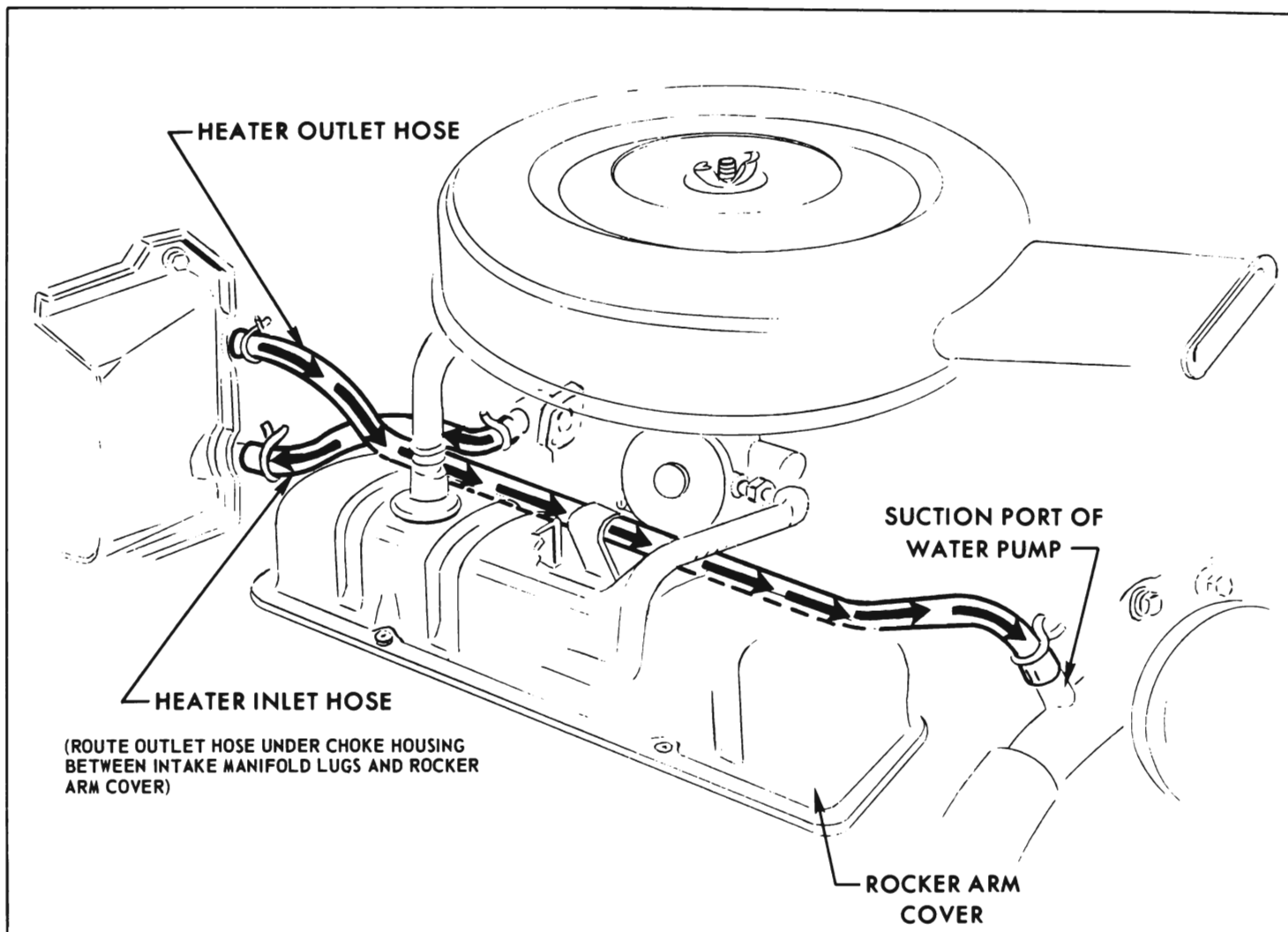


Figure 11-13—Heater Hose Routing, V-8 Engine

3. Move temperature lever to HOT position and rotate (if necessary) adjuster nut to obtain 1/8 to 3/16 inch springback.

c. Removal and Installation of Heater Control Assembly

REMOVAL

1. Remove five screws from instrument panel nose trim pad and lift off nose trim pad (see Figure 11-15).
2. Remove four screws securing trim control bezel to instrument panel and take off bezel.
3. Disconnect three control cables from heater assembly.

