SECTION 12-03A Air Conditioning System

VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION AND OPERATION

This section covers all Taurus / Sable vehicles.

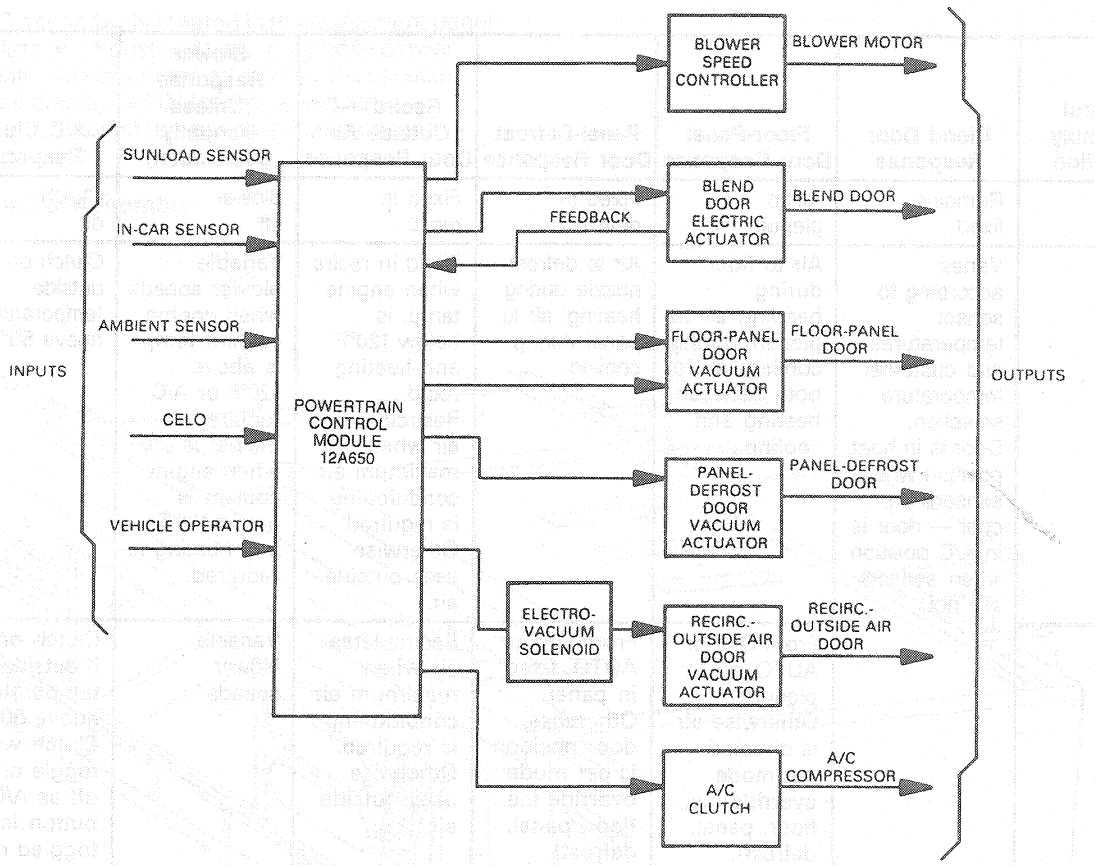
Taurus / Sable vehicles with 3.0L engines offer two types of A / C systems. The main difference between these systems involve the mandatory requirement of the use of different refrigerants. The two types of A / C systems are:

1. Fixed orifice tube type system with cycling clutch using the chlorofluorocarbon (CFC) based Refrigerant 12 (R-12).
2. Fixed orifice tube type system with cycling clutch using the non-chlorofluorocarbon (Non-CFC) based Refrigerant 134a (R-134a).

The electronic automatic temperature control (EATC) system is available as an option on Taurus / Sable vehicles. This system is graphically represented in a block diagram.

DESCRIPTION AND OPERATION (Continued)

System Block Diagram



With the use of a microcomputer, the control assembly analyzes inputs from six major sources:

1. Temperature, function, and blower selections (made by the vehicle occupants)
2. In-vehicle temperature
3. Ambient temperature
4. Cold engine lock out (CELO)
5. Sunload sensor
6. A/C system clutch cycling pressure switch

Using these inputs, the microcomputer determines the correct conditions for the following six outputs:

1. A/C compressor clutch engagement
2. Blower speed
3. Blend door position
4. Floor-panel door position
5. Panel-defrost door position
6. Outside-recirc door position

A small DC electric motor or actuator is used to operate the temperature blend door. Vacuum actuators are used to control each of the three remaining air distribution doors. A feedback circuit is used in the blend door actuator to supply the control assembly with blend door position information. The blower motor is controlled by the control assembly through the blower speed controller. The blower speed controller is necessary to react to the low power signal from the control assembly to provide high power signal required to drive the blower. The following system response chart shows the control assembly response to the function selections.

DESCRIPTION AND OPERATION (Continued)

System Response

Control Assembly Selection	Blend Door Response	Floor-Panel Door Response	Panel-Defrost Door Response	Recirc — Outside Air Door Response	Blower Response (Unless Manually Overridden)	A/C Clutch Response
Off	Remains fixed	Air to plenum	Fixed in defrost	Fixed in recirc	Blower off	Clutch off
Auto	Varies according to sensor temperatures and customer temperature selection. Door is in heat position when sensors are cool — door is in A/C position when sensors are hot.	Air to floor during heating; air to plenum during cooling; air to both between heating and cooling.	Air to defrost nozzle during heating; air to panel during cooling.	Fixed in recirc when engine temp. is below 120°F and heating req'd. Recirculates air when maximum air conditioning is required. Otherwise uses outside air.	Variable blower speeds when engine coolant temp. is above 120°F or A/C required. Blower is off when engine coolant is below 120°F and heating is required.	Clutch on if outside temperature is above 50°F.
A/C		From OFF or AUTO, air to plenum. Otherwise air is directed per mode override (i.e., floor, panel, defrost).	From OFF or AUTO, fixed in panel. Otherwise, door position is per mode override (i.e., floor, panel, defrost).	Recirculates air when maximum air conditioning is required. Otherwise uses outside air.	Variable blower speeds	Clutch on if outside temperature is above 50°F. Clutch will toggle on and off as A/C button is toggled on and off.
Panel		Air to plenum	Fixed in panel			
Panel & floor		Air to plenum and floor				
Floor		Air to floor	Fixed in defrost	Fixed in outside air		
Floor & defrost		Air to plenum and floor				Although clutch is always on if outside temperature is above 50°F, A/C indicator may be toggled on and off.
Defrost		Air to plenum				

