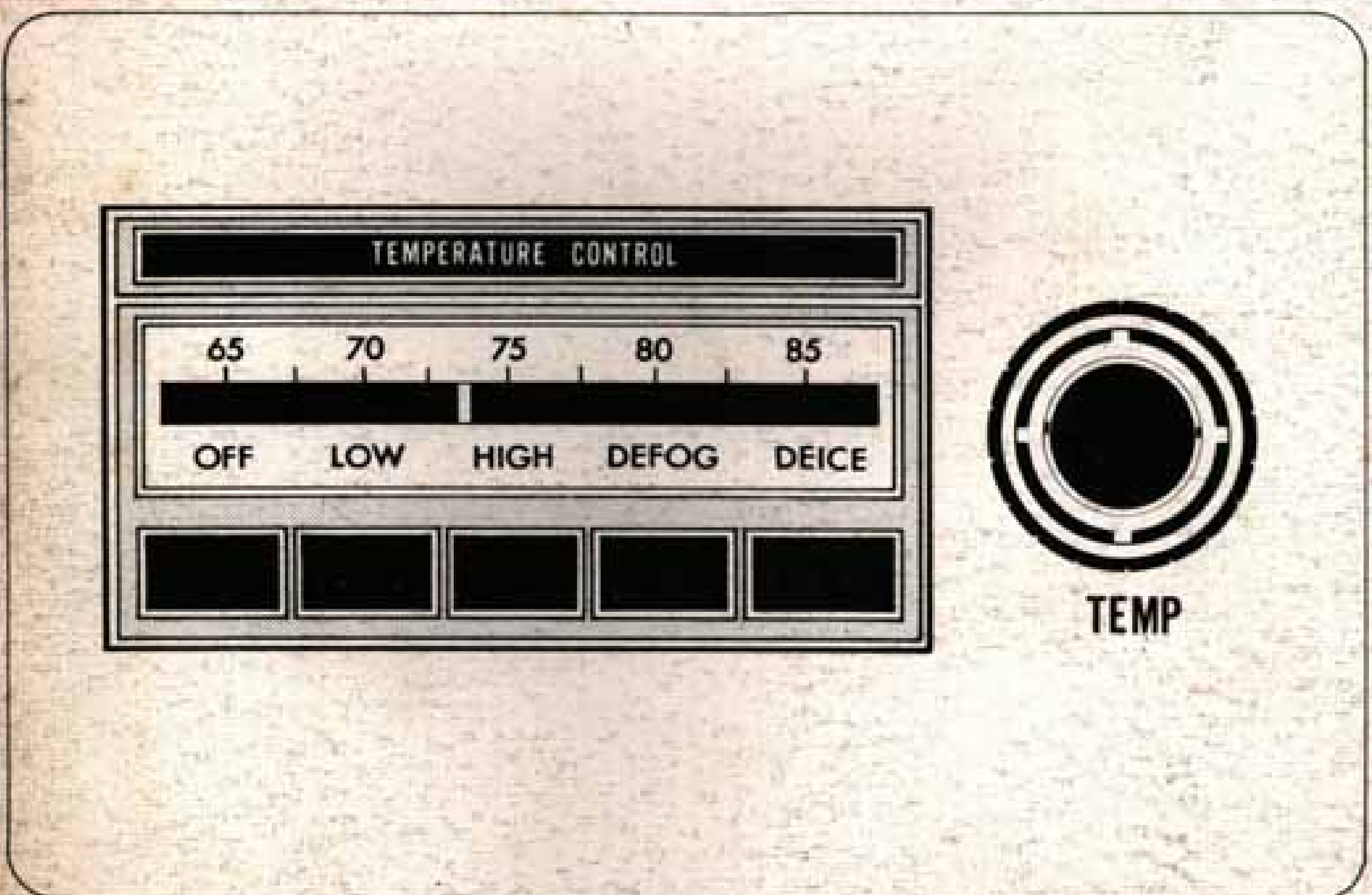
1967

LINCOLN Continental

AUTOMATIC TEMPERATURE CONTROL MANUAL



SERVICE DEPARTMENT

LINCOLN-MERCURY DIVISION

Ford

1967
AUTOMATIC TEMPERATURE CONTROL

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DESCRIPTION

The Automatic Temperature Control System installation is shown in Figure 1.

The Automatic Temperature Control System will automatically control the temperature, blower speed, and reduce the relative humidity of air inside the car. The operator need only set a dial at the desired temperature, and push a button and the system will deliver heated or cooled air, or a combination of the two to maintain the car interior at the temperature selected. The system will maintain the set comfort level automatically regardless of the weather and requires little or no change in the setting to compensate for changes due to outside weather conditions.

Automatic control of temperature is maintained in both summer and winter. In hot weather, it will cool the car rapidly to the pre-set comfort level and then modulate cooling to whatever degree is required to maintain the desired temperature.

In mild weather, the interior of the vehicle remains comfortable without re-setting the controls. In cold weather, the system will heat the car quickly to the desired temperature, then level out to maintain the pre-set temperature.

During operation, outside air is drawn from the cowl vent just below the windshield at all times, except at maximum cooling when recirculated air is used.

The system utilizes what is called a "reheat" system to provide conditioned air to the car interior. With this type of system all air flow from the blower passes through the evaporator core. Temperature is then regulated by reheating the cooler air to the desired temperature. Temperature of the outlet air is varied by the temperature blend door which governs whether the cooled air flows through and/or around the heater core, from where it is mixed and directed into the distribution plenum. From here it is diverted to the heater ducts, the defroster nozzles, or the air conditioning registers.

When warmer air is required to maintain the desired level, the air is distributed through openings at the bottom of the unit for the front passenger compartment. A duct is located over the tunnel to direct heater air at floor level to the rear seat area. Air for defroster operation is distributed through two defroster ducts onto the windshield. When cooler air is required to maintain the desired level, the air is distributed through the four adjustable registers on the instrument panel and also through two smaller adjustable air outlets below the instrument panel to the toe-board area.

At any temperature above approximately 35° F., the system when in operation, will remove excess moisture from the air due to the fact that the compressor is engaged and in operation. This removal of excess moisture from the air increases passenger comfort, particularily when traveling in humid weather limiting window fogging and interior condensation.

The Automatic Temperature Control utilizes both electrical and vacuum control. The controls on the instrument panel provide electrical signals to a master control unit. The Master Control Unit then supplies vacuum signals to the various vacuum motors which open and close the respective air doors, and electrical signals to operate the blower motor at varying speeds.

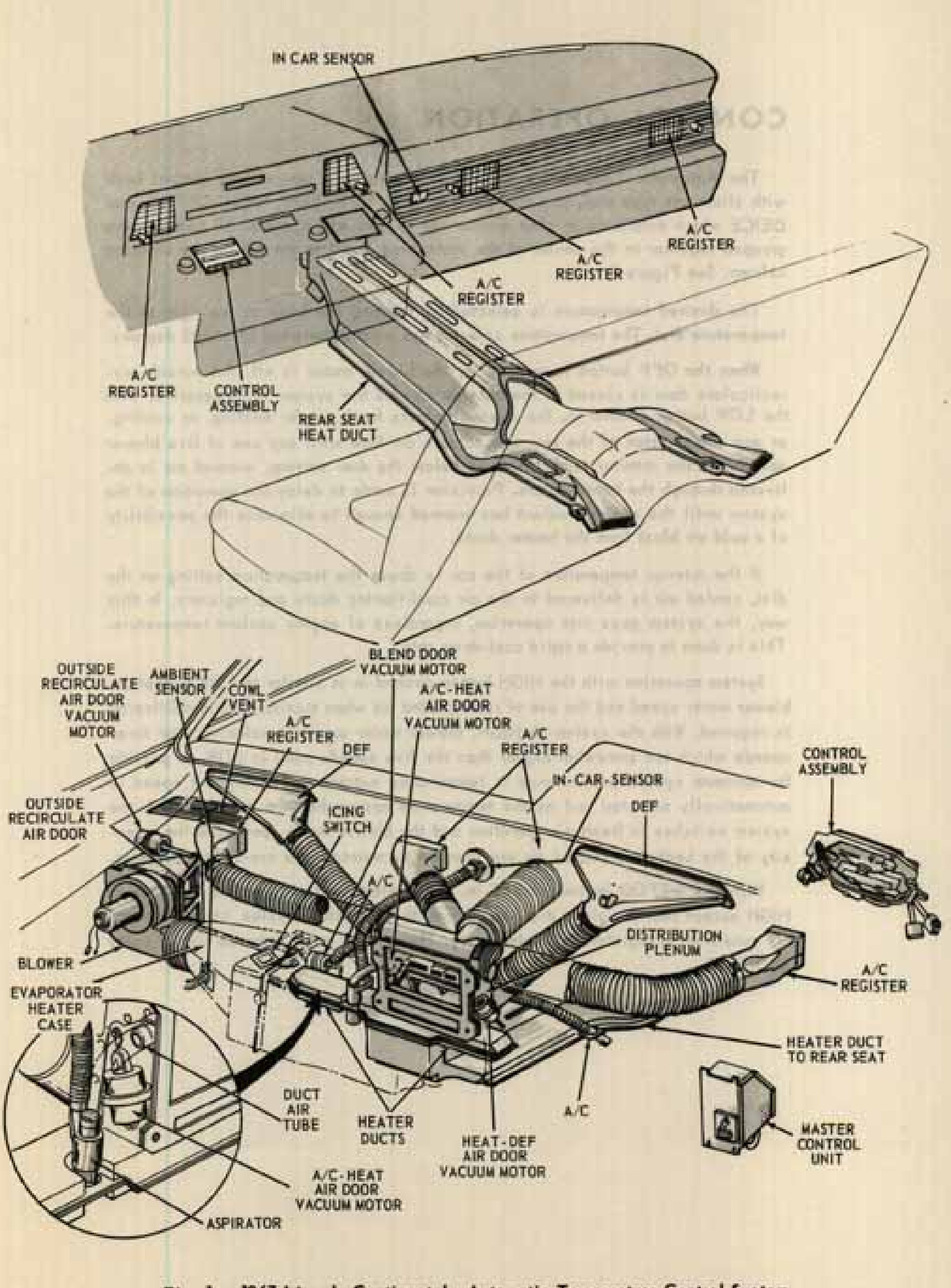


Fig. 1 – 1967 Lincoln Continental – Automatic Temperature Control System

CONTROL OPERATION

The Automatic Temperature Control incorporates a temperature control knob with slide rule type dial, and five push buttons, OFF, LOW, HIGH, DEFOG, and DEICE which determine in what manner the system will operate. All controls are grouped together in the center of the instrument panel to the left of the steering column. See Figure 2.

The desired temperature is selected by rotating the knob at the right of the temperature dial. The temperature selector has a range between 65 and 85 degrees.

When the OFF button is pushed in, the blower motor is off, the outside air-recirculate door is closed to the outside air and the system is inoperative. With the LOW button pushed in, the system selects fresh air for heating, or cooling, or any combination of the two and adjusts air flow with any one of five blower speeds. If the interior temperature is below the dial setting, warmed air is delivered through the heater ducts. Provision is made to delay the operation of the system until the engine coolant has warmed enough to eliminate the possibility of a cold air blast from the heater ducts.

If the interior temperature of the car is above the temperature setting on the dial, cooled air is delivered to the air conditioning ducts and registers. In this way, the system goes into operation, regardless of engine coolant temperature. This is done to provide a rapid cool-down rate.

System operation with the HIGH button pushed in is similar to LOW except for blower motor speed and the use of recirculated air when maximum air conditioning is required. With the system in HIGH, blower motor speed is selected from three speeds which are somewhat higher than the five speeds used in LOW, to provide for optimum system performance in temperature extremes. The highest speed is automatically selected and as the temperature approaches the pre-set level, the system switches to fresh air operation and the blower motor speed and the intensity of the heated or cooled air are lowered to maintain the pre-set temperature.

With the DEFOG button pushed in, the system operation is the same as in HIGH except that the air is discharged from the defroster nozzles, rather than the air conditioning registers or heater ducts. There is no water warm-up blower delay in DEFOG.

CONTROL OPERATION (Cont'd)

When the DEICE button is pushed in, the system selects the maximum heat available at the highest blower speed and the air is discharged from the defroster nozzles. In both DEFOG and DEICE, approximately 20 percent of the air flow is directed to the heat ducts. In LOW and HIGH, with heater type operation, approximately 20 percent of the heater air is diverted from the heat duct to the defroster outlet to keep the windshield clear. No air is directed to the windshield in A/C type operation.

In DEFOG, both the temperature and blower speed are generally at maximum initially, but as the actual interior car temperature moves toward the pre-selected temperature, both the blower motor speed and the heat intensity are gradually reduced. In DEICE, maximum blower speed and maximum heat are in effect at all times. In order to return to normal in-car air distribution, it will be necessary to push in the HIGH or the LOW button. There is no blower delay in DEICE due to engine coolant temperature.

The register at each A/C outlet is adjustable for air flow direction by a lever located in the center of the outlet. Individual outlets may also be shut off by this lever. Two adjustable A/C outlets are located under the instrument panel for floor bleed level cooling.

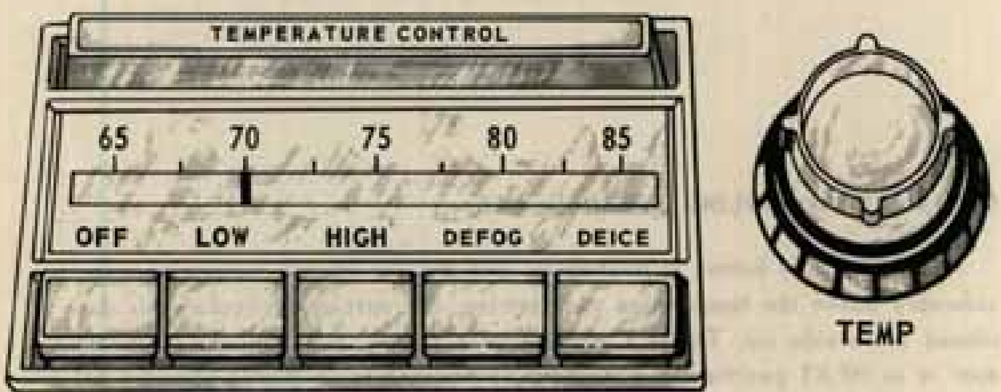


Fig. 2 – Automatic Temperature Controls

SYSTEM AIRFLOW

Figures 3 through 10 contain system schematics which illustrate airflow during the various system conditions.

OFF POSITION

In "OFF", the outside-recirculate air door is closed to outside air and the temperature blend door remains in the last operational position; the A/C-Heat door is in heat position; the Heat-Defrost door is in heat position; the heater water valve is shut off. The blower is also turned off.

HIGH MAXIMUM COOLING (RECIRCULATE)

When the HIGH button is pushed in, and the car interior temperature is considerably above the temperature dial setting, the outside-recirculate air door is closed to outside air. The A/C-Heat door is in A/C position, the Heat-Defrost door is in HEAT position, the temperature blend door is closed allowing all air to bypass the heater core. Warm air is drawn from the passenger compartment, directed through the evaporator core where it is cooled, and returned to the car interior through the A/C ducts and registers.