4. Remove three screws holding heater control assembly to instrument panel and partially withdraw heater control assembly and attach control wires.

5. Remove connector from fan switch, and disconnect lamp socket from heater control assembly.

6. Complete removal of heater control assembly.

INSTALLATION

7. Install heater control assembly reverse of removal procedures.
8. Check and adjust air and temperature control levers as necessary (ref. subpar. "a" and "b").

d. Removal and Installation of Blower and Air Inlet Assembly

REMOVAL

1. Remove fender skirt as follows:
 - (a) Disconnect battery and remove battery and battery support (see Figure 11-109).
 - (b) Unfasten all harnesses attached to skirt.
 - (c) Remove five screws holding front of skirt to radiator baffle.
 - (d) Remove screw securing fender support to skirt.
 - (e) Remove two screws from center of skirt holding skirt to upper fender flange.

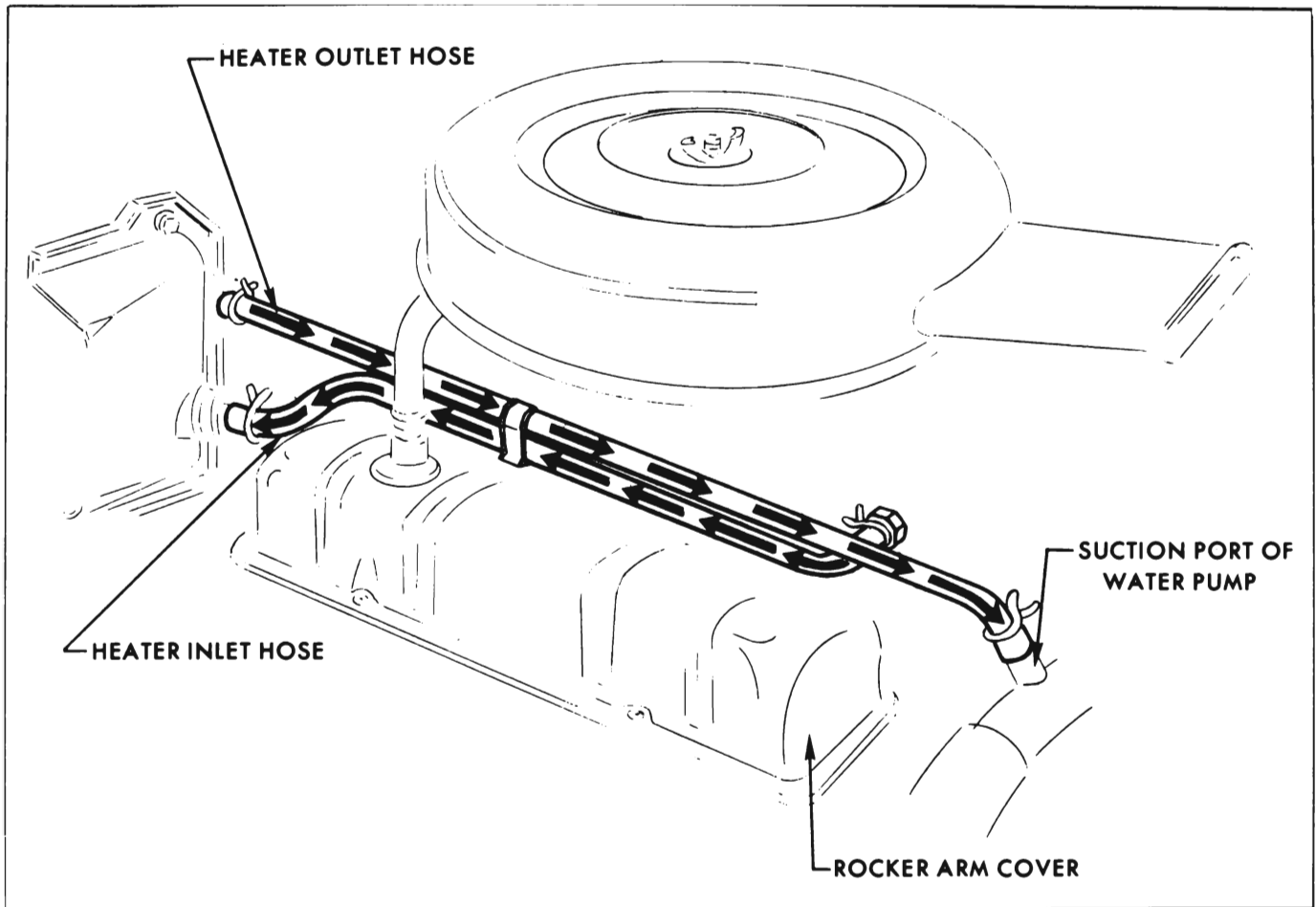


Figure 11-14—Heater Hose Routing, V-6 Engine

(f) Remove screw holding fender skirt bracket to cowl.