CCL 2638-C

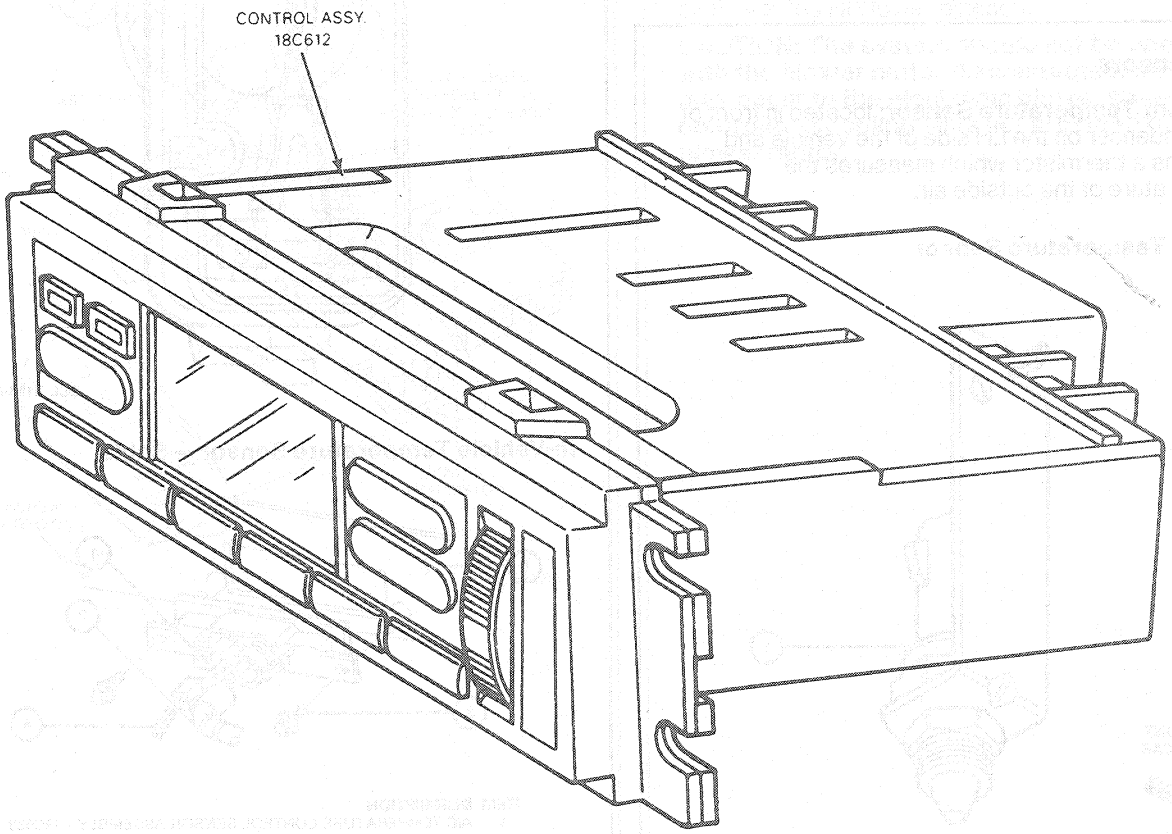
A Self Test feature has been included in the control assembly to supply the technician with air distribution error codes. These codes direct the technician to the damaged component. The Self Test is described as outlined.

DESCRIPTION AND OPERATION (Continued)

Control Assembly

The EATC assembly is located in the instrument panel and consists of 11 push buttons, a variable blower speed control knob for manual input and a vacuum fluorescent display (VFD) for displaying set temperature, ambient temperature, function, and diagnostic codes.

EATC Control Assembly



When the system is operating under AUTOMATIC control, the VFD display will show the preferred or target temperature to which the elements of the automatic control system respond. Blower motor speed, under automatic control, varies in response to ambient temperature changes and a predetermined delay factor. Temperature selection may be raised or lowered in one degree increments between 18°C (65°F) and 29°C (85°F) by pressing the red button to raise or the blue button to lower the desired temperature and automatic control will respond accordingly.

Other control assembly features include:

- A 16°C (60°F) setting for maximum cool and a 32°C (90°F) setting for maximum heat.
- An OUTSIDE TEMP button which, when depressed, will result in a four-second display of the air temperature outside the vehicle.
- An OFF button which, if depressed, will apply vacuum to close the outside-recirc air door shut off blower motor operation, and discontinue climate control functions through the system.

When the thumbwheel control for the blower motor is rotated out of the position it occupied under automatic control, it will remain under manual control until the automatic button is again depressed. Under automatic control, blower speed varies as required to accommodate the total automatic functions in the system. Under manual control, blower speed is constant based on the thumbwheel setting.

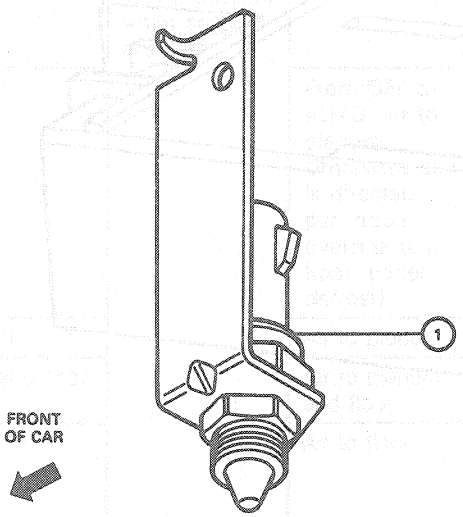
DESCRIPTION AND OPERATION (Continued)

An illumination bulb in the control assembly provides backlighting for the vacuum fluorescent display window. When the rheostat on the headlamp / parking lamp switch is rotated, the intensity of the light from this bulb will increase or decrease depending upon the direction of rotation. (The backlighting on the control assembly, as well as in other instrument panel locations, will dim whenever the light switch is engaged.)

Input Sensors

- **Ambient Temperature Sensor:** located in front of the condenser on the LH side of the vehicle and contains a thermistor which measures the temperature of the outside air.

Ambient Temperature Sensor

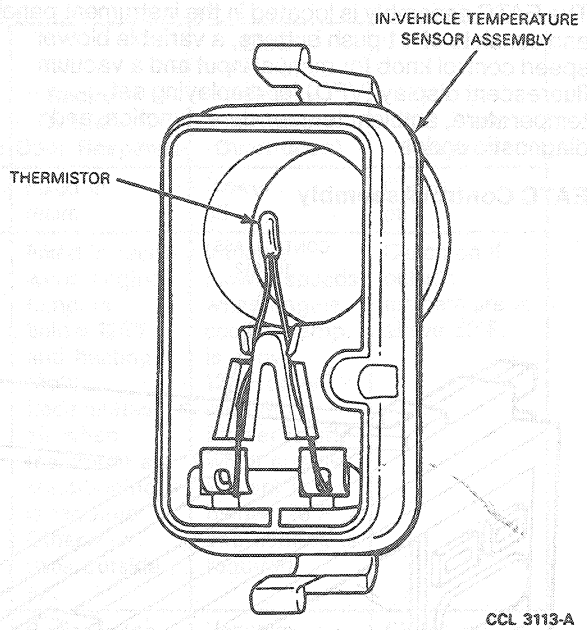


ITEM DESCRIPTION
1. AMBIENT TEMPERATURE SENSOR - 19E702

CCL 2640-C

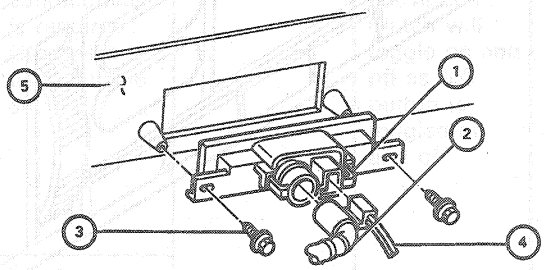
- **In-Vehicle Temperature Sensor:** located behind the instrument panel above the glove compartment, contains a thermistor which measures the temperature of the air inside the passenger compartment.

In-Vehicle Temperature Sensor—Taurus



CCL 3113-A

In-Vehicle Temperature Sensor—Sable

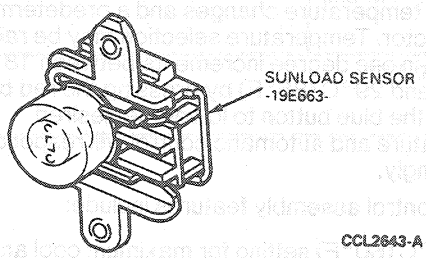


ITEM DESCRIPTION
1. A/C TEMPERATURE CONTROL SENSOR ASSEMBLY - 19C933
2. A/C TEMPERATURE CONTROL HOSE ASSEMBLY - 19D888
3. SCREW - N803876-S36 (2 REQ'D)
4. WIRING ASSEMBLY - 14401
5. INSTRUMENT PANEL ASSEMBLY

CCL 3553-B

- **Sunload Sensor:** located in the RH upper outer finish panel. The sunload sensor contains a photovoltaic (sensitive to sunlight) diode.