(CAR COOLING CONTINUED ON NEXT PAGE)

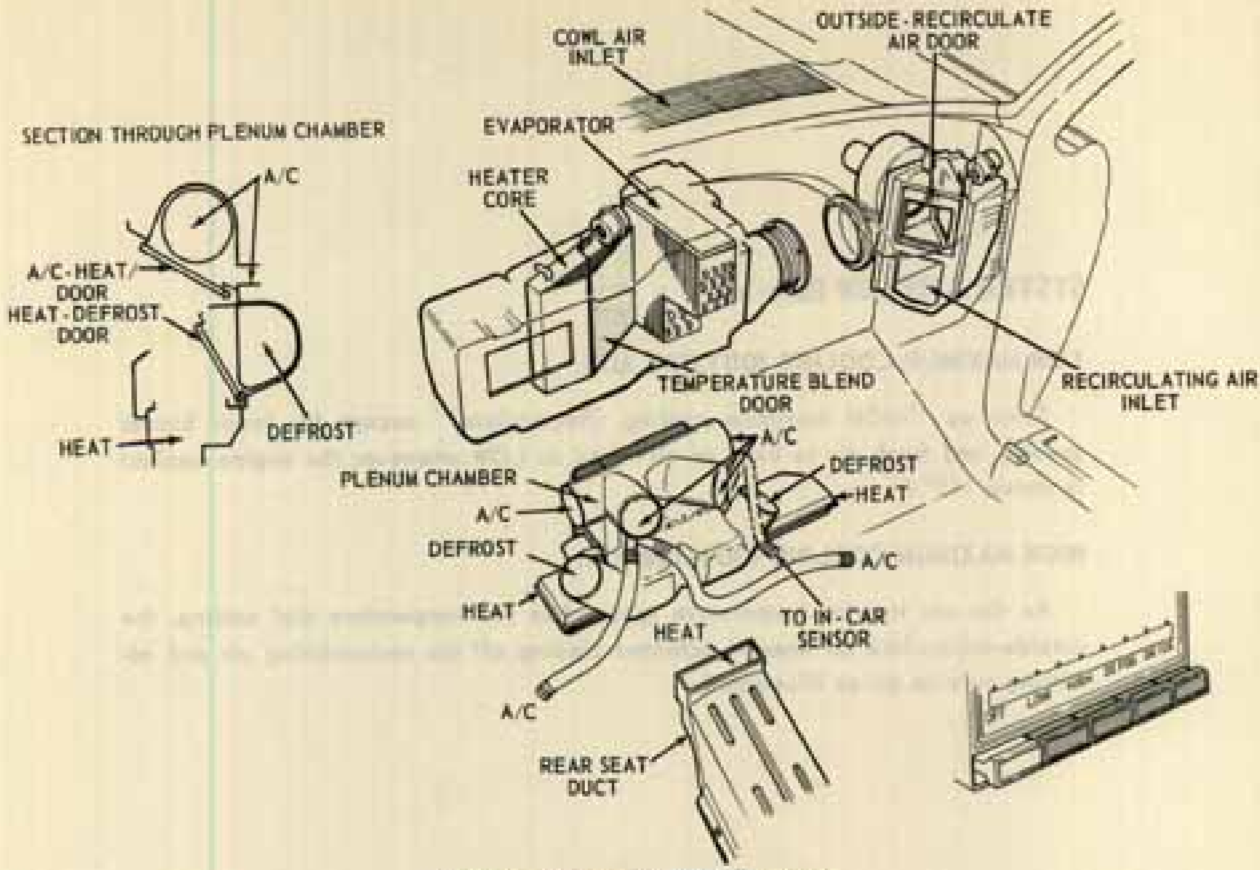


Fig. 3 – Control in OFF Position

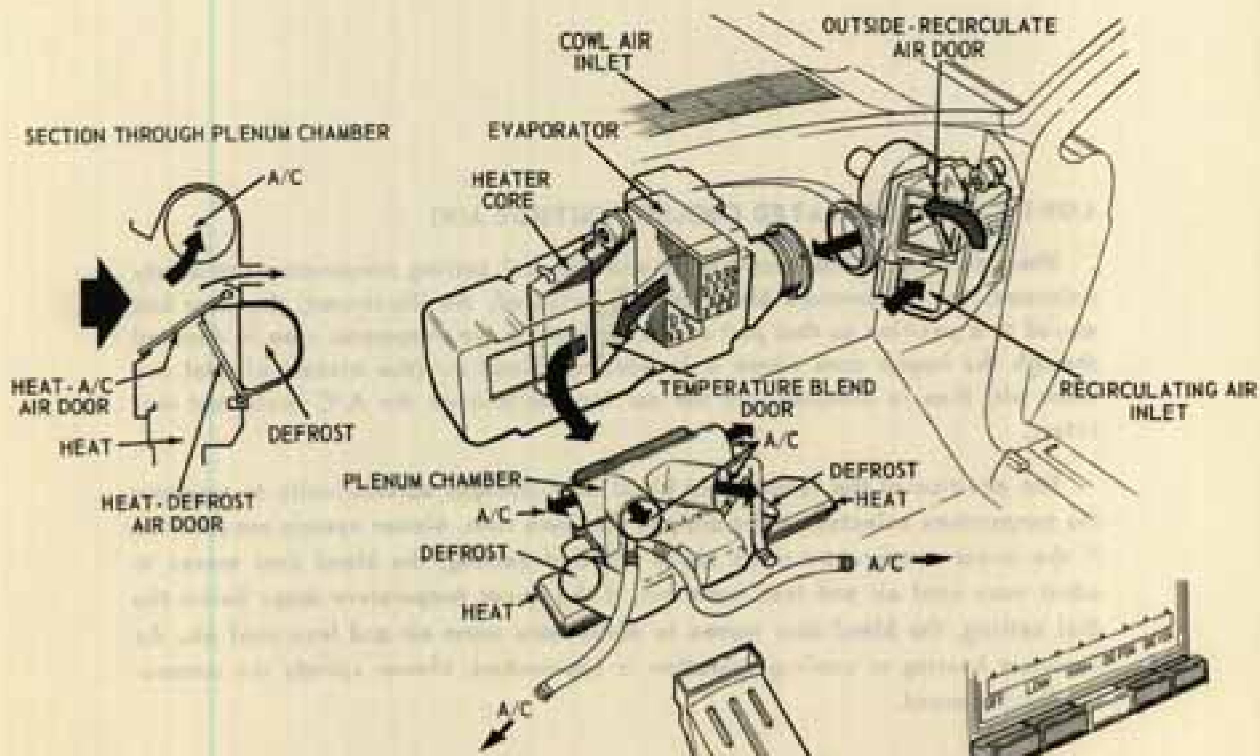


Fig. 4 – High Maximum Cooling (Recirculate)

SYSTEM AIRFLOW (Cont'd)

LOW MAXIMUM COOLING (OUTSIDE AIR)

Same as "HIGH maximum cooling (Recirculate)" except for lower blower speeds, and fresh air is used at all times in LOW whenever the engine coolant is above 115° F.

HIGH MAXIMUM COOLING (OUTSIDE AIR)

As the car interior temperature approaches the temperature dial setting, the outside-recirculate air door is actuated closing off the recirculating air and admitting outside air as illustrated.

LOW OR HIGH MODULATED COOLING (OUTSIDE AIR)

When the interior car temperature and the dial setting temperature are nearly balanced, the temperature blend door is actuated. As illustrated, the door has moved to a position so that part of the air leaving the evaporator core is directed through the heater core where it is warmed. Blend air (the mixture of cool and warm air) then is directed into the car interior through the A/C ducts and registers.

The position of the temperature blend door changes automatically to maintain the temperature selected on the dial; at the same time, blower speeds are reduced. If the in-car temperature rises above the dial setting, the blend door moves to admit more cool air and less warm air. If the in-car temperature drops below the dial setting, the blend door moves to admit more warm air and less cool air. As maximum heating or cooling operation is approached, blower speeds are automatically increased.

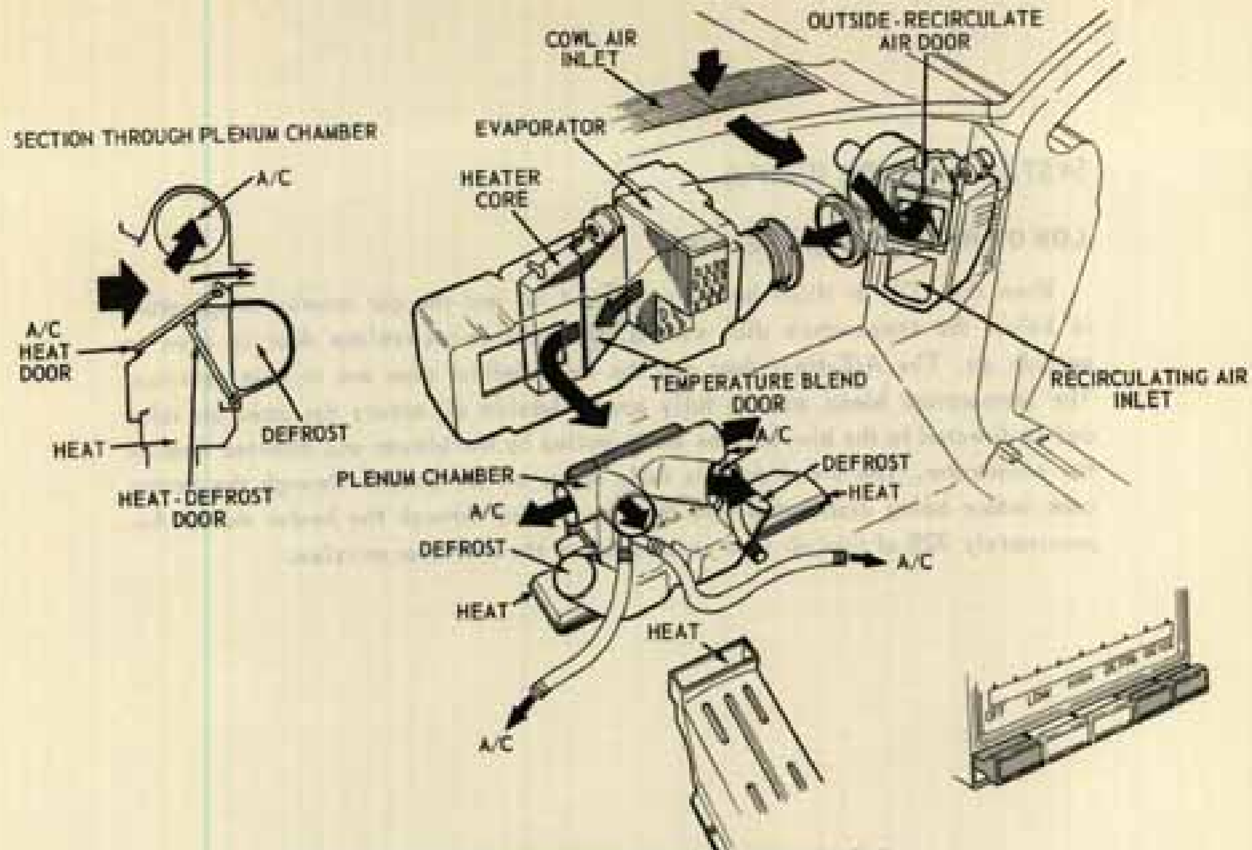


Fig. 5 – Low or High Maximum Cooling (Outside Air)

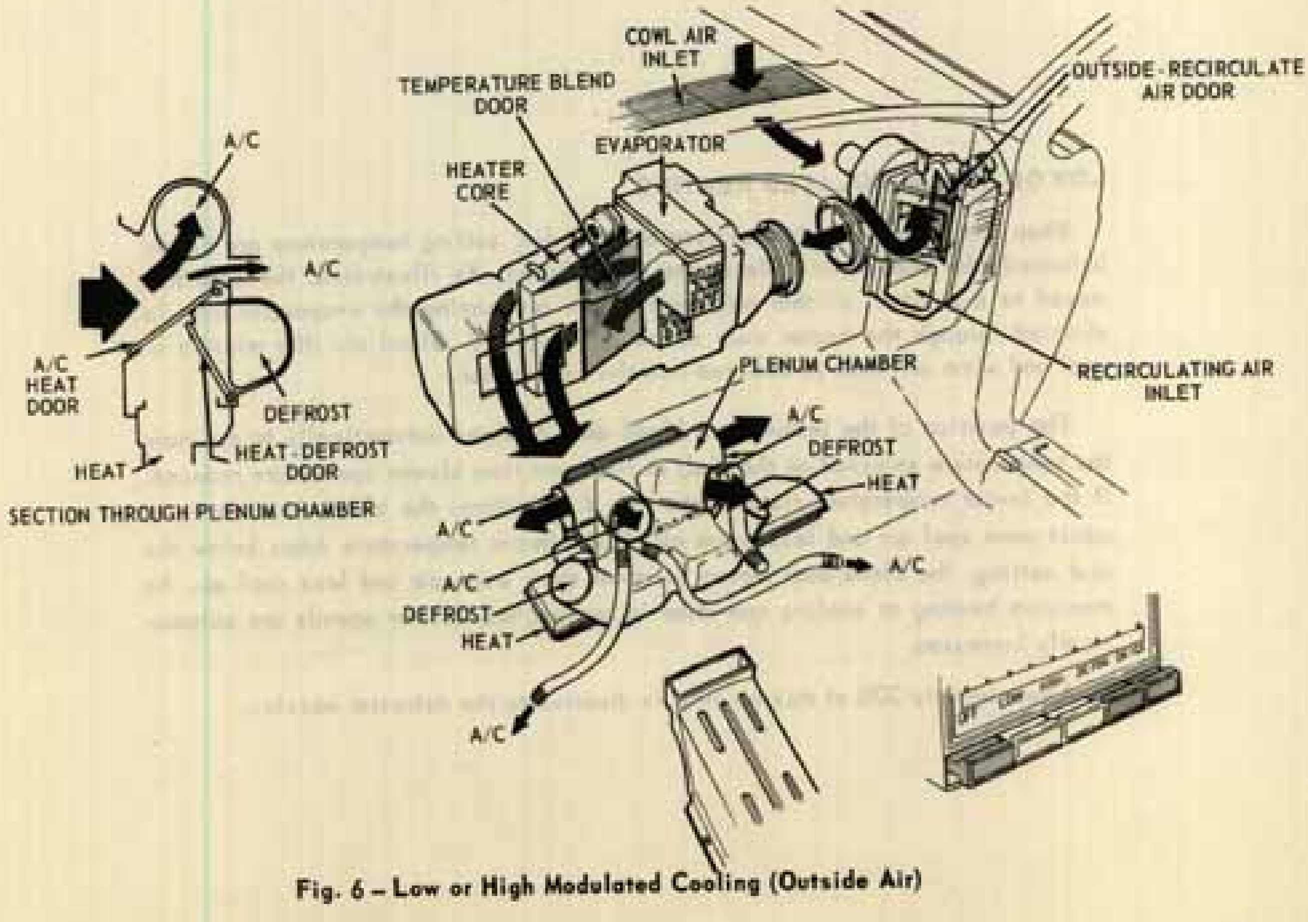


Fig. 6 – Low or High Modulated Cooling (Outside Air)

SYSTEM AIRFLOW (Cont'd)

LOW OR HIGH MAXIMUM HEATING

When the LOW or HIGH button is pushed in, and the car interior temperature is below the temperature dial setting, the outside-recirculate door is open to outside air. The A/C-Heat door and the Heat-Defrost door are in heat position. The temperature blend door is fully open. Outside air enters the cowl air inlet and is directed to the blower. The air is pulled by the blower and directed through the evaporator. The blend door is fully open, all air passes through the heater core before being distributed into the car interior through the heater ducts. Approximately 20% of this air flow is diverted to the defroster nozzles.

LOW OR HIGH MODULATED HEATING

When the interior car temperature and the dial setting temperature are nearly balanced, the temperature blend door is actuated. As illustrated, the door has moved to a position so that only part of the air leaving the evaporator core is directed through the heater core where it is warmed. Blend air (the mixture of cool and warm air) then is directed into the car interior.

The position of the temperature blend door changes automatically to maintain the temperature selected on the dial; at the same time blower speeds are reduced. If the in-car temperature rises above the dial setting, the blend door moves to admit more cool air and less warm air. If the in-car temperature drops below the dial setting, the blend door moves to admit more warm air and less cool air. As maximum heating or cooling operation is approached, blower speeds are automatically increased.

Approximately 20% of this air flow is diverted to the defroster nozzles.