(g) Remove six screws holding outer edge of skirt to outer rim of fender wheelhouse.

(h) Remove one bolt securing lower edge of fender to rocker panel.

(i) Push skirt inward until lip of fender is cleared, and then roll the fender outward and lift out.

NOTE: It may be necessary to slightly stress outward the lower rear portion of the fender in order to clear the lip of the fender.

2. Disconnect blower motor wire, remove five nuts and washers, and two screws holding blower and air inlet assembly to cowl (see Figure 11-17) and take out assembly.

INSTALLATION

3. Install blower and air inlet assembly reverse of removal procedures and check for proper operation of blower.

e. Removal and Installation of Heater Assembly

REMOVAL

1. Remove fender skirt (ref. subpar. "d", Step 1).

2. Disconnect air control wires from levers of defroster door and outside air door.

3. Disconnect temperature control wire from lever of temperature door.

4. Drain radiator.

5. Disconnect heater inlet and outlet hoses from heater core inlet and outlet ports (see Figures 11-13 and 11-14).

6. Remove connector from blower resistor assembly (see Figure 11-12).

7. Remove five nuts and washers securing heater assembly to cowl. Pull heater assembly rearward until studs clear cowl, and lift out heater assembly.

INSTALLATION

8. Installation is reverse of removal procedures.