Sunload Sensor



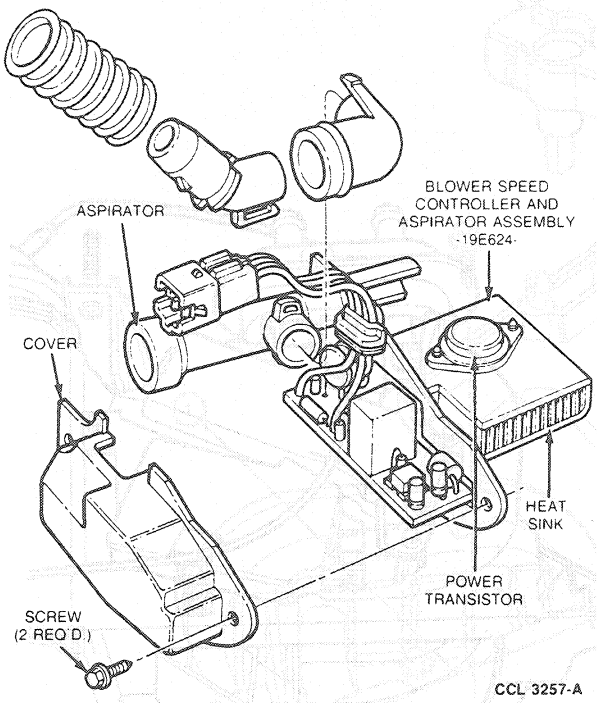
CCL2643-A

DESCRIPTION AND OPERATION (Continued)

Blower Speed Controller

The blower speed controller is located in the evaporator case, upstream of the evaporator core.

Blower Speed Control and Aspirator Assembly



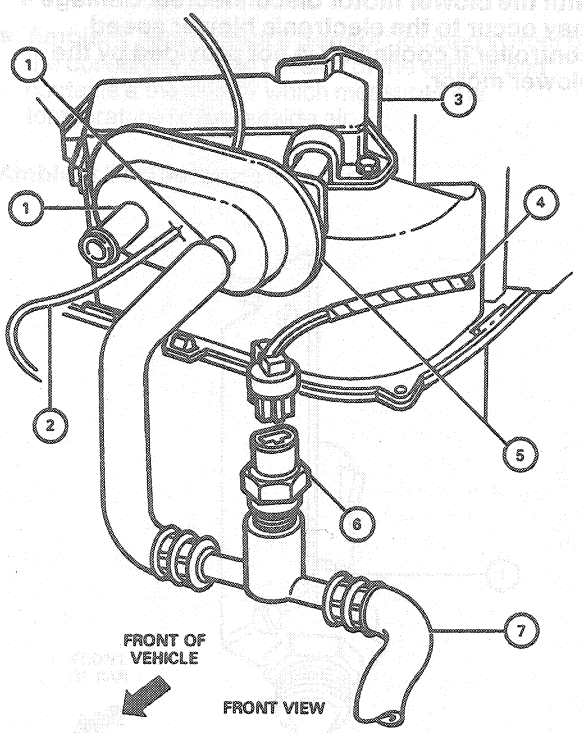
The function of the blower speed controller is to convert low power signals from the EATC control assembly to a high current, variable ground feed for the blower motor. Blower motor speed is infinitely variable and is controlled by the electronic control assembly software and blend door actuator position. A delay function provides a gradual increase or decrease in blower motor speed under all conditions. There is a high blower relay integrated into the blower speed controller which provides power for maximum air flow in the HI blower position.

CAUTION: The system should not be operated with the blower motor disconnected. Damage may occur to the electronic blower speed controller if cooling air is not provided by the blower motor.

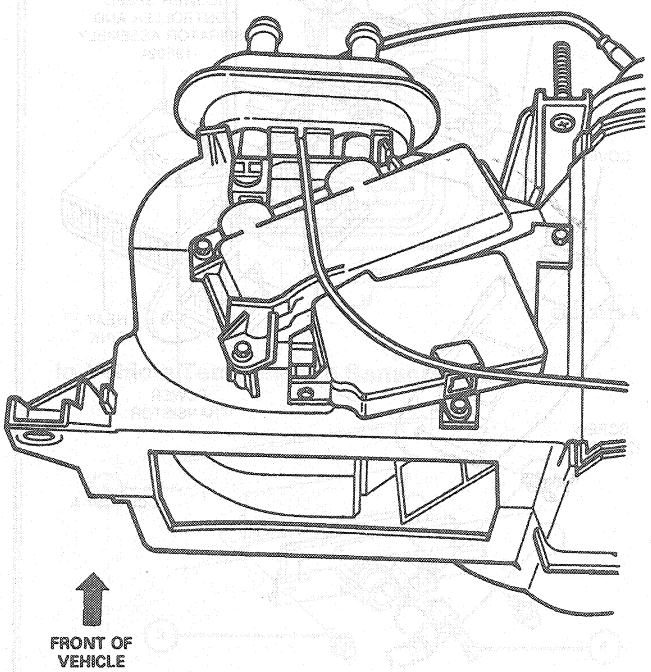
DESCRIPTION AND OPERATION (Continued)

Cold Engine Lock Out Switch (CELO)

The Cold Engine Lock Out switch is shown in the system block diagram. Its function is to prevent blower operation when heating is required and the engine coolant temperature is below 120°F. When the coolant temperature exceeds 120°F, the CELO switch opens, turning the blower on when heating is required. The CELO will not prevent blower operation when cooling or defrost is required. The CELO is located in the heater core inlet hose.



ITEM	DESCRIPTION
1.	HEATER CORE TUBES
2.	VACUUM SOURCE LINE
3.	HEATER CORE ACCESS COVER - 18N276
4.	PART OF HARNESS - 14401



CCL 3128-C

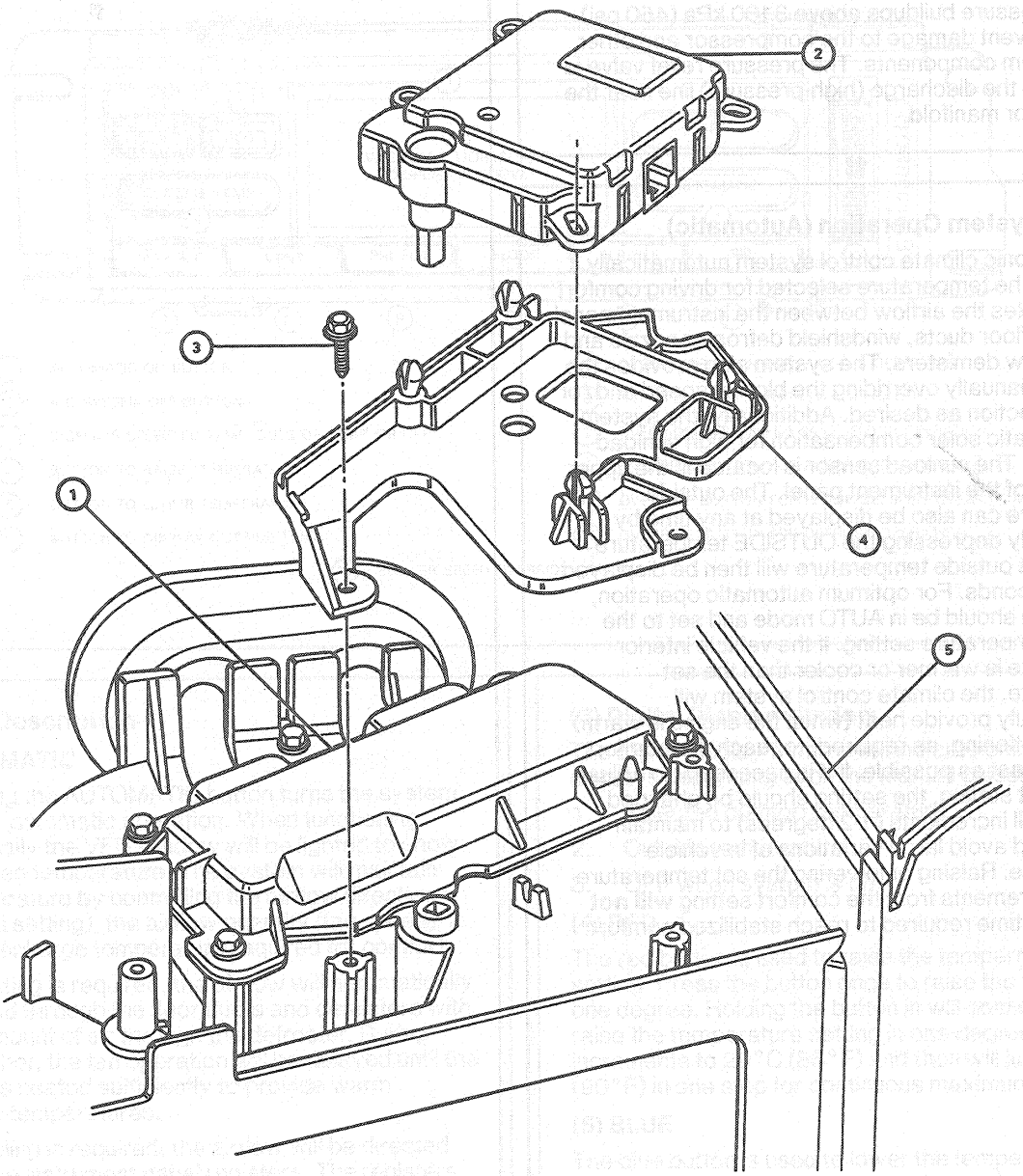
ITEM	DESCRIPTION
5.	HEATER CORE TUBE SEAL (FOAM) - 18529
6.	CELO SWITCH
7.	ENGINE HEATER INLET TUBE

Blend Door Actuator, Electric

The blend door actuator is located on top of the evaporator assembly and controls blend door movement on command from the control assembly. Internally, an electronic circuit accepts commands from the control head and positions the blend door by electric motor. An integral potentiometer feeds blend door position information back to the control head.