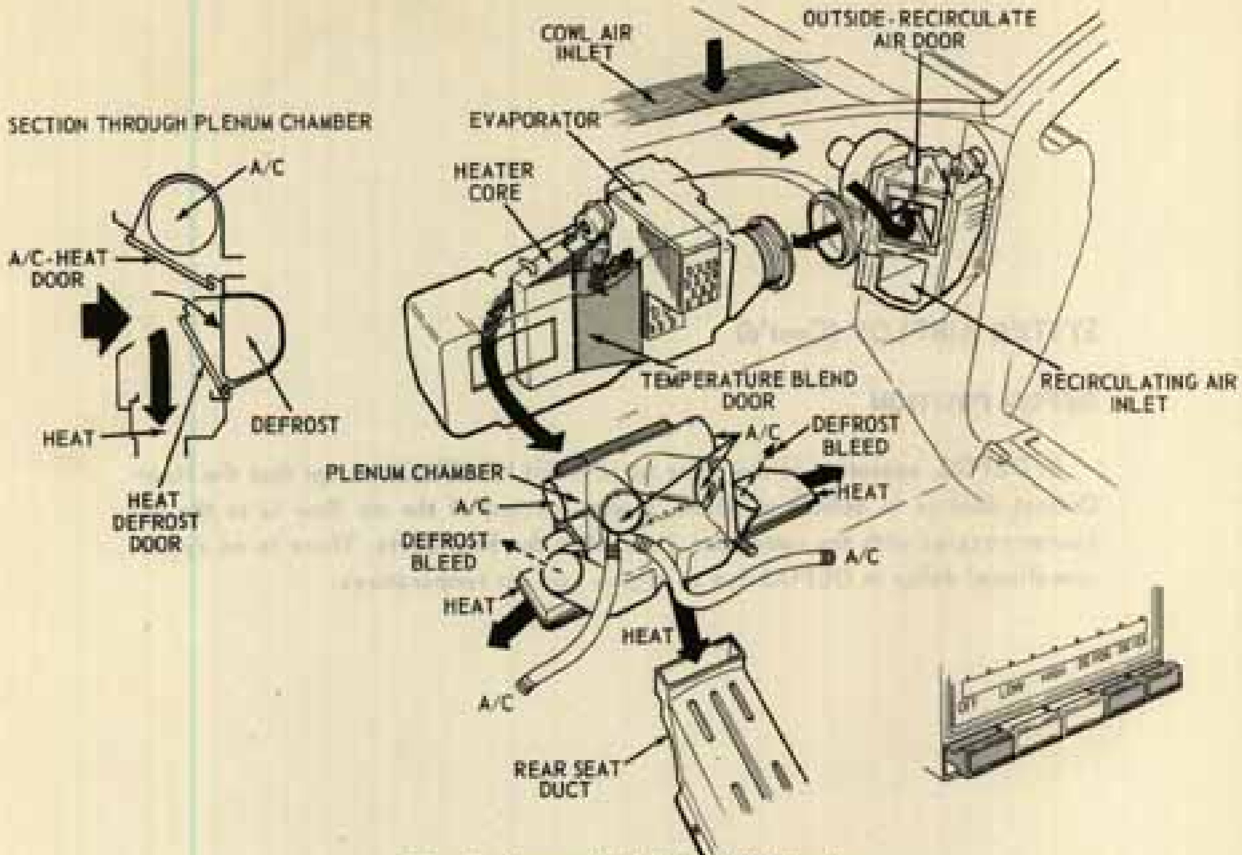


Fig. 7 – Low or High MAXIMUM Heating

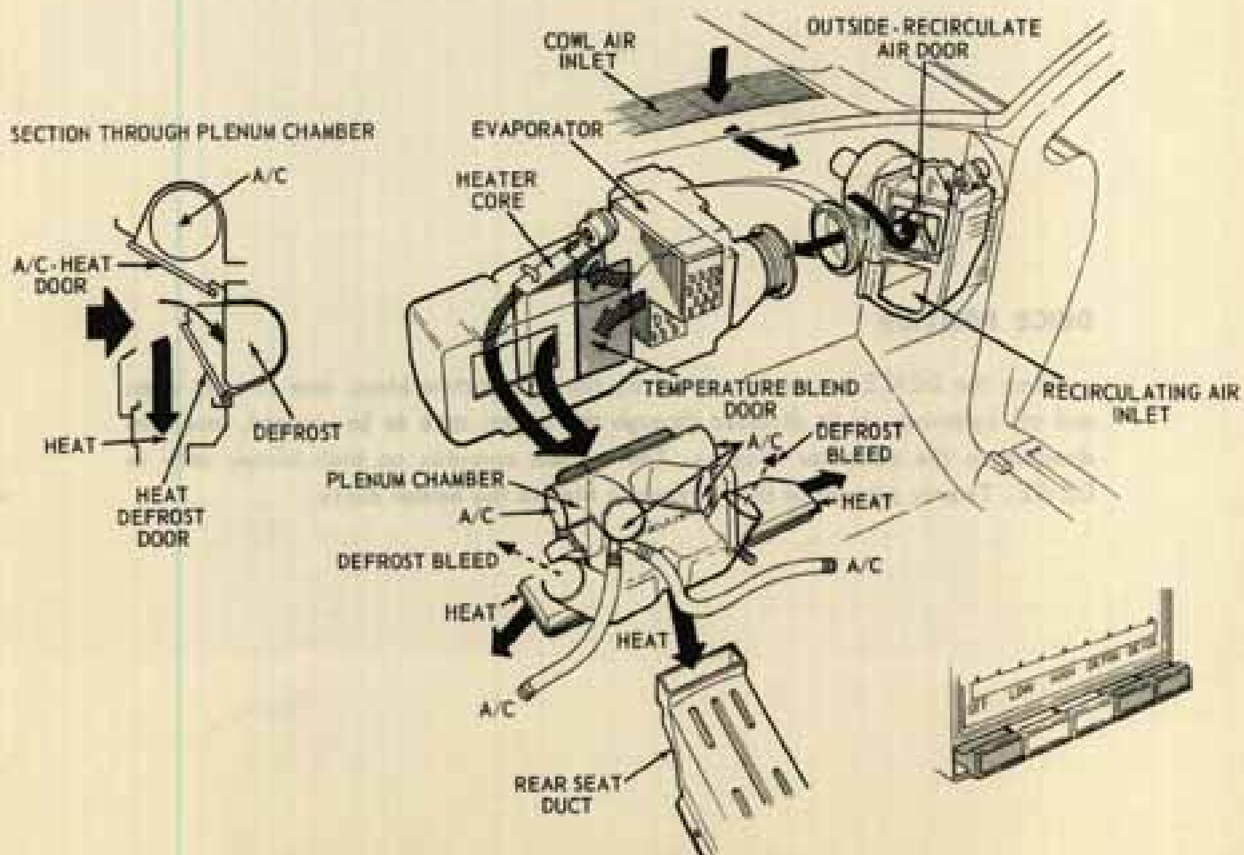


Fig. 8 – Low or High MODULATED Heating

SYSTEM AIRFLOW (Cont'd)

DEFOG POSITION

In DEFOG, operation is the same as in HIGH HEATING, except that the Heat-Defrost door is in defrost position. Eighty percent of the air flow is to the defroster nozzles with the remainder directed to the heat ducts. There is no system operational delay in DEFOG due to engine coolant temperatures.

DEICE POSITION

When the DEICE button is pushed in, the temperature blend door is fully open and all incoming air is diverted through the heater core to be warmed, and then directed to the defroster nozzles. The system operates on high blower only in DEICE. Twenty percent of this airflow is bled to the heater ducts.

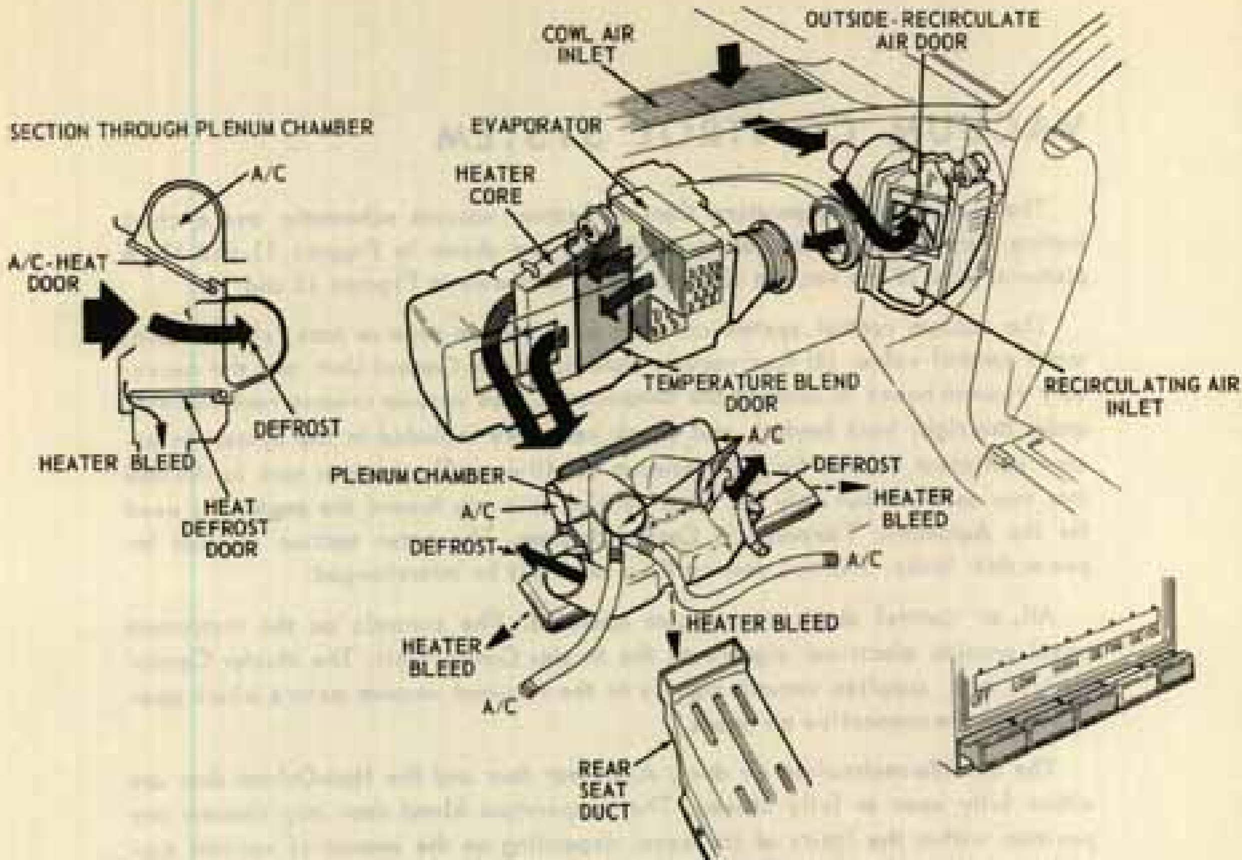


Fig. 9 – Control in DEFOG

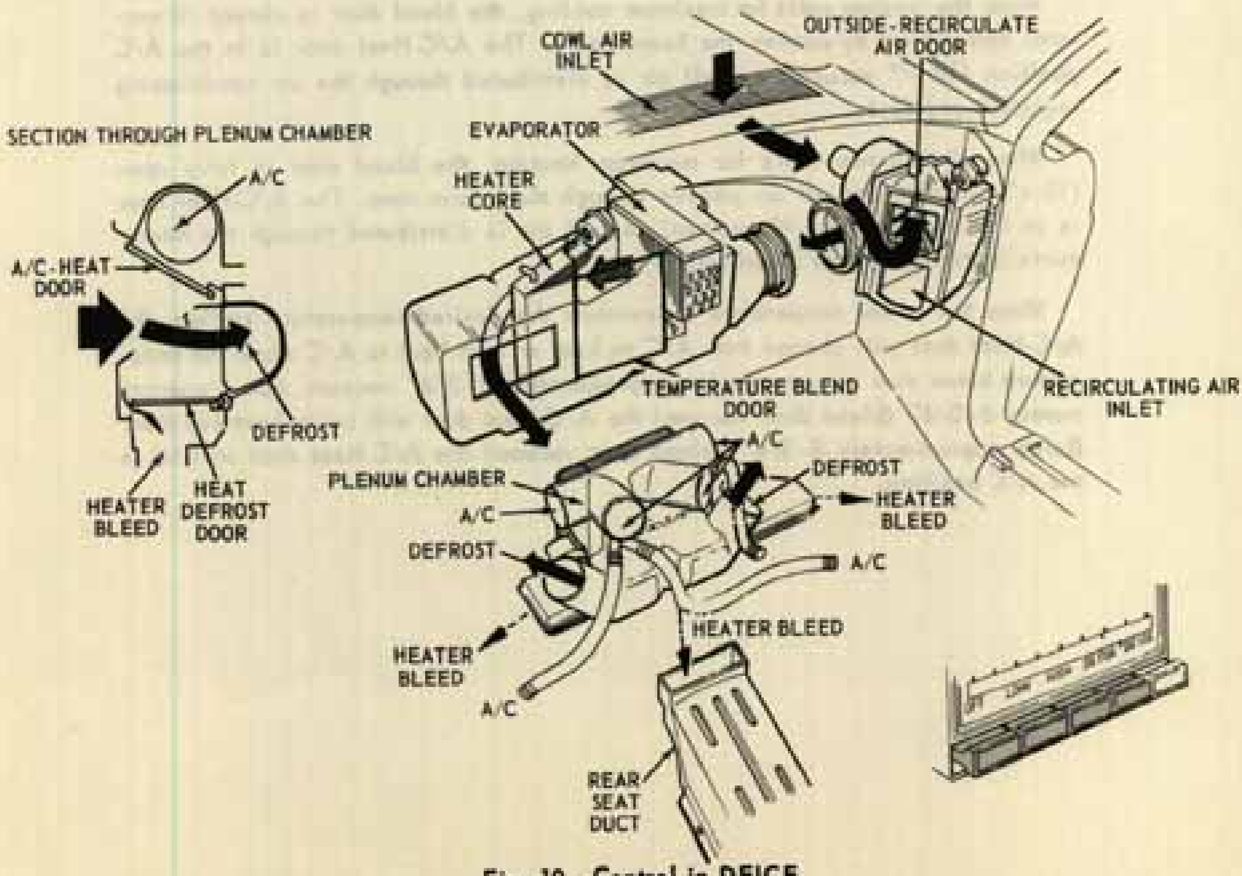


Fig. 10 – Control in DEICE

VACUUM CONTROL SYSTEM

The Automatic Temperature Control System vacuum schematic and a chart listing vacuum system operating conditions are shown in Figures 11 and 12. A pictorial view of the vacuum control system is shown in Figures 13 and 14.

The vacuum control system consists of a vacuum reserve tank, check valve, water control valve, (4) four vacuum motors, Master Control Unit, and the necessary vacuum hoses to connect the components. The vacuum reserve tank (located under the right front fender), and check valve are included in the system to assure sufficient vacuum for all operating conditions. The reserve tank is divided into two sections but only the inner section (the one toward the engine) is used for the Automatic Temperature Control System. The outer section is used for power door locks. The two vacuum lines must not be interchanged.

All air control doors are vacuum operated. The controls on the instrument panel provide electrical signals to the Master Control Unit. The Master Control Unit, in turn, supplies vacuum signals to the required vacuum motors which open and close the respective air doors.

The outside-recirculate air door, A/C-Heat door and the Heat-Defrost door are either fully open or fully closed. The temperature blend door may assume any position within the limits of its travel depending on the amount of vacuum supplied from the Master Control Unit. The water control valve is fully open or fully closed.

When the system calls for maximum cooling, the blend door is closed (0 vacuum) and all air by-passes the heater core. The A/C-Heat door is in the A/C position (12 +" vacuum) and all air is distributed through the air conditioning registers and ducts.

When the system calls for maximum heating, the blend door is fully open (12 +" vacuum) and all air passes through the heater core. The A/C-Heat door is in the heat position (0 vacuum) and all air is distributed through the heater ducts (except defroster bleed air).

When the in-car temperature approaches the desired temperature setting, the A/C-Heat door will change from A/C to heat or from heat to A/C when the temperature blend door vacuum reaches approximately 8-3/4" vacuum. Above approximately 8-3/4" (blend door vacuum) the A/C-Heat door will be in heat position. Below approximately 8-3/4" (blend door vacuum) the A/C-Heat door will be in the A/C position.