9. Check and adjust control wires as necessary (ref. subpar. "a" and "b").

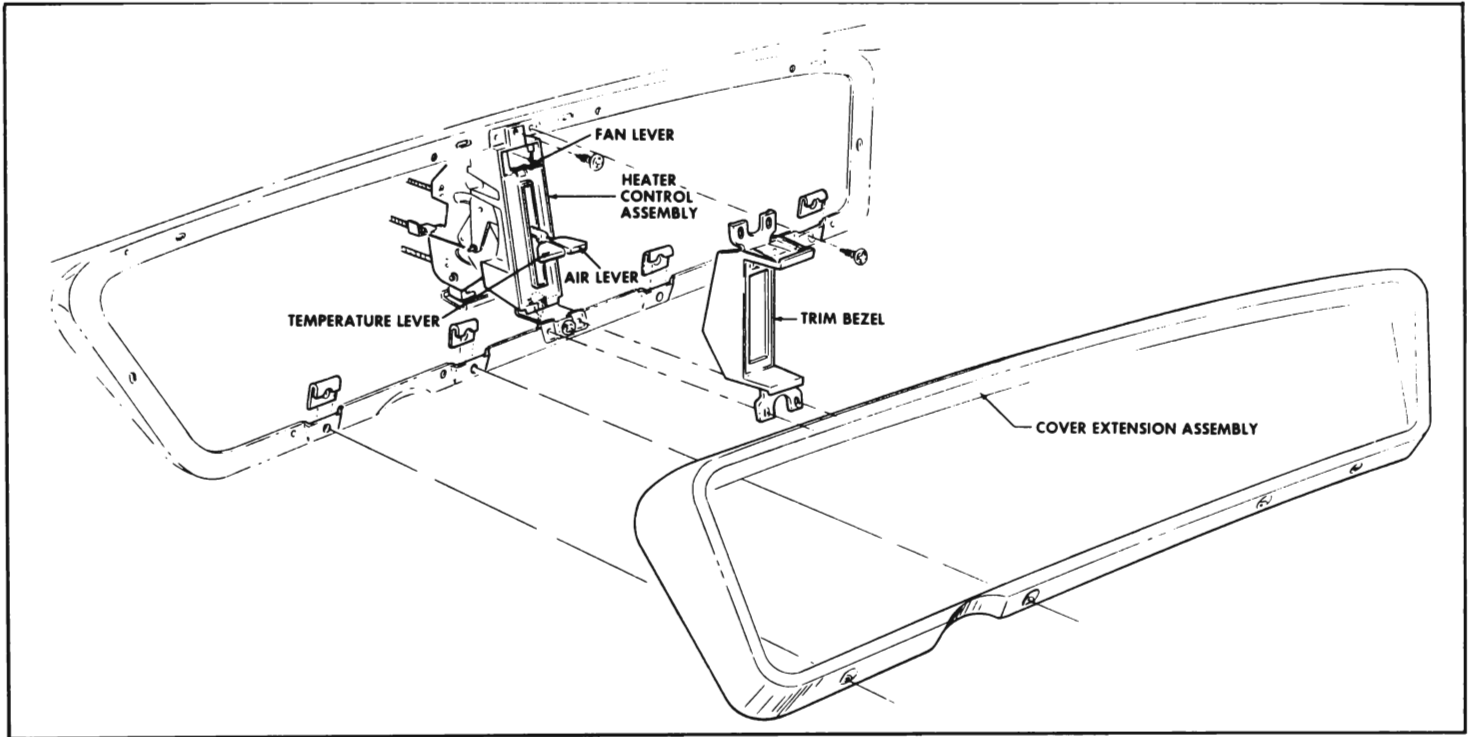


Figure 11-15—Heater Control Assembly Removal

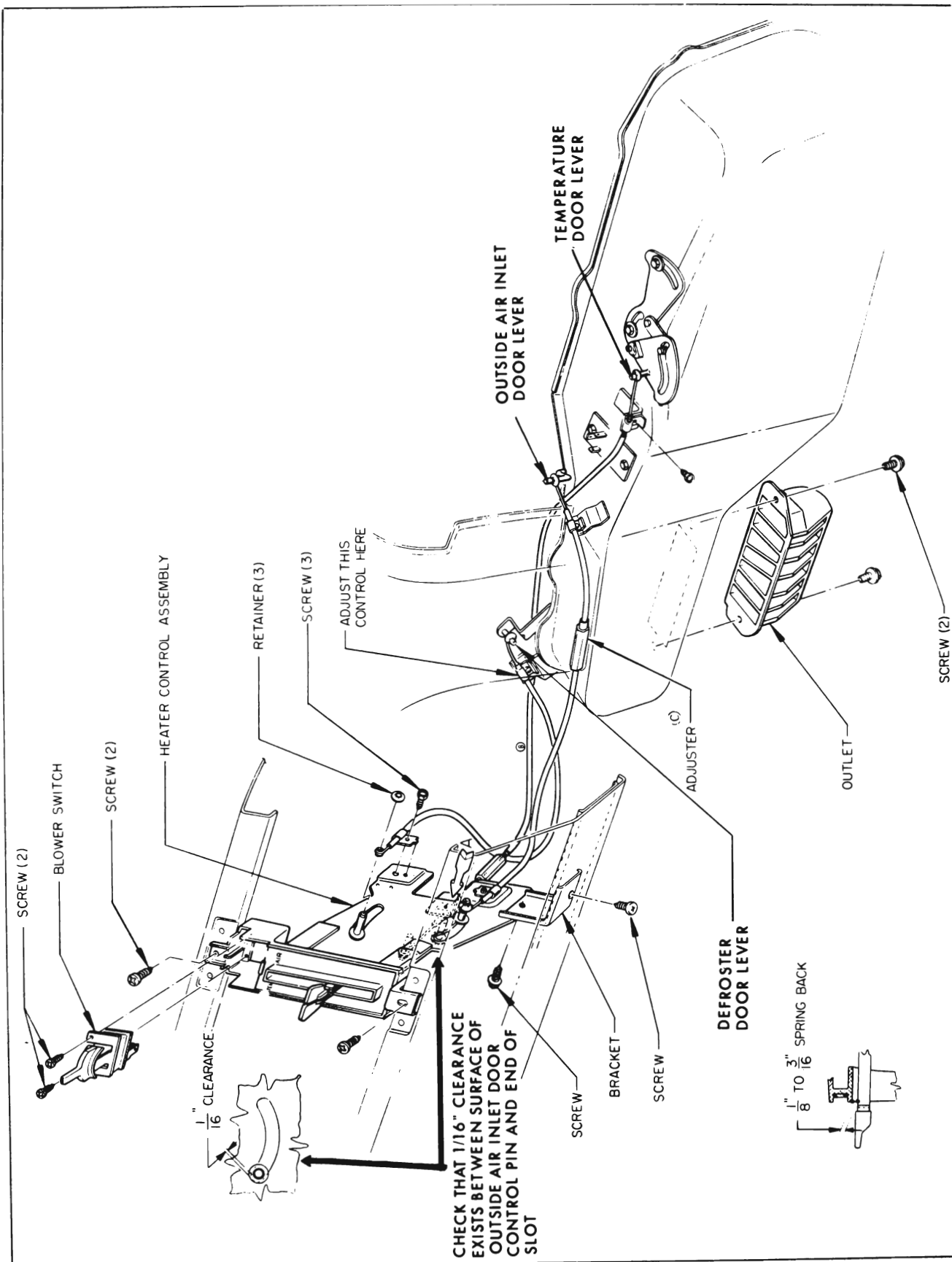


Figure 11-16—Heater Installation - 4000, 4100 and 4300 Series

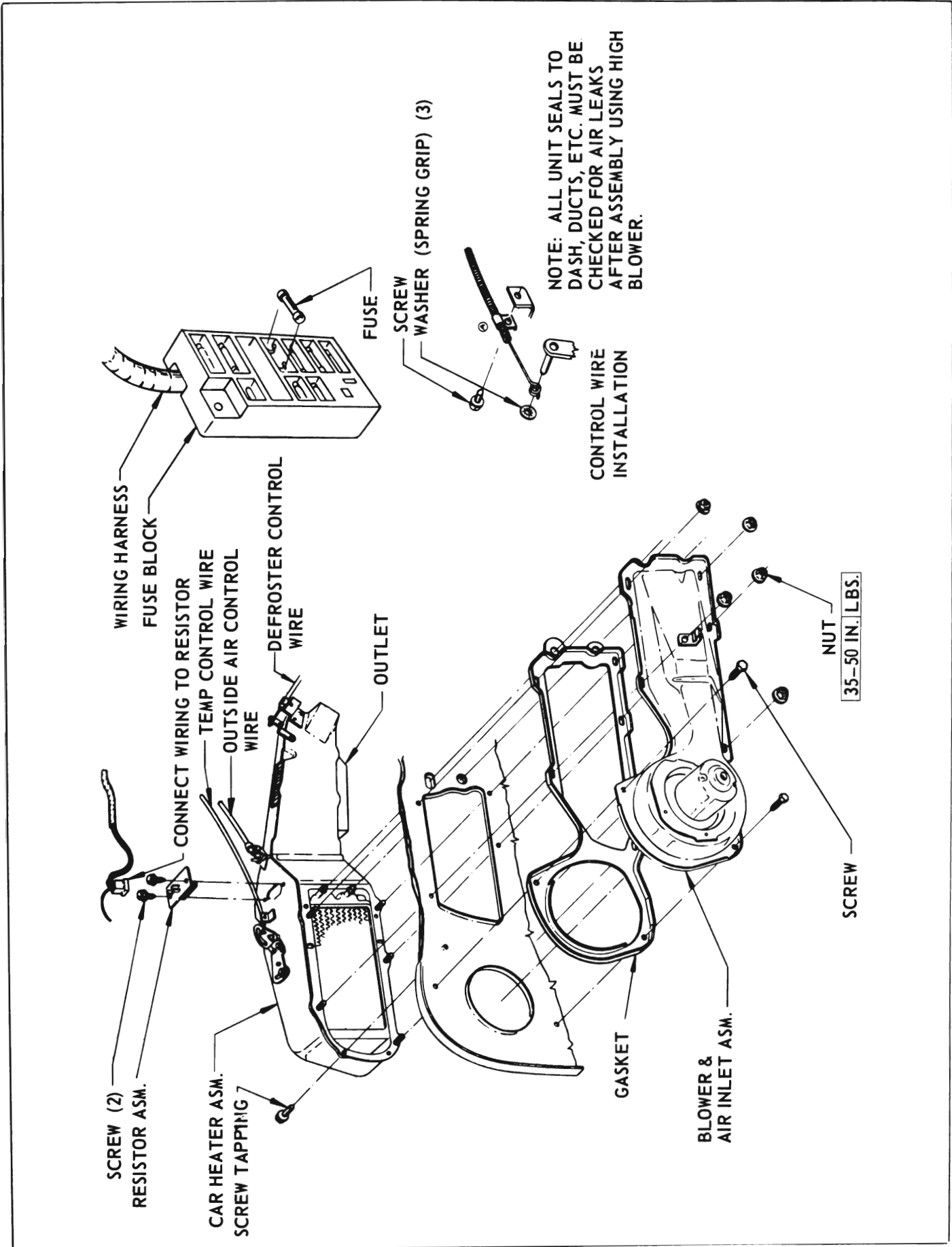


Figure 11-17—Heater Installation - 4000, 4100 and 4300 Series

11-9 HEATER-DEFROSTER TROUBLE DIAGNOSIS

NOTE: It is suggested that prior to inspecting a car for heater system malfunctions, the owner be checked to determine if system is being operated correctly. All windows and vents must be closed to effect maximum heat buildup.

TROUBLE				CAUSE & CORRECTION								
Temperature of heated air at outlets too low <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Outlet Air</td> <td style="width: 12.5%;">145</td> <td style="width: 12.5%;">150</td> <td style="width: 12.5%;">155</td> </tr> <tr> <td>Ambient Air</td> <td>0</td> <td>25</td> <td>40</td> </tr> </table>				Outlet Air	145	150	155	Ambient Air	0	25	40	<p>Check radiator cap for proper sealing action—replace if necessary.</p> <p>Check for proper engine coolant level. If level is down, correct cause of coolant loss and re-fill radiator.</p> <p>Inspect for kinks in heater or radiator hoses—relieve kink or replace hose.