DESCRIPTION AND OPERATION (Continued)

Blend Door Electric Actuator and Mounting Assembly



ITEM	DESCRIPTION
1.	HEATER CORE ACCESS COVER
2.	ACTUATOR ASSEMBLY - 19E616
3.	SCREW - 42141-S2 (3 REQ'D.)
4.	ACTUATOR MOUNTING PLATE - 19E693
5.	EVAPORATOR CASE

CCL 2646-E

DESCRIPTION AND OPERATION (Continued)

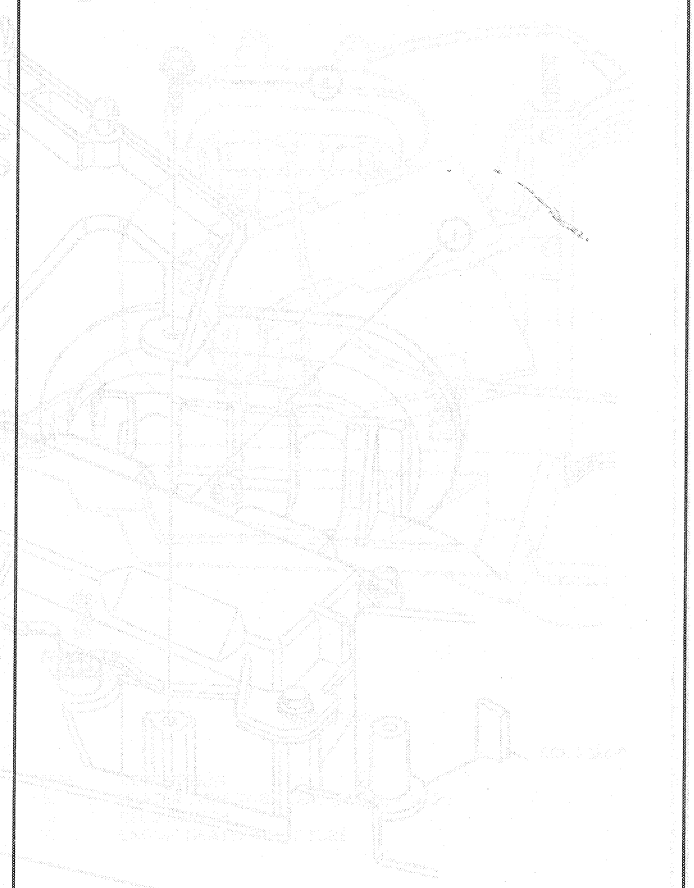
Pressure Relief Valve

A pressure relief valve is installed in the system to relieve pressure buildups above 3100 kPa (450 psi) and to prevent damage to the compressor and other A/C system components. The pressure relief valve is located on the discharge (high-pressure) line near the compressor manifold.

Normal System Operation (Automatic)

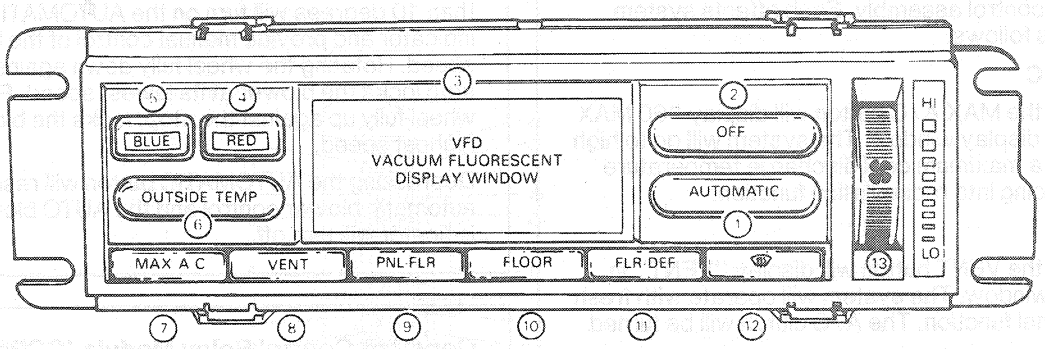
The electronic climate control system automatically maintains the temperature selected for driving comfort and regulates the airflow between the instrument panel registers, floor ducts, windshield defroster nozzle and side window demisters. The system also provides the option of manually overriding the blower speed and/or airflow direction as desired. Additionally, the system has automatic solar compensation for high sunload conditions. The sunload sensor is located in the upper LH corner of the instrument panel. The outside temperature can also be displayed at any time by momentarily depressing the OUTSIDE temperature button. The outside temperature will then be displayed for four seconds. For optimum automatic operation, the system should be in AUTO mode and set to the desired temperature setting. If the vehicle interior temperature is warmer or cooler than the set temperature, the climate control system will automatically provide heat (when the engine is warm) or air conditioning, as required, to reach the comfort setting as fast as possible. If it is necessary to adjust the comfort setting, the setting should be changed only in small increments (1-2 degrees) to maintain comfort and avoid large variations of in-vehicle temperature. Raising or lowering the set temperature in large increments from the comfort setting **will not** reduce the time required to reach stabilized comfort.

Refer to the following illustration. The balloon numbers in the illustration are referenced in the following text.



DESCRIPTION AND OPERATION (Continued)

Control Head Operational Diagram



1. AUTOMATIC ON BUTTON
2. A C SYSTEM OFF BUTTON
3. DISPLAYS SELECTED TEMP, OUTSIDE TEMP, OR OFF
4. BUTTON TO RAISE TEMPERATURE
5. BUTTON TO LOWER TEMPERATURE
6. BUTTON TO DISPLAY OUTSIDE TEMP
7. OVERRIDE BUTTON FOR MAX A C OPERATION
8. OVERRIDE BUTTON FOR VENT OPERATION
9. OVERRIDE BUTTON FOR PANEL-FLOOR OPERATION
10. OVERRIDE BUTTON FOR FLOOR OPERATION
11. OVERRIDE BUTTON FOR FLOOR-DEFROST OPERATION
12. OVERRIDE BUTTON FOR DEFROST OPERATION
13. BLOWER SPEED OVERRIDE CONTROL

CCL 3114-E

System Description

(1) AUTOMATIC

Depressing the AUTOMATIC button turns the system on for fully automatic operation. When functioning automatically the VFD window will be lighted to show the selected temperature. The system will maintain this temperature by controlling the airflow direction (functional setting), the airflow quantity (fan speed), and the discharge temperature required for comfort.

When heating is required, the airflow will automatically be directed through the floor ducts and demisters with a small amount of air through the defroster. During cool weather, the fan operation will be delayed until the engine has heated sufficiently to provide warm discharge temperatures.

When cooling is required, the airflow will be directed through the instrument panel registers. The registers can be adjusted for optimum comfort. When maximum cooling is required, the system will automatically operate with recirculated air for rapid cool-down and automatically change to outside air as the vehicle interior approaches the selected temperature.

In moderate conditions, the system will automatically operate in a split mode, with airflow directed through the floor ducts and through the windshield defroster ducts at a moderate temperature and fan speed.

(2) OFF

Depressing the OFF button will turn the system off completely and display the word OFF in the digital display window.