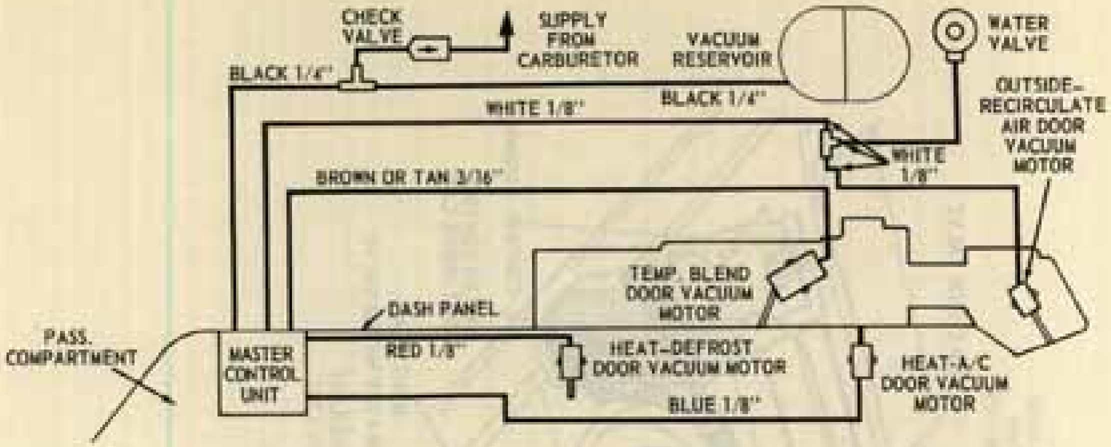


Fig. 11 – Automatic Temperature Control Vacuum Schematic

PUSH BUTTON SELECTION	TEMPERATURE BLEND DOOR		A/C-HEAT DOOR		HEAT-DEFROST DOOR		OUTSIDE-RECIRC AIR DOOR		HEATER WATER VALVE	
	Position	Vac ("Hg) ①	Position	Vac ("Hg)	Position	Vac ("Hg)	Position	Vac ("Hg)	Position	Vac ("Hg)
Off	Stays in Last Used Setting	(0 to 12+)	Heat	0	Heat	0	Recirc	0	Off	0
Low	Max. Cool	0–6	A/C	12+	Heat	0	Outside	12+	On	12+
	Temp. Control Range	6–12	A/C ②	12+	Heat	0	Outside	12+	On	12+
			Heat ②	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
	Max. Heat	12+	Heat	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
High	Max. Cool (Recirc)	0–5½	A/C	12+	Heat	0	Recirc	0	Off	0
	Max. Cool (Outside)	5½–6	A/C	12+	Heat	0	Outside	12+	On	12+
	Temp. Control Range	6–12	A/C ②	12+	Heat	0	Outside	12+	On	12+
			Heat ②	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
	Max. Heat	12+	Heat	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
Defog	Max. Cool	0–6	Heat	0	Defrost	12+	Outside	12+	On	12+
	Temp. Control Range	6–12								
	Max. Heat	12+								
Deice	Max. Heat	12+	Heat	0	Defrost	12+	Outside	12+	On	12+

① Vacuum figures are for vacuum increasing from 0" Hg. to 12+" Hg. With vacuum decreasing from 12+ Hg. to 0" Hg., subtract ½" Hg. from vacuum figures listed.

② A/C – HEAT DOOR changes from A/C to HEAT when TEMPERATURE BLEND DOOR reaches 8-⅜" Hg. vacuum.

③ Same as OFF push button selection if engine coolant is below 115° F.

Max. = Maximum • A/C = Air Conditioning • Vac ("Hg) = Vacuum in inches of mercury
Min. = Minimum • Recirc. = Recirculate

Fig. 12 – Automatic Temperature Control Vacuum System Operating Conditions

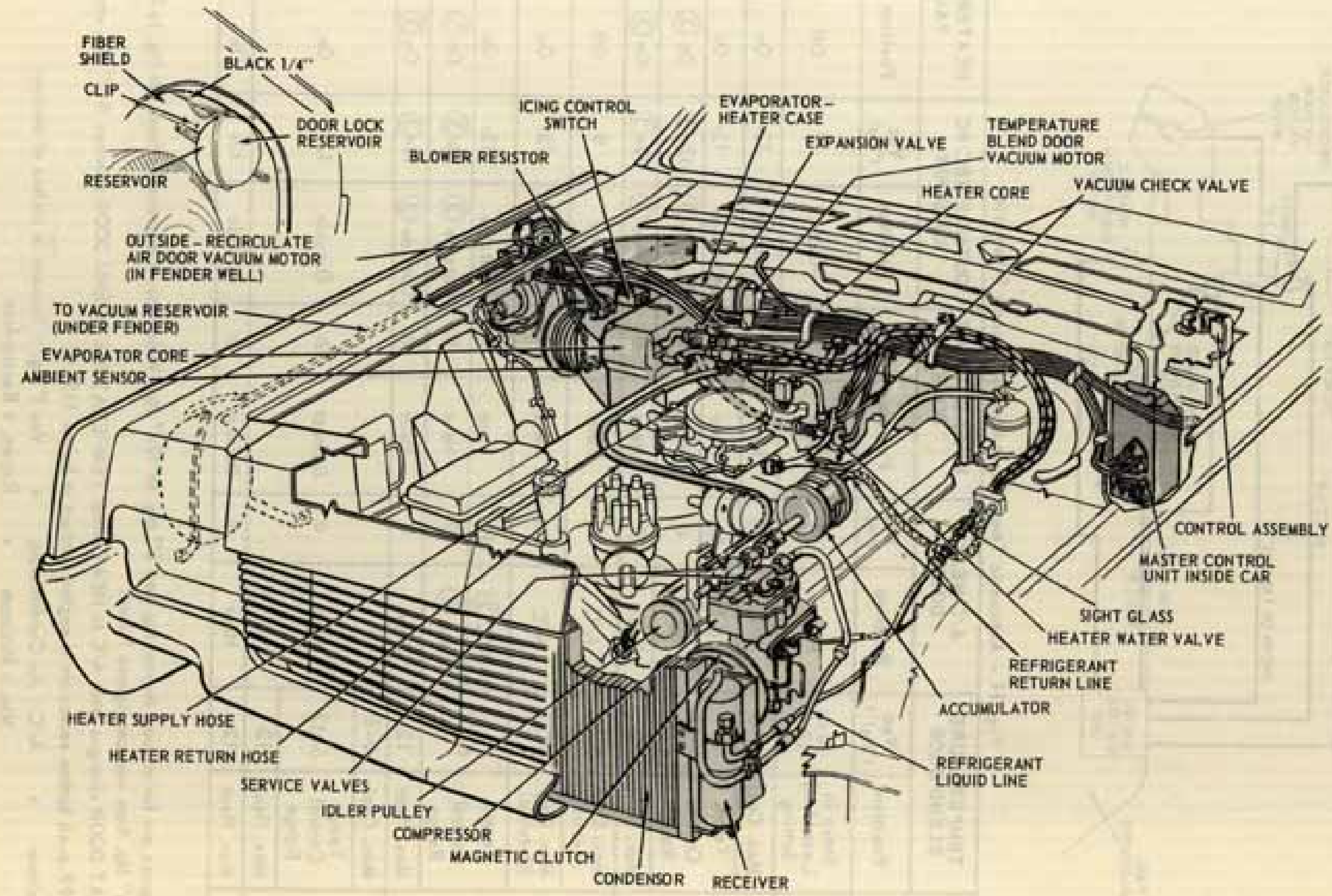


Fig. 13 – Automatic Temperature Control Vacuum System (Engine Compartment)

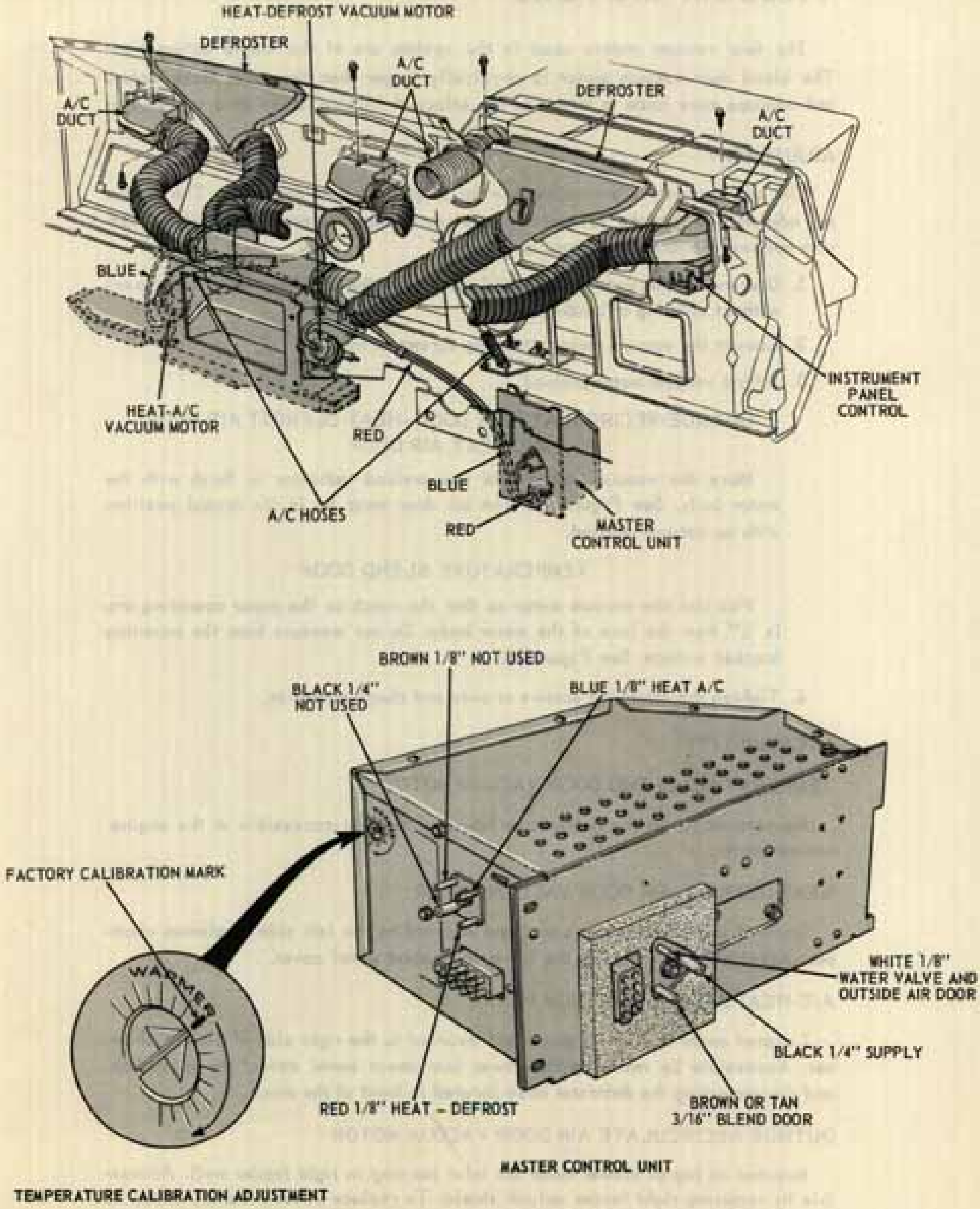


Fig. 14 – Automatic Temperature Control Vacuum System (Passenger Compartment)

VACUUM MOTORS

The four vacuum motors used in the system are of the single acting type. The blend door vacuum motor is physically larger than the other three motors and develops more force to minimize the effect of friction in the door or linkage.

ADJUSTMENT

The vacuum motors are adjustable for proper air door operation. The motors are adjusted so that the vacuum motor return springs are preloaded with no vacuum applied. Perform adjustment as follows:

1. Disconnect the vacuum hose and make sure the air door opens and closes without sticking or binding.
2. Loosen the vacuum motor attaching screws or nuts.
3. Adjust vacuum motor preload.

   OUTSIDE-RECIRCULATE AIR DOOR–HEAT-DEFROST AIR DOOR
   A/C-HEAT AIR DOOR

   Move the vacuum motor until the preload indicator is flush with the motor body. See Figure 15. The air door must be in its normal position with no vacuum applied.

   TEMPERATURE BLEND DOOR

   Position the vacuum motor so that the notch on the motor operating arm is ¼" from the face of the motor body. Do not measure from the mounting bracket surface. See Figure 16.

4. Tighten the attaching screws or nuts and check operation.

ACCESSIBILITY

TEMPERATURE BLEND DOOR VACUUM MOTOR

Mounted on top of the heater core housing. Readily accessible in the engine compartment.

HEAT-DEFROST AIR DOOR VACUUM MOTOR

Located under instrument panel and mounted to the left side of plenum chamber. Accessible by removing the lower instrument panel cover.

A/C-HEAT AIR DOOR VACUUM MOTOR

Located under instrument panel and mounted to the right side of plenum chamber. Accessible by removing the lower instrument panel cover, the glove box, and disconnecting the defroster hose located in front of the motor.

OUTSIDE-RECIRCULATE AIR DOOR VACUUM MOTOR

Mounted on top of blower motor air inlet housing in right fender well. Accessible by removing right fender splash shield. To replace vacuum motor, it may be necessary to remove the air inlet housing.

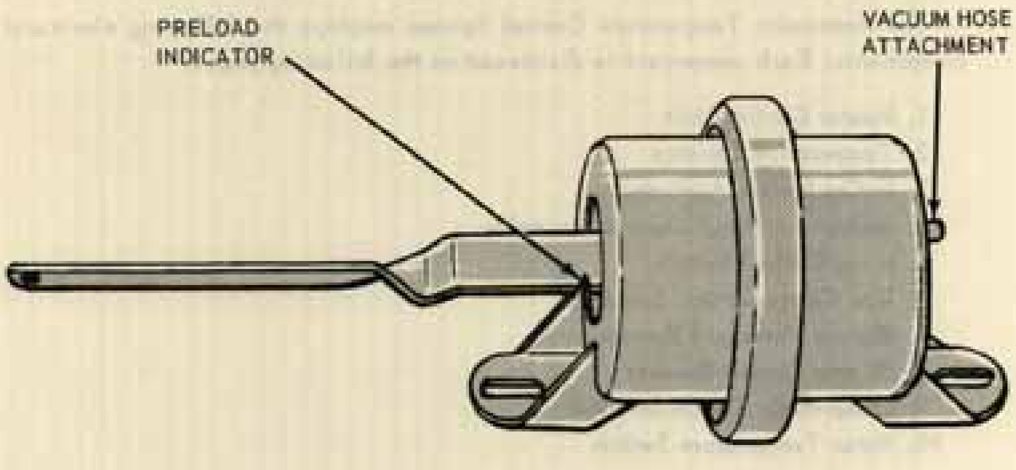


Fig. 15 – Outside Recirculate Air Door Heat – Defrost Air Door, A/C Heat Air Door Vacuum Motor Adjustment

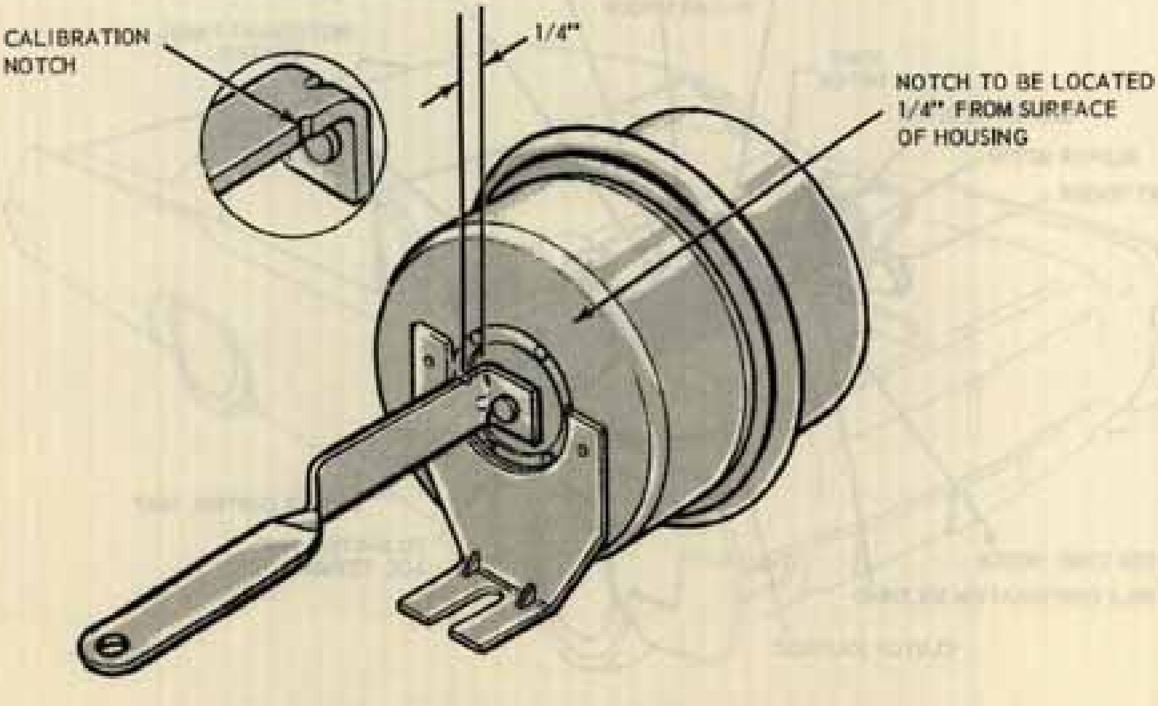


Fig. 16 – Temperature Blend Door Vacuum Motor Adjustment

ELECTRICAL SYSTEM

A pictorial drawing illustrating the location of all electrical components in the Automatic Temperature Control System is shown in Figure 17. The system wiring diagram is illustrated on the opposite page, Figure 18.