</p> <p>Check thermostat operation by measuring temperature of coolant at radiator filler neck cap. Temperature should be within $\pm 5^{\circ}\text{F}$. of rated thermostat value.</p> <p>Check that temperature lever operates temperature door full extent of travel—adjust as required (ref. subpar. 11-8, "b").</p> <p>Heater core partially plugged due to sediment in cooling system—backflush heater core as necessary.</p>
Outlet Air	145	150	155									
Ambient Air	0	25	40									
Temperature of heater air at outlets adequate—car will not build up sufficient heat				<p>Check for body leaks such as: (1) floor side kick pad ventilators partially open, (2) leaking grommets in cowl, (3) leaking welded seams along rocker panel and windshield, (4) leaks through access holes and screw holes, (5) leaking rubber molding around door and windows, (6) leaks between sealing edge of blower and air inlet assembly and cowl, and between sealing edge of heater assembly and cowl.</p>								
Inadequate defrosting action				<p>Check owner to determine if window side vents are kept closed to promote maximum defrosting.</p> <p>Check that air lever completely opens defroster door in DEF position—adjust as required (ref. subpar. 11-8, "a").</p> <p>Check for air leak in ducting between defroster outlet on heater assembly and defroster duct under instrument panel—seal area as necessary with body sealer.</p> <p>Insure that temperature and outside air doors open to full limit of travel—adjust as necessary (ref. subpar. 11-8, "a" and "b").</p>								