(3) Digital Display Window

The digital display window will indicate one of three displays depending upon the manual selection:

1. Selected comfort temperature.
2. Outside temperature.
3. OFF when system is off.

(4) RED

The red button is used to raise the temperature setting. Press the button once to raise the temperature one degree. Holding the button in will continuously raise the temperature setting in one-degree increments to 29°C (85°F) and then will jump to 32°C (90°F) in one step for continuous maximum heating.

(5) BLUE

The blue button is used to lower the temperature setting. Press the button once to lower the temperature one degree. Holding the button in will continuously reduce the temperature setting in one-degree increments to 18°C (65°F) and then will jump to 15°C (60°F) in one step for continuous maximum cooling.

(6) OUTSIDE TEMP

Depressing this button will display the outside temperature for four seconds and will automatically change back to the previous display. Outside temperature may be selected any time the ignition switch is in the RUN position whether the system is on or off.

DESCRIPTION AND OPERATION (Continued)

Manual Overrides

There are six manual override buttons along the lower edge of the control assembly. Each affects system operation as follows.

(7) MAX A/C

Depressing the MAX A/C button will display "60 MAX A/C" in the display window. The system will go to high blower with a maximum cool discharge temperature while also going into recirculation function.

(8) VENT

Depressing the VENT button will display "VENT" in the display window. The system will operate with fresh air in the panel function. The A/C clutch will be turned off.

(9) PNL/FLR

Depressing the PNL-FLR button will display "PANEL FLOOR" in the display window. The air will be discharged equally between the panel and the floor. The A/C clutch will be on.

(10) FLOOR

Depressing the FLOOR button will display "FLOOR" in the display window. The majority of the air distribution will be directed through the floor ducts with a small bleed to the side window demisters and the defroster nozzle.

(11) FLR-DEF

Depressing the FLR DEF button will display "FLOOR DEFROST" in the display window and results in a mix position, with the air distributed equally between the defroster nozzle and the floor ducts, with a small bleed out the side window demisters.

(12) DEFROST

Depressing the DEFROST button lights the "DEFROST" indicator and directs the majority of the airflow through the defroster nozzle, with a small bleed to the side window demisters and the floor ducts.

(13) Blower Speed Override Thumbwheel

Rotating the blower speed override thumbwheel more than 10 degrees will turn on the AUTOMATIC blower indicator and provide manual control of the blower speed. Rotating the wheel fully down against its lower stop locks the blower at its lowest speed. Rotating the wheel fully up against the stop, locks the blower at its highest speed.

Depressing the AUTOMATIC button will resume automatic blower control and the AUTO blower indicator will turn off.

Constant Control Relay Module (CCRM)

Vehicles equipped with an engine mounted in the transverse position are also equipped with an electric engine cooling fan. A constant control relay module (CCRM) incorporates circuit control provisions for various engine functions as well as for the engine cooling fan and the A/C compressor clutch coil. When the engine coolant temperature reaches approximately 105°C (221°F), the cooling fan is energized. If an A/C function is chosen, the compressor clutch coil will energize only when the engine cooling fan is operating.

NOTE: The following conditions may cause the A/C compressor to disengage due to the CCRM:

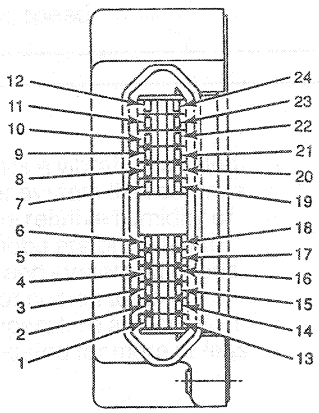
1. Wide Open Throttle (WOT)
2. Very high or too low engine speed
3. Engine cranking
4. High engine coolant temperature of 118°C (245°F)

The following illustrations provide schematics of the circuit involved. They also illustrate and chart the pin-outs in the integral connector for the module.

DESCRIPTION AND OPERATION (Continued)

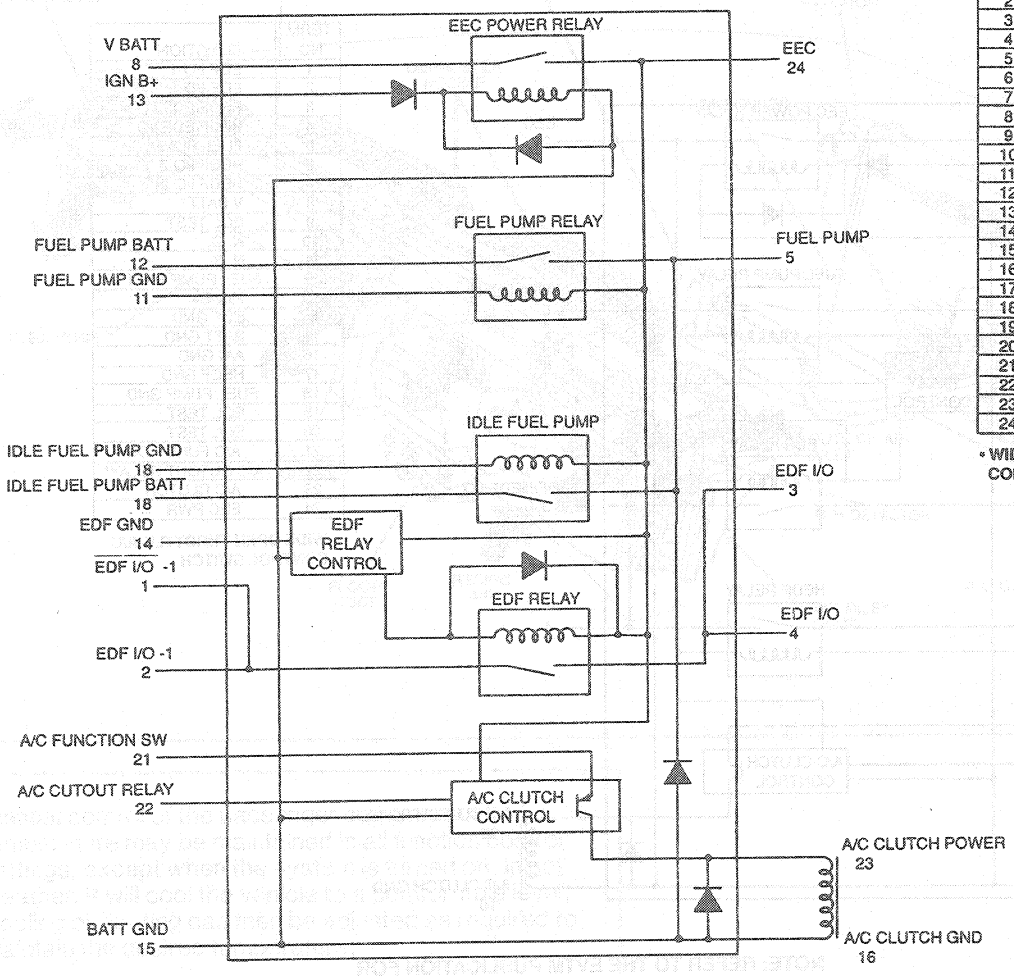
CCRM Circuit and Pin-Outs—3.0L SHO

INTEGRAL CONNECTOR



TERM NO.	FUNCTION
1	EDF I/O-1
2	EDF I/O-1
3	EDF I/O
4	EDFI/O
5	FUEL PUMP
6	N. C.
7	N. C.
8	V BATT
9	EOL TEST
10	IDLE FUEL PUMP BATT
11	FUEL PUMP GND
12	FUEL PUMP BATT
13	IGN B+
14	EDF GND
15	BATT GND
16	A/C GND
17	N. C.
18	IDLE FUEL PUMP GND
19	EOL TEST
20	EOL TEST
21	A/C FUNCTION
22	A/C CUTOUT RELAY*
23	A/C CLUTCH
24	EEC PWR

* WIDE OPEN THROTTLE-A/C CONTROL SWITCH



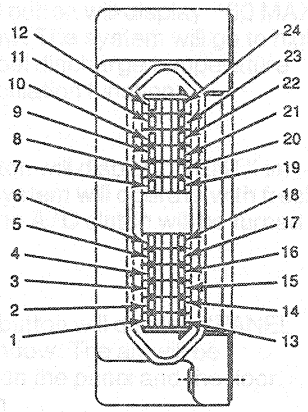
NOTE: REFER TO THE EVTM PUBLICATION FOR COMPLETE CIRCUIT SCHEMATIC AND WIRE COLORS.