The Automatic Temperature Control System employs the following electrical components: Each component is discussed on the following pages:

1. Master Control Unit
2. Temperature Sensors
3. In-Car Sensor Aspirator
4. Instrument Panel Control Assembly
5. Icing Control Switch
6. Idle Compensation Solenoid
7. Blower Motor and Resistor
8. 30 amp Circuit Breaker
9. Compressor Clutch Solenoid
10. Water Temperature Switch

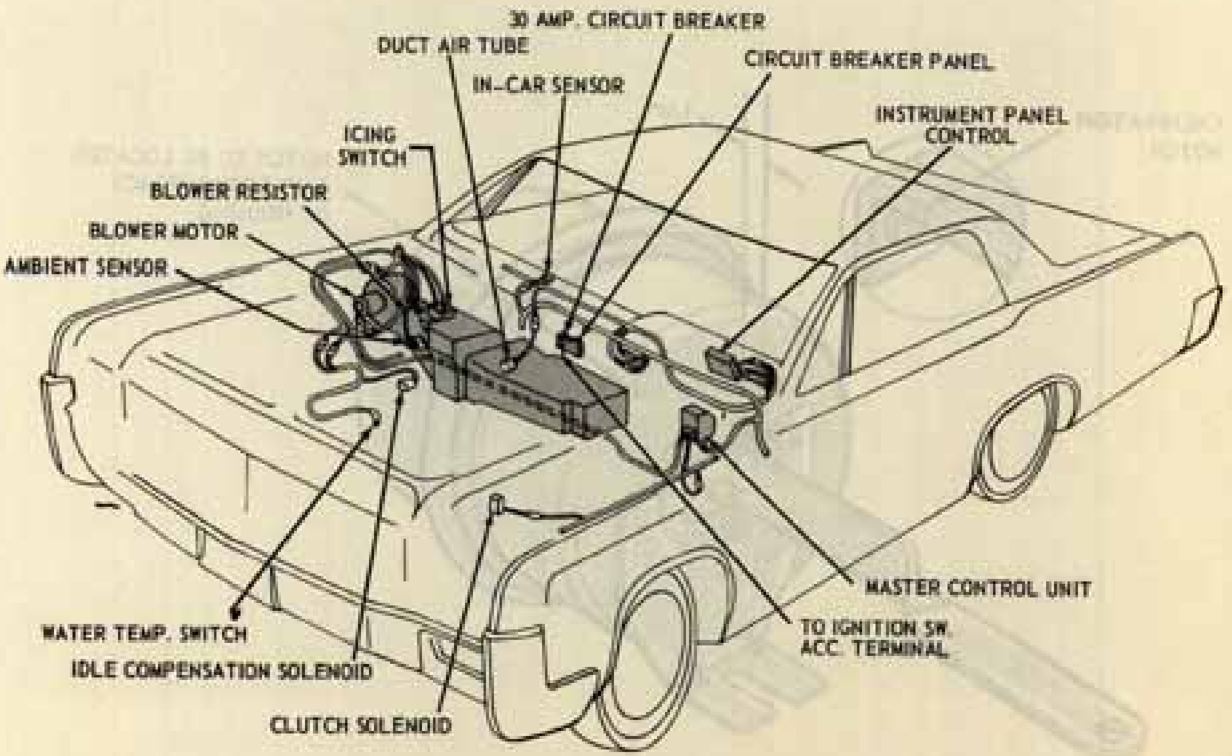


Fig. 17 – Automatic Temperature Control Electrical System Installation

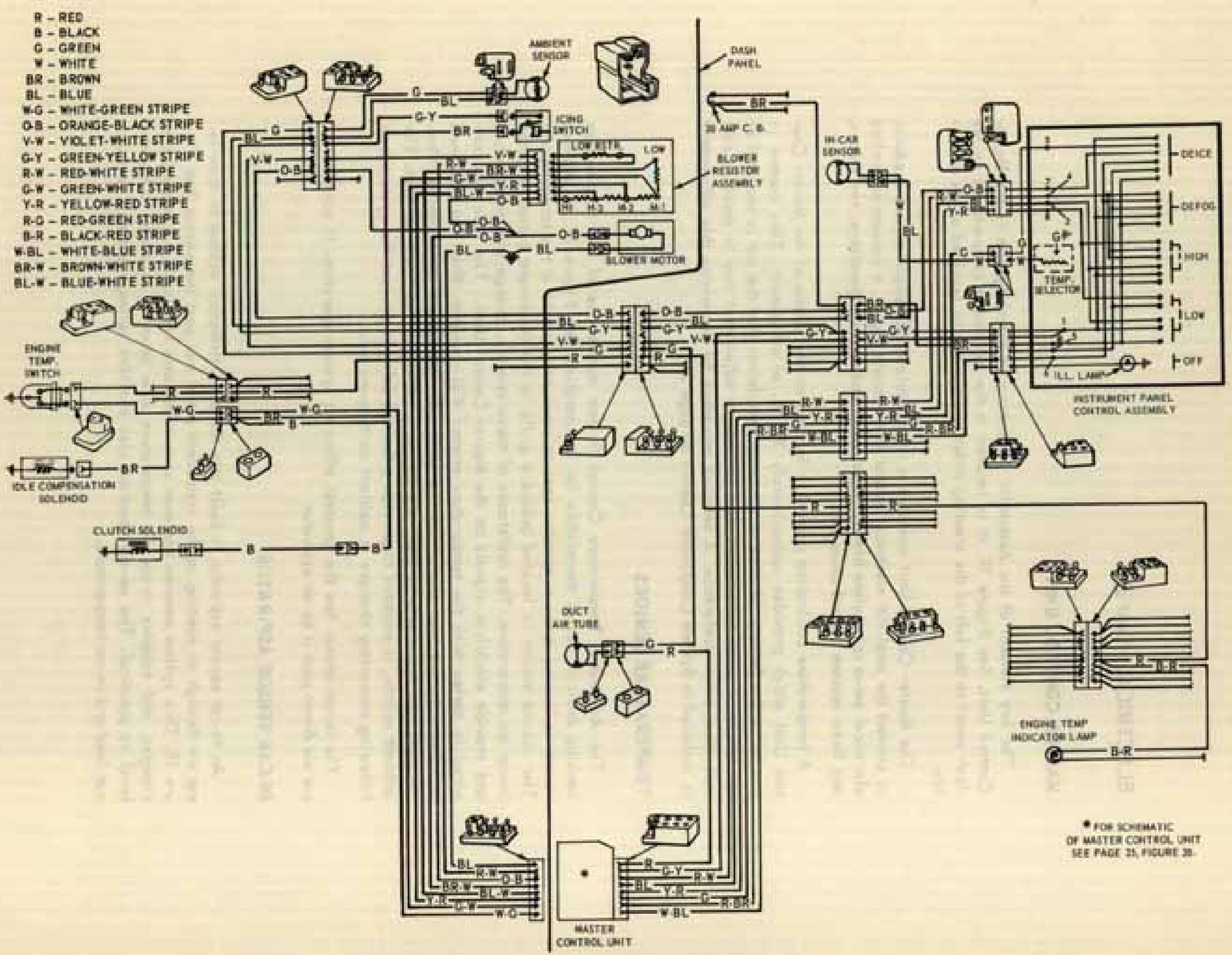


Fig. 18 – Automatic Temperature Control Wiring Diagram

ELECTRICAL (Cont'd)

MASTER CONTROL UNIT

The key element of the Automatic Temperature Control System is the Master Control Unit. See Figure 19. It is located in the passenger compartment on the dash panel to the left of the steering column. This unit is serviced as an assembly.

The Master Control Unit contains a transistorized DC amplifier, a transducer to convert the amplifier electrical output to a vacuum signal, a vacuum controlled electrical servo to regulate blower motor speed and control operations, two relays, and three vacuum control solenoids.

A temperature calibration control is located on the bottom of the Master Control Unit which provides approximately 30° F. of adjustment. This control is pre-set at the factory. In case of customer complaints that the car is too cool or too hot for a given temperature dial setting, an adjustment may be made to suit individual owner preference. A detailed procedure for performing this adjustment is included in System Component Checks on page 34.

TEMPERATURE SENSORS

The Automatic Temperature Control System makes use of two temperature sensing devices, called thermistors for its operation. See Figure 19. An ambient sensor is located in the evaporator case to sense temperature of the incoming air. The second sensor is located behind a grille in the instrument panel to sense in-car air temperature. The resistance of these sensors, change with temperature and provide electrical signals to the Master Control Unit. The sensors are wired in series with the temperature control dial rheostat. When the combined resistance is low, the Master Control Unit will call for air conditioning. When the combined resistance is high, the Master Control Unit will call for heat. The ambient sensor, is encased to provide a thermal delay to prevent the system from following momentary changes in ambient air temperature.

The in-car sensor has the greatest effect on system operation. It samples in-car air drawn past it by an aspirator.

IN-CAR SENSOR ASPIRATOR

An in-car sensor aspirator is built into the air distribution system to draw in-car air through an opening in the instrument panel and past the sensor. See Figure 19. This system ensures minimum sensor response time to in-car temperature changes, and samples in-car air temperature at a location as close to breath-level as practical. The sensor location also provides optimum balance between sun load and in-car temperature.

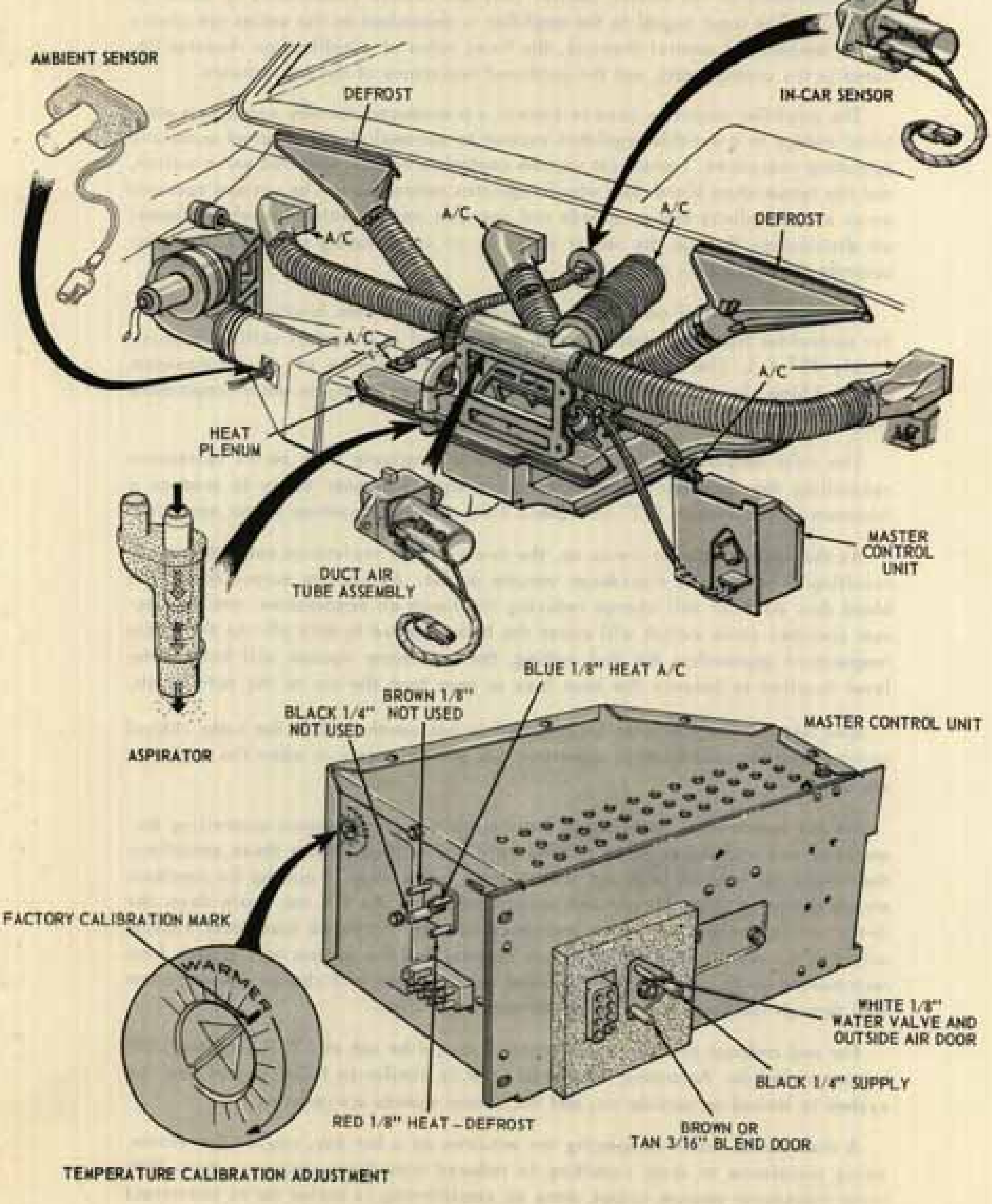


Fig. 19 – Automatic Temperature Control System Components

MASTER CONTROL UNIT – TECHNICAL DISCUSSION

A schematic of the Master Control Unit and related components is shown in Figure 20. The input signal to the amplifier is dependent on the series resistance of the temperature control rheostat, the fixed value of a calibration rheostat (located in the control unit), and the combined resistance of the two sensors.

The amplifier output is used to control a transducer, thereby converting electrical energy to a useable regulated vacuum to accomplish the required automatic operating sequences. Transducer vacuum controls a vacuum operated servo switch, and the temperature blend door which regulates temperature. The vacuum operated servo switch selects blower speeds and operates vacuum solenoids which control air distribution through the heater ducts or air conditioning registers, and also controls the outside air door.

Assuming an initial cold weather operation, the system functions as follows: Set control for HIGH if extremely cold, and set dial in a comfort setting (approximately 75° F.). The heating system will automatically be set up for maximum heat and high blower operation, but will not turn on until engine water temperature reaches 115° F. (This normally takes 3–5 minutes.)

The cold temperature sensors will have a relatively high series resistance controlling the amplifier and transducer in such a manner so as to produce a maximum output vacuum (12" or higher). This calls for maximum heater operation.