11-9 HEATER-DEFROSTER TROUBLE DIAGNOSIS (Cont'd)

TROUBLE	CAUSE & CORRECTION
<p>Inadequate heated air circulated through car</p>	<p>Inspect floor carpet to insure that carpet lies flat under front seat and does not obstruct air flow under seat, and also inspect around outlet ducts to insure that carpet is well fastened to floor to prevent cupping of air flow—correct as necessary.</p>
<p>Erratic heater operation</p>	<p>Partially plugged heated core—backflush heater core as necessary.</p> <p>Sediment in heater lines and radiator causing engine thermostat to stick open—flush system and replace thermostat if necessary.</p> <p>Check for kinked heater hoses—relieve kinks or replace hose as necessary.</p>
<p>Hard operating or broken control wires</p>	<p>Check for loose wire clamps or misadjusted wires—correct as required (ref. subpar. 11-8, “a” and “b”).</p> <p>Check for sticking door(s)—lubricate as required using Buick Silicone Spray (Group No. 8.800, Part No. 980473).</p>
<p>Blower inoperative</p>	<p>Check fuse in fuse block and replace if necessary.</p> <p>Check wiring for open circuit—correct as necessary.</p> <p>Inspect for defective fan switch—replace as necessary.</p> <p>Check for defective blower motor—replace as necessary.</p> <p>Check blower resistor—replace if necessary.</p>