CCL3769-A

DESCRIPTION AND OPERATION (Continued)

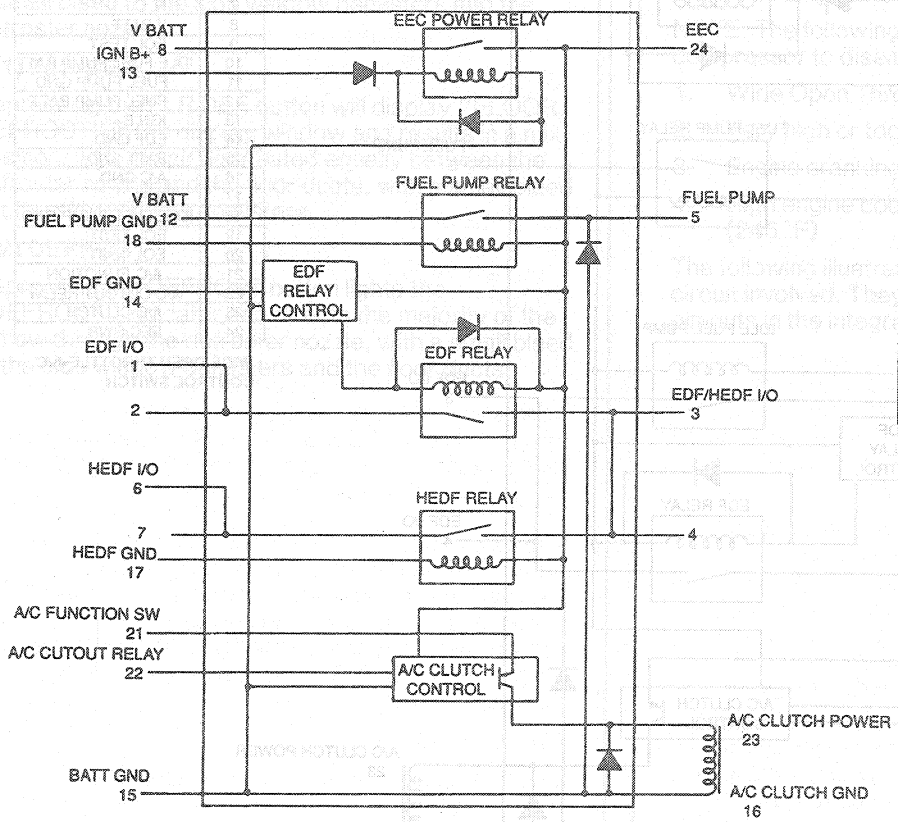
CCRM Circuit and Pin-Outs—3.0L, 3.8L and 3.2L SHO

INTEGRAL CONNECTOR



TERM NO.	FUNCTION
1	EDF I/O-1
2	EDF I/O-1
3	HEDF/EDF I/O
4	HEDF/EDF I/O
5	FUEL PUMP
6	HEDF I/O 2
7	HEDF I/O 2
8	V BATT
9	EOL TEST
10	N. C.
11	N. C.
12	FUEL PUMP BATT
13	IGN B+
14	EDF GND
15	BATT GND
16	A/C GND
17	HEDF GND
18	FUEL PUMP GND
19	EOL TEST
20	EOL TEST
21	A/C FUNCTION
22	A/C CUTOUT RELAY*
23	A/C CLUTCH
24	EEC PWR

* WIDE OPEN THROTTLE-A/C CONTROL SWITCH



NOTE: REFER TO THE EVTM PUBLICATION FOR COMPLETE CIRCUIT SCHEMATIC AND WIRE COLORS.

CCL 3770-A

DESCRIPTION AND OPERATION (Continued)

NOTE: The following conditions may cause the A / C compressor to momentarily disengage:

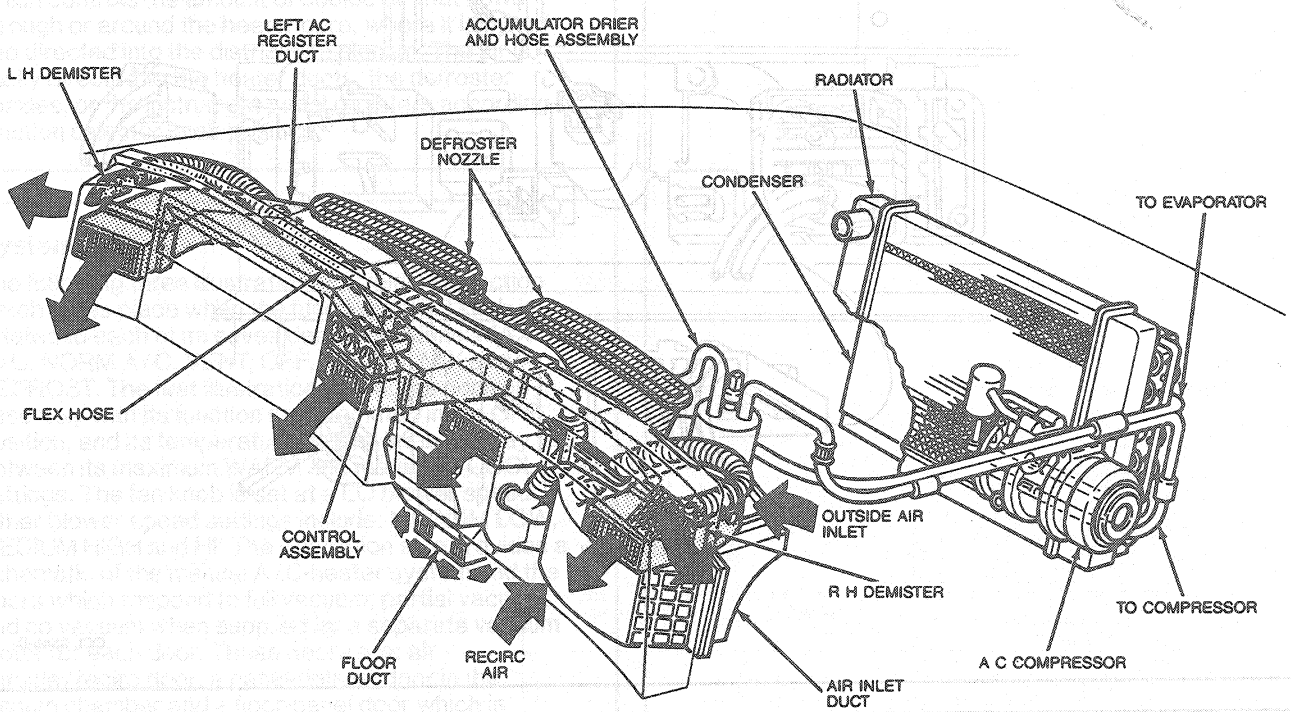
1. Wide open throttle (WOT)
2. Very high, or too low engine speed
3. Engine cranking
4. High engine coolant temperature

A low or no refrigerant condition will also prevent the A / C compressor from engaging.

A / C-Heater System

The manual A / C-heater system is a vibration welded, split-case design integral blower system that controls the temperature and reduces the relative humidity of air inside the vehicle. Control knobs are provided to adjust the desired temperature and system functions. The system will deliver heated or cooled air to maintain the vehicle interior temperature and comfort level. Blower speeds can be adjusted for more or less airflow as desired.