As the vehicle interior warms up, the in-car sensor resistance value decreases resulting in a reduced transducer vacuum output. As vacuum output drops, the blend door position will change reducing discharge air temperature, and the vacuum operated servo switch will cause the blower speed to drop off. As the in-car temperature approaches the dial setting, the transducer vacuum will hold at the level required to balance the heat loss or gain from the car to the outside air.

Now assume the car is to be operated in hot weather. With the same control setting used for cold weather operation, the system comes on when the engine is started.

The hot temperature sensors will have a low series resistance controlling the amplifier and transducer so as to produce a low vacuum. Under these conditions the transducer vacuum is at its lowest value (at or near 0) calling for maximum air conditioning (high blower and recirculated air). As the car cools down the in-car sensor resistance values increases causing increased transducer vacuum output. This results in reduced blower speeds, and the system will change from recirculated air to outside air. The blend door position will change causing some flow through the heater core for temperature regulation.

For mid ambient conditions, the control should be set at 75° F. and the LOW button pushed in. Automatic control in LOW is similar to HIGH except that the system is locked on outside air, and the blower speeds are reduced.

A disturbance, such as opening the windows on a hot day, causes the sensor string resistance to drop, resulting in reduced transducer vacuum output. With lower transducer vacuum output, more air conditioning is called for to counteract the hot air coming in the car windows.

MASTER CONTROL UNIT – TECHNICAL DISCUSSION

In DEFOG system operation is the same as in HIGH except outside air is used at all times and the Heat-Defrost door is in the defrost position. In DEICE, power is supplied directly to the amplifier, overiding all signals and resulting in maximum heat-high blower operation.

Temperature adjustment of individual preference in the range of 65 to 85 degrees is provided by the temperature control knob, rheostat and dial. If the temperature dial is positioned warmer, the rheostat adds resistance to the sensor string. The effect is the same as if the sensor thermistors were cooled and had more resistance. This causes amplifier and transducer response that increases vacuum output. This in turn increases heater output until the sensor thermistors have become warmer and the sensor string resistance has changed to compensate for the control dial adjustment. The system then regulates at the new temperature indicated on the dial. A similar but opposite reaction occurs when the temperature dial is set cooler.

Blower motor speed is controlled by the vacuum-operated servo switch. With either high or low vacuum from the transducer, the switch cuts out blower resistors to provide high blower speed. As the transducer vacuum regulates between the two extremes and car temperature approaches the dial setting, the blower voltage and speed are reduced by cutting in resistors. There are five switch positions to provide five blower speeds in LOW. In HIGH and DEFOG, a push-button controlled relay eliminates the two lowest switch steps and cuts out an additional resistor, giving higher blower voltages and speeds.

The vacuum-operated servo switch closes the electrical circuit to the outside-recirculate air door vacuum solenoid when transducer vacuum is above 5-5½ inches Hg. The LOW, DEFOG and DEICE push buttons also energize this solenoid. The A/C-Heat air door vacuum solenoid is energized (in LOW and HIGH) by the vacuum-operated servo switch when transducer vacuum is below 7¾ to 8¼ Hg. The Heat-Defrost air door vacuum solenoid is energized by the DEFOG and DEICE push buttons.

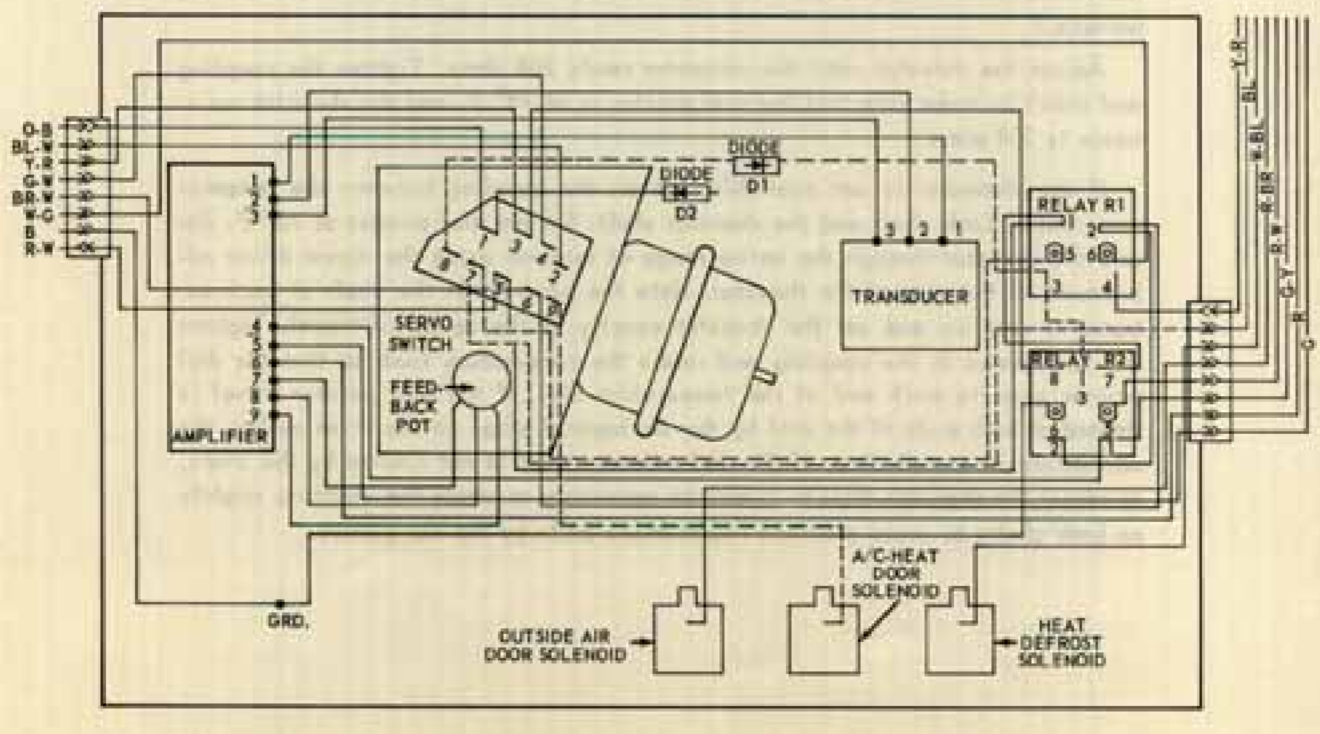


Fig. 20 – Master Control Unit and Related Component Schematic

INSTRUMENT PANEL CONTROL ASSEMBLY

Figures 21 and 22 illustrate the front and rear views of the instrument panel control assembly. The five control push button switches, and the temperature control with slide rule dial are included in the assembly.

The push button selector switches may be checked using a continuity tester. Refer to Figure 22. There should be electrical continuity between the indicated terminals for each push button position. If not, the push button switch is defective.

CONTROL CALIBRATION

The control assembly may be calibrated by varying the relationship between the dial pointer and drive pulley and by varying the relationship between the drive pulley and the temperature control rheostat. Adjust the dial pointer so that the pointer travel is limited at both ends of the temperature dial by the mechanical stops built into the drive pulley. The pointer should not hit at either end of the temperature scale when properly adjusted. The pointer may be moved on the dial cord by loosening the tensioning spring on the drive pulley and sliding the cord through the retaining hooks on the pointer, (early production) or by bending the cord retaining tab to slide the pointer (late production). See Figure 21 and 22.

TEMPERATURE CONTROL RHEOSTAT ADJUSTMENT

After the dial pointer has been adjusted, the temperature control rheostat may be adjusted. If an ohmmeter is available, loosen the coupling between the temperature control knob shaft and the rheostat shaft. Set the temperature dial pointer at 75° F. Connect the ohmmeter between ground and the white wire terminal of the two wire connectors. (The connector must be disconnected from the wiring harness.)

Adjust the rheostat until the ohmmeter reads 268 ohms. Tighten the coupling and check to make sure that the dial pointer is at 75° F. and the rheostat resistance is 268 ohms.

If the ohmmeter is not available, loosen the coupling between the temperature control knob shaft and the rheostat shaft. Set the dial pointer at 75° F. Rotate the rheostat through the entire range of rotation using the screw driver adjustment at the rear of the rheostat. Note the position of the shaft at each extreme of rotation and set the rheostat exactly at the center of travel. Tighten the set screws in the coupling and rotate the temperature knob so that the dial pointer goes to each end of the temperature dial. If the dial pointer travel is limited at both ends of the dial by the mechanical stops on the drive pulley, the adjustment is satisfactory. If the dial pointer travel is not limited by the stops, re-adjust the rheostat. NOTE: It may be necessary to rotate the coupling slightly on both shafts to avoid previous indentations made by the set screws.

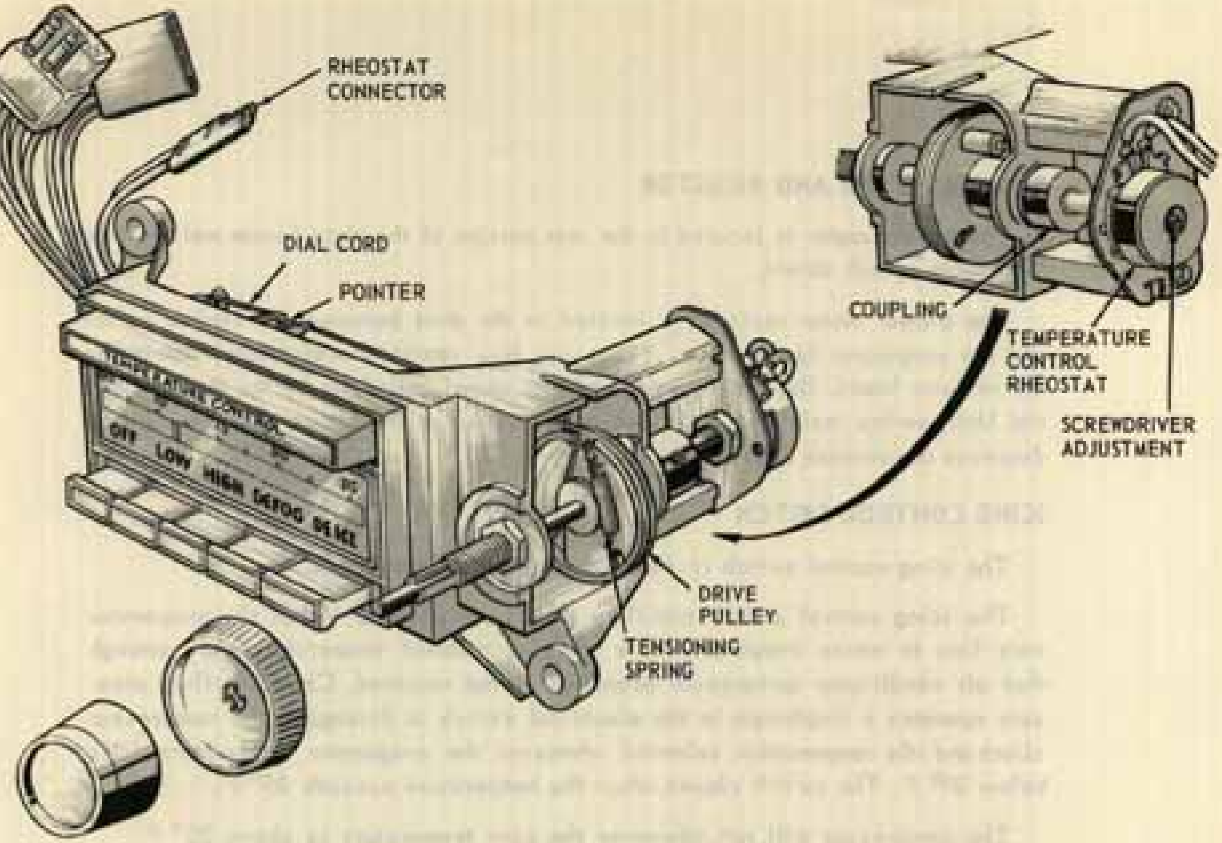
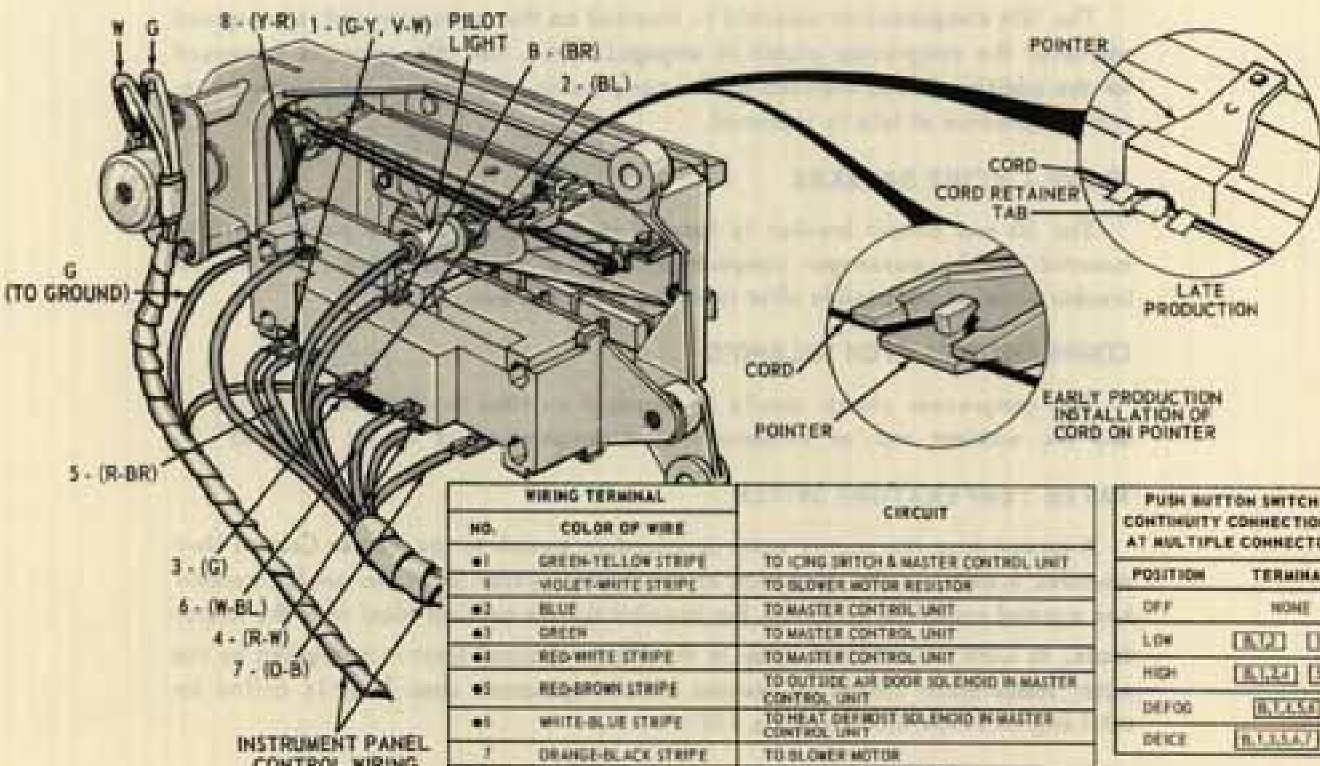


Fig. 21 – Automatic Temperature Instrument Panel Control – Front View



WIRING TERMINAL		CIRCUIT
NO.	COLOR OF WIRE	
●1	GREEN-YELLOW STRIPE	TO ICING SWITCH & MASTER CONTROL UNIT
1	VIOLET-WHITE STRIPE	TO BLOWER MOTOR RESISTOR
●2	BLUE	TO MASTER CONTROL UNIT
●3	GREEN	TO MASTER CONTROL UNIT
●4	RED-WHITE STRIPE	TO MASTER CONTROL UNIT
●5	RED-BROWN STRIPE	TO OUTSIDE AIR DOOR SOLENOID IN MASTER CONTROL UNIT
●6	WHITE-BLUE STRIPE	TO HEAT DEFROST SOLENOID IN MASTER CONTROL UNIT
7	ORANGE-BLACK STRIPE	TO BLOWER MOTOR
●8	YELLOW-RED STRIPE	TO MASTER CONTROL UNIT
B	BROWN	BATTERY FEED
PILOT LIGHT	BLUE-RED STRIPE	PILOT LIGHT FEED
W	WHITE	TO IN-CAR SENSOR
G	GREEN	TO GROUND

● These circuits go to Master Control Unit

PUSH BUTTON SWITCH CONTINUITY CONNECTIONS AT MULTIPLE CONNECTOR	
POSITION	TERMINALS
OFF	NONE
LOW	[B,1,2] [3,8]
HIGH	[B,1,2,4] [3,8]
DEFOG	[B,7,4,5,8]
DEICE	[B,1,3,5,6,7]

NOTE: Box indicates terminals connected together when push button is depressed.