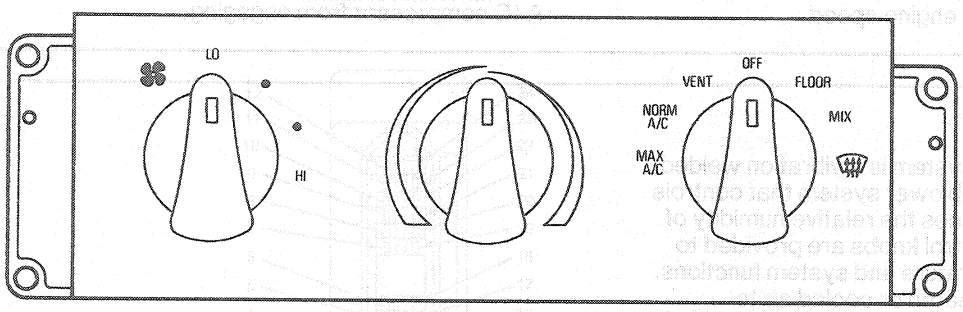
A / C System Installation and Airflow



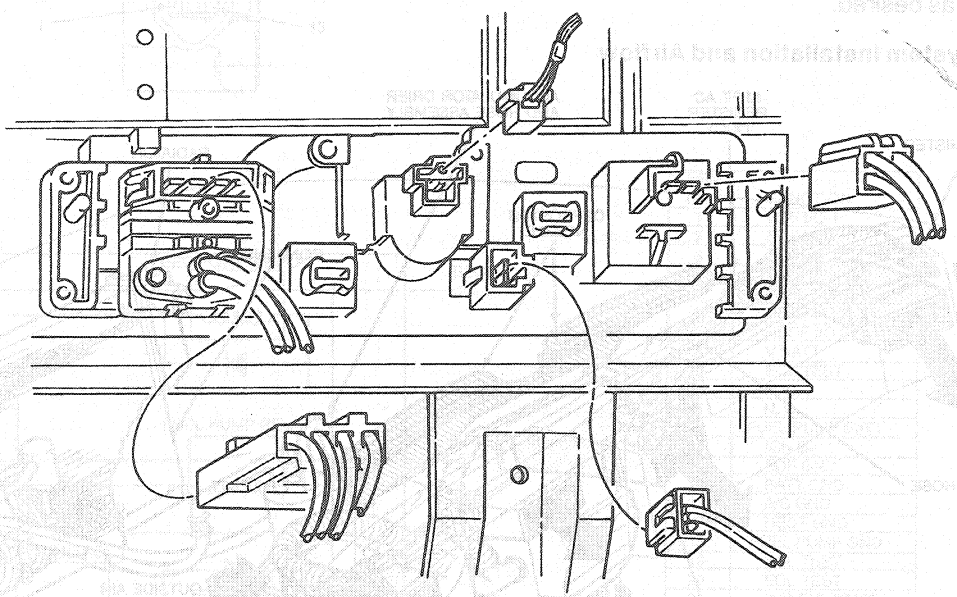
Manual control of the passenger compartment temperature may be maintained in all function control settings, except when the system is turned off. In hot weather, it will cool the vehicle to a comfortable level. Cooling or heating can then be adjusted as required to maintain the desired temperature.

DESCRIPTION AND OPERATION (Continued)

Control Assembly



FRONT VIEW



REAR VIEW

CCL 3546-D

For cold weather conditions, the system may be turned off by placing the function selector knob in the OFF position. This will minimize the discharge of cold air and delay the operation of the system while the engine coolant warms. After the engine is warm, the function selector knob can be turned on, and the system will heat the vehicle to the desired temperature.

Outside air is drawn from the cowl air inlet just below the windshield during all system operations except MAX A/C cooling, when recirculated air is used.

Control Operation

The manual A/C-heater control includes a function selector knob which has positions: OFF, MAX-A/C, NORM A/C, VENT, FLOOR, MIX and DEFROST. The position of the knob determines the manner in which the system will operate. A temperature control knob manually sets the desired comfort temperature, and a fan control knob controls the volume of air movement. Each position of the function selector knob and fan control knob is detented for positive engagement. The fan control knob provides four manually selected blower speeds, and may be operated in any position of the function selector knob to select the desired amount of airflow.

DESCRIPTION AND OPERATION (Continued)

Temperature Control

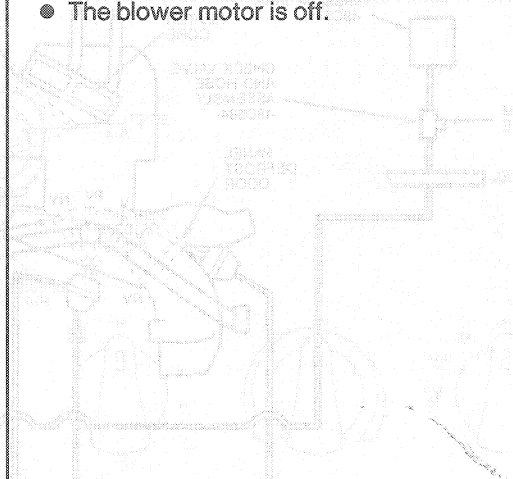
Temperature control of the manual A/C-heater system is determined by the position of the temperature control knob on the control assembly and is accomplished by means of a control cable between the control assembly and the temperature blend door. System airflow is manually controlled by the control assembly. A vacuum selector valve, controlled by the function selector knob, distributes vacuum to the various door vacuum motors, which in turn direct the airflow through the system.

The system uses what is called a "reheat" method to provide conditioned air to the vehicle interior. With this method, all airflow from the blower passes through the evaporator core, where it is cooled and dehumidified. Temperature is then regulated by reheating a portion of the cooled dry air and blending it with the remaining cool air to the desired temperature. Temperature blending is varied by the temperature blend door, which controls the amount of cooled air that flows through or around the heater core, where it is mixed and directed into the distribution plenum. The air is finally directed to the heater ducts, the defroster nozzles, or the instrument panel registers according to function selector knob position.

System Airflow

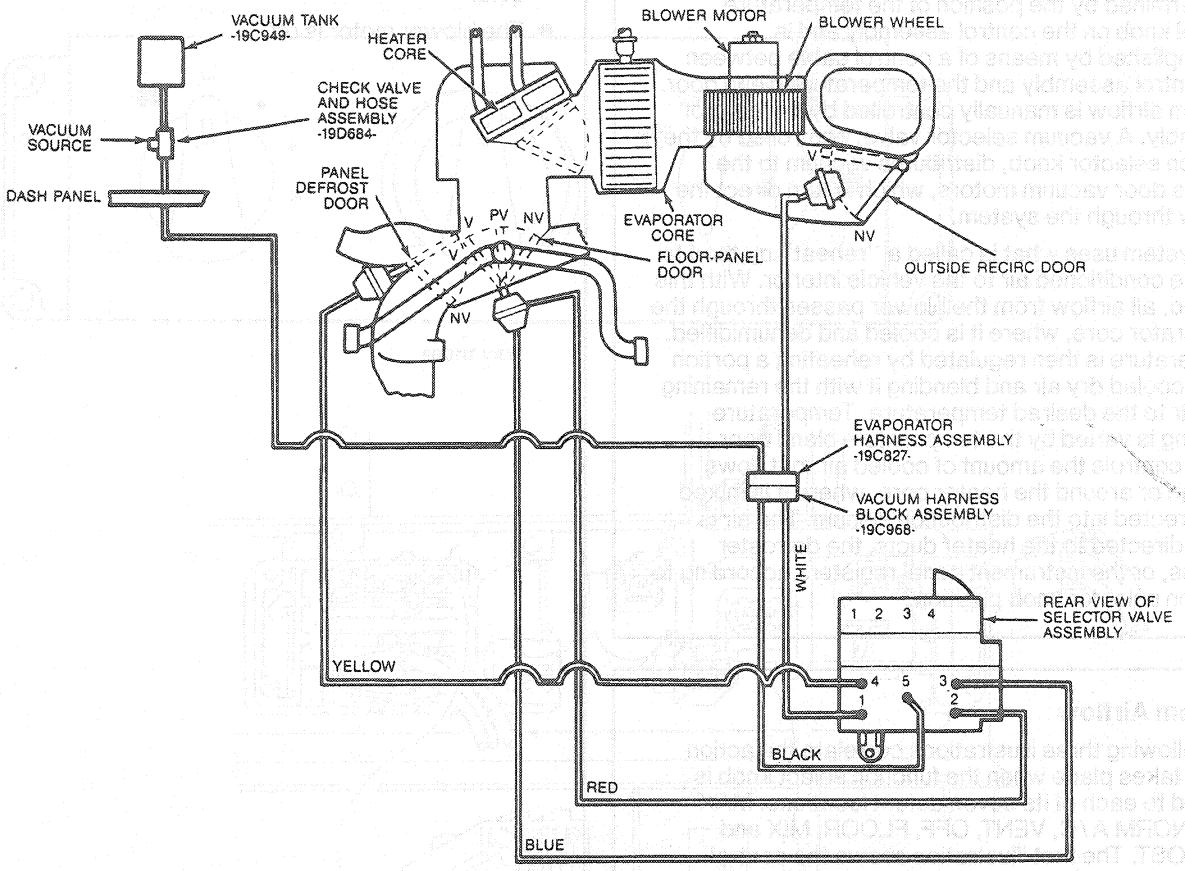
The following three illustrations correlate the action which takes place when the function select knob is rotated to each of its seven detent locations: MAX A/C, NORM A/C, VENT, OFF, FLOOR, MIX and DEFROST. The first illustration shows the control assembly with its function selector knob in the OFF position, and its temperature control knob midway between its maximum WARM and maximum COOL settings. The fan knob is set at a LO blower speed. Other blower speed settings include: MEDIUM LOW, MEDIUM HIGH and HI. The illustration also provides a schematic of the manual A/C-heater system and the doors which respond to full vacuum, partial vacuum, and no vacuum when supplied by a separate vacuum motor for each door. These doors are: air outside/recirc door, a panel-defrost door in the plenum chamber and a floor-panel door which is designed to provide full, partial or no vacuum positions. The blend door is manually controlled by a cable and moves according to the position of the temperature control knob.