Fig. 22 – Automatic Temperature Instrument Panel Control – Rear View

BLOWER MOTOR AND RESISTOR

The blower motor is located in the rear portion of the right fender well behind the fender splash shield.

The blower motor resistor is located in the duct between the blower outlet and the evaporator heater case. There are five resistance elements mounted to the resistor board. Depending on the blower speed called for by the Master Control Unit, series resistance is added to or cut out of the blower motor circuit to decrease or increase speed.

ICING CONTROL SWITCH

The icing control switch is mounted on the evaporator case.

The icing control switch capillary tube is positioned within the evaporator core fins to sense evaporator core icing or ambient temperatures low enough that air conditioner compressor operation is not required. Capillary fluid pressure operates a diaphragm in the electrical switch to disengage the compressor clutch and idle compensation solenoid whenever the evaporator temperature falls below 30° F. The switch closes when the temperature exceeds 35° F.

The compressor will run whenever the core temperature is above 35° F.

IDLE COMPENSATION SOLENOID

The idle compensation solenoid is mounted on the carburetor and is energized whenever the compressor clutch is engaged. Thus, the idle speed is increased for the additional load imposed by the compressor, and the air conditioning system performance at idle is improved.

30 AMP CIRCUIT BREAKER

The 30 amp circuit breaker is located in the circuit breaker panel which is mounted on the passenger compartment side of the dash panel. The circuit breaker panel is accessible after removing the glove box.

COMPRESSOR CLUTCH SOLENOID

The compressor clutch should be engaged anytime the system is turned on and the ambient and/or evaporator core temperature is above 30° – 35° F.

WATER TEMPERATURE SWITCH

A circuit from the engine water temperature switch to the Master Control Unit provides a delay in the operation of the heater system until the engine coolant has warmed enough to eliminate the possibility of a cold air blast from the heater ducts. In LOW and HIGH a relay in the Master Control Unit is energized by the water temperature switch to prevent blower operation when heat is called for until engine temperature reaches 115° F.

DIAGNOSIS AND TROUBLE SHOOTING

A General Trouble Diagnosis Guide is provided on pages 38–41. If a problem can be related to those listed, the problem can usually be narrowed down to a few specific areas. However, if the details of the problem are not known, the complete control system should be checked out for proper operation as follows:

1. Check all vacuum hoses for proper connection and color code at the vacuum motors, Master Control Unit and components in the engine compartment. (Refer to vacuum schematic in Figure 11, page 15.)
2. With the engine running, operate the push buttons and temperature control knob through all system conditions. Note operation of all air doors, air flow at ducts, and vacuum at the respective vacuum motors and water control valve using Chart 1 shown on the next page.

Before using Chart 1, check system supply vacuum at the ¼" black hose leading from the vacuum check valve to the "TEE" feeding the reservoir and Master Control Unit. Check the vacuum at the control unit side of the check valve. The vacuum must be at least 15". (Refer to Figure 13, page 16.) A vacuum gauge should be connected, in turn, to the specified vacuum connection at the control unit and/or vacuum motor and water control valve and the vacuum reading and door operation noted for each control push button setting. The temperature blend door vacuum motor readings will vary depending on the temperature dial settings. Vacuum readings other than those listed and/or improper operation indicate a problem in the vacuum or electrical systems.

NOTE: *If a constant hissing sound is heard in any push button position, it is an indication of an air leak in the vacuum circuit or hose connections, a leaking vacuum motor or other component.*

If the problem has not been pin pointed to a particular area of the system, proceed as follows:

Disconnect the multiple wiring connector from the bottom side of the Master Control Unit. Using a 12 volt testlight, check for continuity through the wiring harness from the instrument panel control assembly to the control unit. Refer to Figure 23 on page 31 and the electrical wiring diagram on page 21 for wiring color codes and their relation to the push button switches.

NOTE: *The following wires which emanate at the panel control are not routed to the Master Control Unit:*

Brown wire (battery feed), orange-black (DEICE button to blower motor), and violet-white (high position to blower resistor). Check these circuits for continuity at connectors under the instrument panel or at the components involved. To check the sensor string circuit at the Master Control Unit multiple connector, connect an ohmmeter between the red wire (9) and ground.

If circuit continuity is not satisfactory, check control switches and wiring harness. If circuit continuity is satisfactory, the instrument panel control and wiring to the Master Control Unit is not at fault. Proceed to Vacuum System Check.

1967 LINCOLN AUTOMATIC TEMPERATURE CONTROL SYSTEM VACUUM SYSTEM OPERATING CONDITIONS

CHART – 1

PUSH BUTTON SELECTION	TEMPERATURE BLEND DOOR		A/C-HEAT DOOR		HEAT-DEFROST DOOR		OUTSIDE-RECIRC AIR DOOR		HEATER WATER VALVE	
	Position	Vac ("Hg) ①	Position	Vac ("Hg)	Position	Vac ("Hg)	Position	Vac ("Hg)	Position	Vac ("Hg)
Off	Stays in Last Used Setting	(0 to 12+)	Heat	0	Heat	0	Recirc	0	Off	0
Low	Max. Cool	0–6	A/C	12+	Heat	0	Outside	12+	On	12+
	Temp. Control Range	6–12	A/C ②	12+	Heat	0	Outside	12+	On	12+
			Heat ②	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
	Max. Heat	12+	Heat	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
High	Max. Cool (Recirc)	0–5½	A/C	12+	Heat	0	Recirc	0	Off	0
	Max. Cool (Outside)	5½–6	A/C	12+	Heat	0	Outside	12+	On	12+
	Temp. Control Range	6–12	A/C ②	12+	Heat	0	Outside	12+	On	12+
			Heat ②	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
	Max. Heat	12+	Heat	0	Heat	0	Outside ③	12+ ③	On ③	12+ ③
Defog	Max. Cool	0–6	Heat	0	Defrost	12+	Outside	12+	On	12+
	Temp. Control Range	6–12								
	Max. Heat	12+								
Deice	Max. Heat	12+	Heat	0	Defrost	12+	Outside	12+	On	12+

① Vacuum figures are for vacuum increasing from 0" Hg. to 12+" Hg. With vacuum decreasing from 12+ Hg. to 0" Hg., subtract ½" Hg. from vacuum figures listed.

② A/C – HEAT DOOR changes from A/C to HEAT when TEMPERATURE BLEND DOOR reaches 8-¾" Hg. vacuum.

③ Same as OFF push button selection if engine coolant is below 115° F.

Max. = Maximum • A/C = Air Conditioning • Vac ("Hg) = Vacuum in inches of mercury
Min. = Minimum • Recirc. = Recirculate

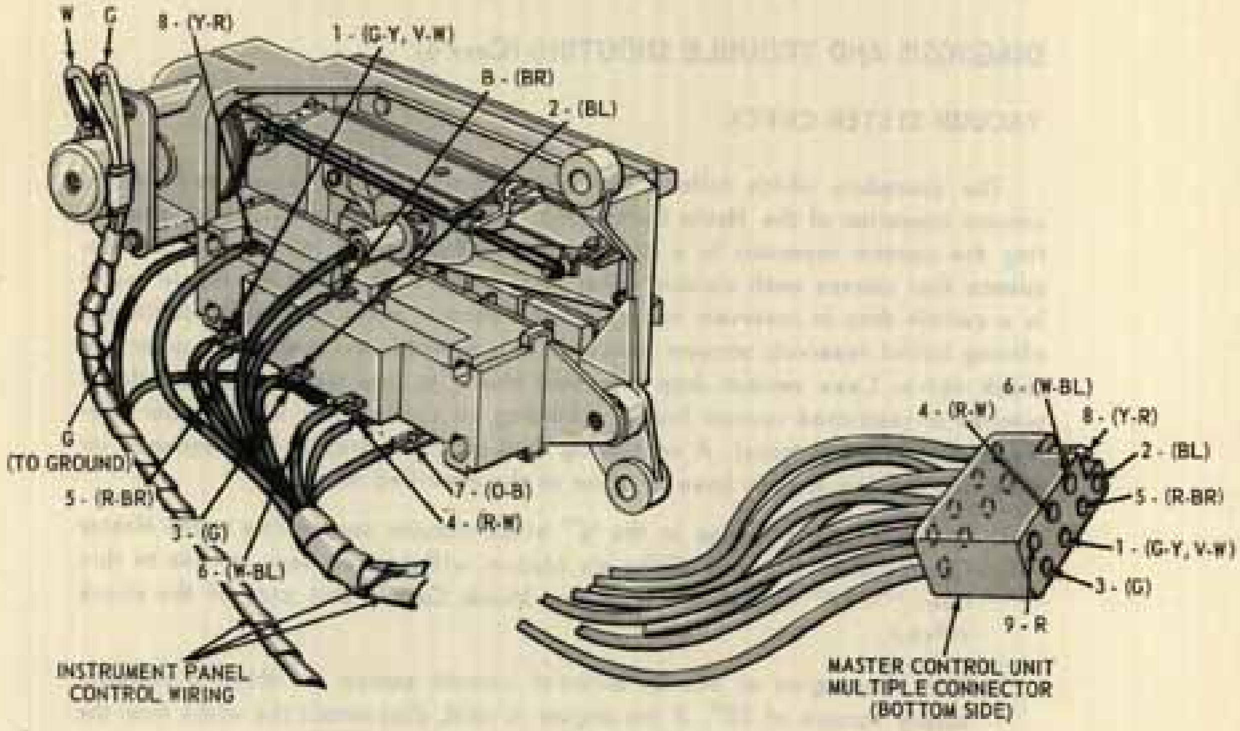


Fig. 23 – Automatic Temperature Instrument Panel Control Rear View

WIRING TERMINAL		CIRCUIT
NO.	COLOR OF WIRE	
●1	GREEN-YELLOW STRIPE	TO ICING SWITCH & MASTER CONTROL UNIT
1	VIOLET-WHITE STRIPE	TO BLOWER MOTOR RESISTOR
●2	BLUE	TO MASTER CONTROL UNIT
●3	GREEN	TO MASTER CONTROL UNIT
●4	RED-WHITE STRIPE	TO MASTER CONTROL UNIT
●5	RED-BROWN STRIPE	TO OUTSIDE AIR DOOR SOLENOID IN MASTER CONTROL UNIT
●6	WHITE-BLUE STRIPE	TO HEAT DEFROST SOLENOID IN MASTER CONTROL UNIT
7	ORANGE-BLACK STRIPE	TO BLOWER MOTOR
●8	YELLOW-RED STRIPE	TO MASTER CONTROL UNIT
B	BROWN	BATTERY FEED
PILOT LIGHT	BLUE-RED STRIPE	PILOT LIGHT FEED
W	WHITE	TO IN-CAR SENSOR
G	GREEN	TO GROUND

● These circuits go to Master Control Unit

PUSH BUTTON SWITCH CONTINUITY CONNECTIONS AT MULTIPLE CONNECTOR	
POSITION	TERMINALS
OFF	NONE
LOW	1-2 [5-8]
HIGH	1-2-4 [5-8]
DEFOG	1-4-5-6
DEICE	1-3-5-6

NOTE: Box indicates terminals connected together when push button is depressed. Terminals 5 & 8 are a separate circuit.

DIAGNOSIS AND TROUBLE SHOOTING (Cont'd)

VACUUM SYSTEM CHECK

The procedure which follows activates all the vacuum motors and verifies vacuum operation of the Master Control Unit. This procedure provides for evacuating the vacuum reservoir to a known value and operating the controls in a sequence that causes each vacuum motor to operate. Each operation should result in a certain drop in reservoir vacuum as the vacuum motor cycles. Gradually declining initial reservoir vacuum indicates a leak within the system or a defective check valve. Less vacuum drop than that shown in any step indicates either a pinched or restricted vacuum line or a binding air control door which is not moving through the full travel. A continuing drop after any step in the sequence indicates a leaking vacuum hose or motor at the specified location.

1. Insert a vacuum gauge in the ¼" black vacuum supply line to the Master Control Unit. Removal of the air cleaner will provide easy access to this line. ("TEE" the gauge in at the Master Control Unit side of the check valve.)
2. Start the engine or use an external vacuum source to obtain a minimum supply vacuum of 18". If the engine is cold, disconnect the wires from the engine temperature sending unit.
3. Shut off engine or the external vacuum source. Turn the ignition key to the ACC position. Set the temperature control for 65°F. Depress the "DEICE" push button. Wait 60 seconds and record the supply vacuum.
4. Depress the "HIGH" push button. Wait 30 seconds. The vacuum gauge should abruptly drop approximately 1" vacuum. (A/C-Heat door vacuum motor actuates.)
5. Set the temperature control for 85° F. The vacuum gauge should initially drop approximately 2" vacuum. (Initial motion of temperature blend door vacuum motor.)
6. This should be followed by an abrupt drop of approximately 1-½" of vacuum. (Outside air door vacuum motor and heater water valve.)
7. The vacuum should continue to drop an additional 2". (Final motion of temperature blend door vacuum motor.)
8. Depress the DEICE push button. The vacuum should abruptly drop approximately 1". (Heat-Defrost door vacuum motor actuates.)

DIAGNOSIS AND TROUBLE SHOOTING (Cont'd)

TEMPERATURE BLEND DOOR VACUUM CHECK (SOURCE VACUUM AT 15" HG. OR HIGHER)

Connect a vacuum gauge to the temperature blend door vacuum motor line (brown stripe) and test as follows:

Set control for 65° LOW.

Vacuum should drop toward 0" Hg.

Slowly increase dial setting to 85° and observe a gradual increase in vacuum (up to approximately 8" Hg. at car temperature above 70° F.; up to 12+" Hg. below 70° F. car temperature.

MASTER CONTROL UNIT

The Master Control Assembly is a sealed unit and is serviced as a complete assembly. If all areas of the system have checked out satisfactorily and the problem still exists, the system should be tested using a known good Master Control Unit. Remove the questionable control unit from the dash panel and substitute a known good assembly. If the system then functions properly, the original control unit should be replaced. However, if the system continues to malfunction, test the system further to locate cause of trouble, and install the original control unit.

ADDITIONAL SYSTEM COMPONENT CHECKS

MASTER CONTROL UNIT TEMPERATURE CALIBRATION

A temperature calibration control is located on the bottom of the Master Control Unit which provides approximately 30° F. of adjustment. (Refer to Figure 19, page 23.) This control is pre-set at the center of the adjustment range at the factory. In case of customer complaints, it may be altered to suit individual owner preference. If the car is said to be too cool for a given temperature dial setting, rotate the control in the direction indicated by the curved arrow and the "warmer" notation (clockwise when looking at the bottom of the unit). If the car is said to be too warm, rotate the control in the opposite direction. Be sure to mark the original control setting before re-adjustment. Each calibration division is approximately 2° F.

If the system is not operating properly, the Master Control Unit calibration control should not be adjusted. This calibration control is included to compensate for variations in the Master Control Unit, temperature sensors, and control assembly rheostat.

After servicing and with the system operating correctly, tape an accurate thermometer to the padded instrument panel to measure temperatures at the in-car sensor opening. Set the temperature control to 75° F., depress the HIGH push button, and operate the system until the temperature within the car has stabilized. This check should be made with the car driven at approximately 40 miles per hour. Note the stabilized thermometer temperature reading. If necessary, readjust as necessary and again operate the car at approximately 40 miles per hour and note the stabilized temperature again. A minor calibration adjustment may be necessary to complete the temperature calibration.

TEMPERATURE SENSORS AND CONTROL RHEOSTAT CHECK

The resistance of the two sensors should be tested together with the control assembly rheostat to determine if they are operating properly. A quick functional check of the sensors and rheostat can be made with the engine and system operating. Set the dial pointer at 85° with the "High" button pushed in for this check. Hold a lighted match in front of the in-car sensor opening in the instrument panel. The system should operate on full air conditioning operation within 15 seconds. If the system does not respond to this functional check, the sensors and rheostat should be checked for proper resistance values.

Use the following procedure to determine if the sensors and rheostat are operating properly. The resistance of the sensors change with temperature. The car and sensors should be at approximately 70° to 80° for accurate test results.

1. Disconnect the car battery.
2. Set the temperature control dial at 75°. Disconnect the 8-terminal connector from the bottom of the Master Control Unit. Connect an ohmmeter between the red wire of the electrical harness and ground.
3. Observe the resistance. With the ambient temperature between 70° F. and 80° F., the resistance of the sensor string and rheostat should be between 1200 and 1300 ohms. If the resistance measured is somewhat higher or lower than that specified, the resistance of the individual sensors and rheostat should be checked.

4. To check the rheostat, measure total resistance with the temperature control set for 85°. Then set temperature control dial at 65° and again note the resistance reading. The difference in resistance between 65° and 85° dial setting should be between 400 and 500 ohms. If resistance is less than 400 ohms, the rheostat is defective or has a loose shaft set screw. If resistance is more than 500 ohms, the rheostat is defective.

5. To check the resistance of the ambient sensor disconnect the two terminal connector at the sensor and connect the ohmmeter across the two terminals. The resistance should be between 165 ohms and 185 ohms with an ambient temperature of approximately 70° F. to 80° F.

6. To check the resistance of the in-car sensor (rheostat must be satisfactorily checked out first), set the temperature control dial at 65° and connect an ohmmeter between ground and the blue wire terminal of the two terminal wiring harness connector to the ambient sensor. The in-car sensor resistance should be between 750 ohms and 900 ohms.

BLOWER MOTOR AND RESISTOR ASSEMBLY

The blower motor and resistor assembly may be checked as follows:

1. Connect a 0-20 volt DC meter positive (+) lead to the orange-black lead blade terminal of the blower resistor assembly.
2. Turn ignition switch to "accessory". Depress the DEICE push button. Voltmeter should read battery voltage (approximately 12 volts). If not, either the control assembly push button switch, the wiring between the push button switch and the resistor assembly is defective. If the voltage reading is approximately 12 volts and the blower operates at a relatively high speed, the blower motor is okay. If the voltage is approximately 12 volts and the blower does not operate, the blower motor is defective. If the voltage is less than 11 volts, the blower motor may be shorted. Perform the blower motor current draw test described below. If the blower motor checks out according to specifications, the wiring to the resistor assembly is defective.
3. Set the temperature dial to 85° F. and depress the "LOW" push button. Operate the engine until the temperature in the car is at least 75° F. and the engine is warm.
4. Set the temperature dial to 65° F. and observe the voltmeter reading. The voltage reading should decrease and then increase. After the voltage increases to approximately 8 volts, adjust the temperature dial slowly to 85° F. The voltage should decrease in four (4) steps down to approsimately 4 volts. The voltage should then increase in the same steps up to approximately 8 volts.
5. Depress the "HIGH" push button. The voltage should increase from approximately 8 volts to 12 volts.
6. Set temperature dial to 65° F. The voltage should decrease in two (2) steps from approximately 12 volts to 10 volts to 8 volts and then increase in the same steps to approximately 12 volts. If the voltage does not change in two steps either the wiring between the Master Control Unit and the resistor assembly, the resistor assembly or the Master Control Unit is defective. Improper blower operation (as checked out in paragraphs 4, 5 and 6) indicate a defective resistor, a defective master control unit, or defective wiring between the MCU and the resistor assembly.

BLOWER MOTOR CURRENT DRAW TEST

Connect a 0-50 ammeter between the positive post of the battery and the blower motor orange wire. The motor should operate. The current draw should be approximately 12-18 amps.

TEMPERATURE CONTROL ASSEMBLY CHECKS

Complaints of inaccurate temperature calibration can be caused by malfunctions in the control assembly. As a preliminary check, the temperature control knob should be varied over the entire range of rotation. Observe the dial pointer and note if it travels the whole lenght of the temperature scale. If the pointer fails to move, the dial cord is broken or the dial cord drive pulley is loose. If the pointer fails to reach the limit of travel at one end of the scale and the knob has a "springy" feel at the limit of travel on the other end of the scale, the pointer has slipped on the dial cord or the rheostat coupling has loosened and slipped. If there is slack between the knob and pointer movement, either the dial cord is too long, the tensioning spring has been stretched or the dial cord drive pulley is loose. After repairs have been made, it will be necessary to perform the control assembly calibration procedure listed under ELECTRICAL INSTRUMENT PANEL CONTROL ASSEMBLY.

ICING CONTROL SWITCH CHECK

The icing control is used to turn off current to the air conditioner compressor clutch whenever temperature at the evaporator falls below 30° F. The control may be checked with a continuity tester and should show a closed circuit if the capillary temperature is above 35° F. If not, the control is defective and should be replaced. At any temperature below 30° F., the control should show an open circuit. With most ambient conditions and with the car temperature above 75° F., this may be checked by closing off the A/C registers, depressing the LOW push button and setting the temperature control to 65° F. Operate the engine at a fast idle. After a period of operation, the compressor clutch should disengage. If not, the control is defective and should be replaced.

HEATER WATER CONTROL VALVE CHECK

The heater water control valve is used to cut off the flow of coolant through the heater core when the Master Control Unit calls for maximum air conditioning with recirculated air. The valve is also closed with the OFF push button depressed.

To check water control valve set control for 85°. With the LOW button pushed in run engine until water is warm. Check for proper blend door vacuum motor position; it should be between the mid and full vacuum position. Warm air should be discharged from the heater ducts. If air is not warm, check water valve by removing 1/8" white vacuum line from valve and noting if a vacuum signal is available. If vacuum signal is available and no heat is noted, water valve is defective. If no vacuum is noted, refer to vacuum control system for corrective action.

1967 LINCOLN AUTOMATIC TEMPERATURE CONTROL SYSTEM
GENERAL TROUBLE DIAGNOSIS GUIDE

CUSTOMER COMPLAINT	POSSIBLE DIAGNOSIS
System will not cool at all, heats all the time	Open circuit in temperature sensor wiring Defective temperature sensor Defective control assembly rheostat Defective push button switch assembly Open circuit between push button switch assembly and Master Control Unit Broken lead at control assembly rheostat
System will not cool enough, heats okay	Low refrigerant charge Compressor clutch slipping Compressor belt slipping Temperature blend door not properly adjusted Defective expansion valve Heater water valve stuck open Ambient and icing control defective Wiring broken or disconnected in icing-clutch circuit Defective Master Control Unit causing low blower speed
System will not cool at all, heats okay	Compressor clutch circuit open Ambient and icing control defective Defective compressor clutch Low refrigerant charge or no refrigerant in system Defective compressor Compressor clutch slipping Compressor belt slipping Defective expansion valve Defective Master Control Unit
System will not cool enough only at idle, heats okay	Open circuit in idle compensation solenoid wiring Defective idle compensation solenoid

GENERAL TROUBLE DIAGNOSIS GUIDE (Cont'd)

CUSTOMER COMPLAINT (Cont'd)	POSSIBLE DIAGNOSIS (Cont'd)
System will not heat – cools all the time	Shorted temperature sensor No vacuum to temperature blend door vacuum motor Defective temperature blend door vacuum motor Temperature blend door vacuum motor stuck Vacuum hose to Master Control Unit disconnected or kinked Vacuum check valve plugged Defective Master Control Unit
System will not heat – cools okay	Kinked or restricted coolant hose Plugged heater core Vacuum line to heater water valve plugged or kinked Defective heater water valve
System heats poorly, cools okay	Heater core restricted Engine thermostat defective Coolant hose kinked or restricted Heater water valve restricted Insufficient vacuum supply to Master Control Unit Temperature blend door motion restricted Temperature blend door vacuum motor improperly adjusted Low engine coolant level Defective vacuum check valve
System heats erratically, cools okay	Defective engine thermostat Temperature blend door or vacuum motor binding Sticking heater water valve Moisture in vacuum system (freezing) (check heater water valve) Low engine coolant Defective Master Control Unit

GENERAL TROUBLE DIAGNOSIS GUIDE (Cont'd)

CUSTOMER COMPLAINT (Cont'd.)	POSSIBLE DIAGNOSIS (Cont'd.)
System will not blow air with any push button setting	Defective blower motor Defective circuit breaker Defective wiring between Master Control Unit and blower resistor Defective accessory circuit at Ignition Switch Defective wiring between push button switch assembly and Master Control Unit
System will not blow enough air with any push button setting	Loose boot between blower and evaporator-heater case Defective blower motor
System will not blow enough air sometimes	Evaporator core freeze-up Loose wiring or connector to blower or resistor Defective blower motor Obstruction in air hoses or ducts Defective Master Control Unit
Blower runs at first and then stops – starts erratically	Open circuit in blower resistor wiring Defective blower motor Open resistance element in blower resistor Defective Master Control Unit
Blower Remains on High at all times	System vacuum leak Defective Master Control Unit
Temperature indicated on dial not the same as car temperature	Dial pointer slipped on drive cord Coupling between temperature control knob shaft and rheostat slipped or loose Temperature calibration control on Master Control Unit out of adjustment Temperature sensors damaged Defective rheostat Defective Master Control Unit

GENERAL TROUBLE DIAGNOSIS GUIDE (Cont'd.)

CUSTOMER COMPLAINT (Cont'd.)	POSSIBLE DIAGNOSIS (Cont'd.)
Temperature will not adjust as dial pointer moves	Open sensor circuit Coupling between temperature control knob shaft and rheostat loose Defective Master Control Unit
Temperature dial pointer will not move	Broken pointer Dial cord broken
System will not shut off in OFF position	Defective push button switch assembly Push button switch assembly incorrectly wired
System will not operate in DEICE	Defective push button switch Open circuit from push button switch assembly to blower motor
A/C air blows out heater outlets	A/C-Heater door vacuum motor line disconnected, pinched, or plugged Vacuum motor defective A/C-Heat door sticking Defective Master Control Unit
System operates erratically, blows hot, then cold air. Switches back and forth between heater and A/C outlets – will not hold car temperature constant	Aspirator outlet blocked or restricted by carpeting Aspirator hoses disconnected at sensors or aspirator System vacuum leak

REMOVAL AND INSTALLATION PROCEDURES

HEATER-VENTILATION AND HEATER-AIR CONDITIONER SYSTEMS

HEATER CORE

The heater core is located under a cover plate on top of the heater case.

1. Disconnect the battery ground cable.
2. Remove the air cleaner.
3. Drain the coolant from the system.
4. Disconnect the hoses from the heater core.
5. Remove the harness clamp on top of the heater case.
6. Remove the temperature blend door vacuum motor.
7. Remove the heater core cover plate retaining screws and the cover plate.
8. Remove core retainer bracket.
9. Lift out the heater core.
10. To install, reverse the removal procedure. The temperature blend door vacuum motor adjustment procedure must be performed after the vacuum motor has been installed.

HEATER-AIR CONDITIONER CONTROL BOX

The heater control box is located on the passenger side of the dash panel to the left of the steering column.

1. Disconnect the battery ground cable.
2. Disconnect and lower the instrument panel chin casting.
3. Remove plastic wiring shield.
4. Remove the wiring harness clip retaining screws on the bottom and front of the box.
5. Disconnect the vacuum hoses and the wiring multiple connector from the bottom of the box.
6. Remove two screws retaining the lower edge of the box to the dash panel.
7. To remove the control box, carefully slide the box down and rearward.
8. Disconnect the three vacuum hoses and wiring multiple connector from the rear of the box. Secure the hoses and wiring harness so they do not slip through the access hole in the dash panel.
9. To install, reverse the removal procedure.

   NOTE: *Be sure to hook up the three vacuum hoses (note color codes) and the wiring multiple connector that lead into the engine compartment before installing the control box.*

INSTRUMENT PANEL CONTROL ASSEMBLY

1. Disconnect the battery ground cable.
2. Remove eight screws retaining the instrument cluster lower panel and lower the panel.
3. Carefully lower the panel and disconnect the wiring multiple connectors. Remove the lower panel.
4. Remove the speed control unit on vehicles so equipped.
5. Remove the temperature and blower fan knobs.
6. Remove the nut and washer from the control shaft.
7. Disconnect the wiring connectors.
8. Remove three screws retaining the control to the cluster.
9. Remove the nut on the control shaft and remove the control.
10. To install, reverse the removal procedure.

BLOWER MOTOR AND OUTSIDE AIR DOOR VACUUM MOTOR

The blower motor is located in the rear portion of the right fender well. The outside air door vacuum motor is located on top of the blower air inlet housing.

Blower Motor

1. Disconnect battery.
2. Remove the right front fender splash shield.
3. Remove four screws retaining the blower motor to the housing. Disconnect the wires and remove motor.
4. To install, reverse the removal procedure.

BLOWER MOTOR AIR INLET HOUSING

1. Remove the blower motor.
2. From inside the car, remove the right cowl trim panel and remove the three screws retaining the air inlet housing to the cowl.
3. From under the fender, remove one screw at the top. Disconnect the vacuum hose and remove the air inlet housing. Remove the vacuum motor.
4. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION PROCEDURES HEATER-AIR CONDITIONERS

EVAPORATOR ASSEMBLY

1. Disconnect the battery ground cable and remove the air cleaner.
2. Close the compressor service valves and discharge the refrigerant in the system into the garage exhaust system.
3. Remove the right front wheel and fender splash shield.
4. Disconnect the wiremold connector between the evaporator-heater case and blower assembly at evaporator-heater case.
5. Remove the windshield washer pump hoses and the wiring harness shield.
6. Remove the right front fender support brace (two on convertible).
7. Disconnect the main wiring harness at the blower resistor and ambient sensor.
8. Remove the transmission dipstick and tube assembly.
9. Disconnect the refrigerant hoses (at the hose side of the expansion valve).
10. On thermactor equipped vehicles, remove the anti-backfire valve bracket mounting bolts and push the valve and bracket assembly aside.
11. Disconnect the icing control wiring, remove the mounting screws and remove the control. Use care while pulling the capillary tube out of evaporator core.
12. Remove the two screws securing the molded insulation to the evaporator-heater case and remove the insulation.
13. Remove the 13 screws from the evaporator-heater case cover and remove the cover.
14. Remove the three clips holding the evaporator core at forward edge of the evaporator heater case.
15. Remove the four evaporator core mounting screws at the rear of the evaporator-heater case.
16. Slide the evaporator core diagonally up through the engine compartment. Be careful not to bend the fins on the evaporator core. NOTE: In some cases, it may be necessary to grind off approximately ¼" of material from the boss at the rear of the right exhaust manifold in order to remove evaporator core.

    To install, reverse the removal procedure. Use caution when installing the icing control capillary tube. Use body sealer around outer periphery of evaporator-heater case joint to ensure an air-tight seal.

ICING CONTROL SWITCH

The icing control switch is mounted on top of the evaporator core case.

1. Disconnect the switch wiring connectors.
2. Remove two attaching screws and remove cover.
3. Remove switch assembly, carefully pulling the capillary tube out of the evaporator core.

    To install, reverse the removal procedure. NOTE: Be sure the capillary tube extends 9" into the evaporator core case when installing the switch.

IN-CAR SENSOR

The in-car sensor is located behind the instrument panel and A/C grille just above the ash tray.

1. Disconnect battery.
2. Remove six instrument panel and A/C grille retaining screws. Pull grille back slightly.
3. Remove screws retaining A/C ducts to grille.
4. Remove sensor to grille retaining screws, remove grille.
5. Disconnect aspirator hose and wiring connector. Remove sensor.

    To install, reverse removal procedure.

AMBIENT SENSOR

The ambient sensor is located on the evaporator case. To remove sensor, disconnect wiring and remove two screws.

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