- The blend door may be positioned anywhere within the range of its cable travel, from full heat to full cold.
- The blower motor is off.

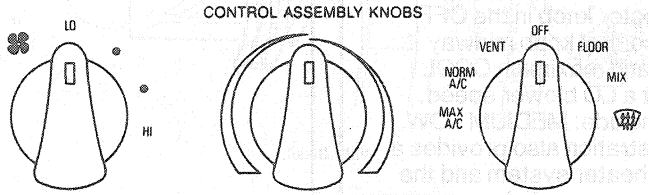


DESCRIPTION AND OPERATION (Continued)

A/C System Schematic and Vacuum Control Chart



CONTROL ASSEMBLY KNOBS



FUNCTION SELECTOR KNOB POSITION	OUTSIDE-RECIRC. AIR DOOR	FLOOR-PANEL DOOR	PANEL-DEFROST DOOR	BLOWER MOTOR
MAX — A/C	V	NV	V	ON
NORM — A/C	NV	NV	V	ON
VENT	NV	NV	V	ON
OFF	V	V	V	OFF
FLOOR	NV	V	NV	ON
MIX	NV	PV	NV	ON
DEFROST	NV	NV	NV	ON
VACUUM HOSE COLOR CODE	WHITE	RED / BLUE①	YELLOW	—

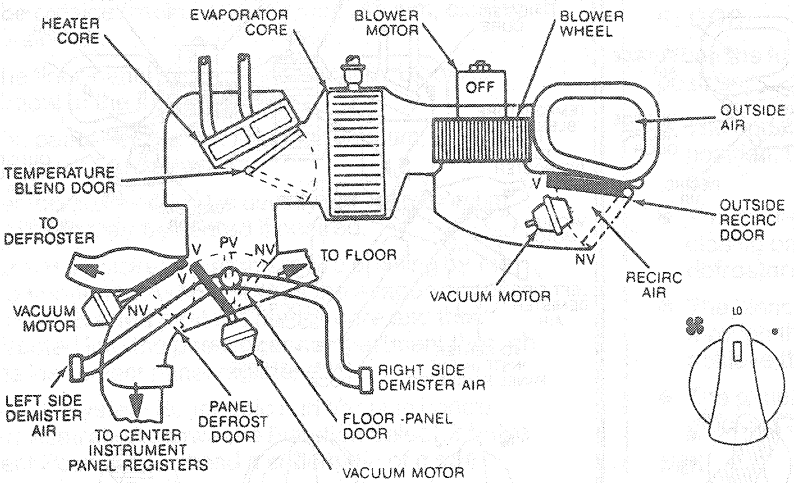
①BLUE — PARTIAL VACUUM; BLUE AND RED — FULL VACUUM

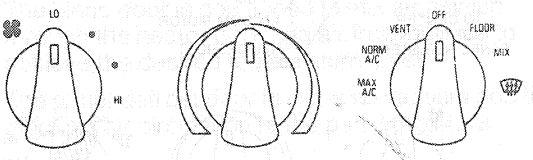
CCL 2608-E

DESCRIPTION AND OPERATION (Continued)

Airflow Chart 1 (OFF, MAX A/C, NORM A/C)

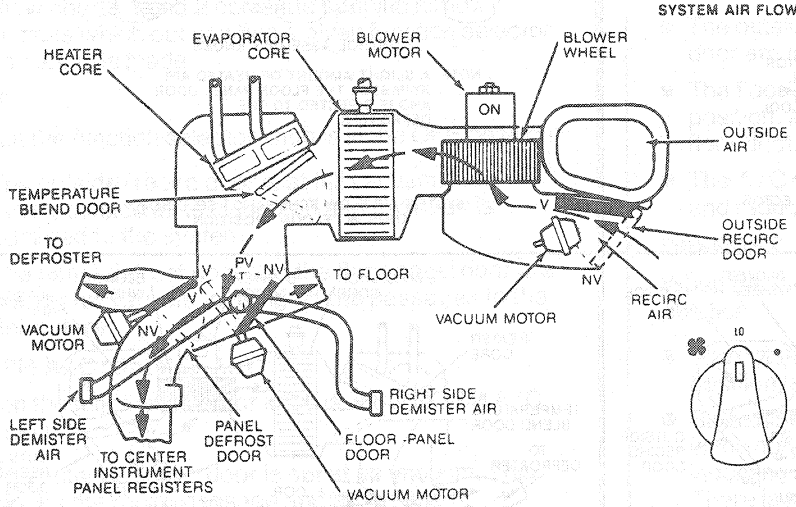
SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "OFF" POSITION

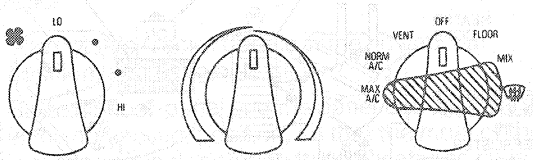




CONTROL ASSEMBLY KNOBS

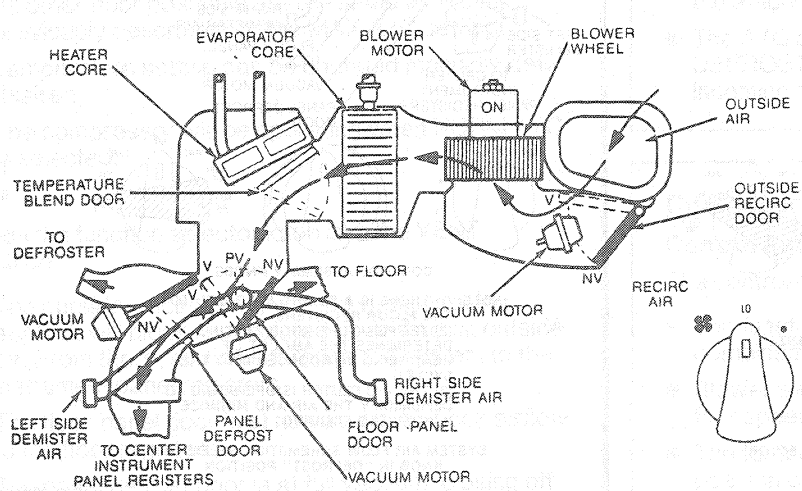
SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "MAX A/C" POSITION



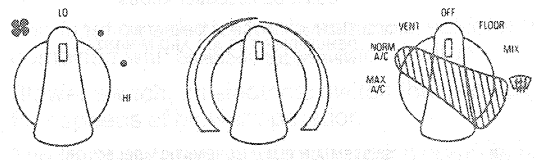


CONTROL ASSEMBLY KNOBS

SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "NORMAL A/C" POSITION



NOTE: THE COMPRESSOR IS OPERATING

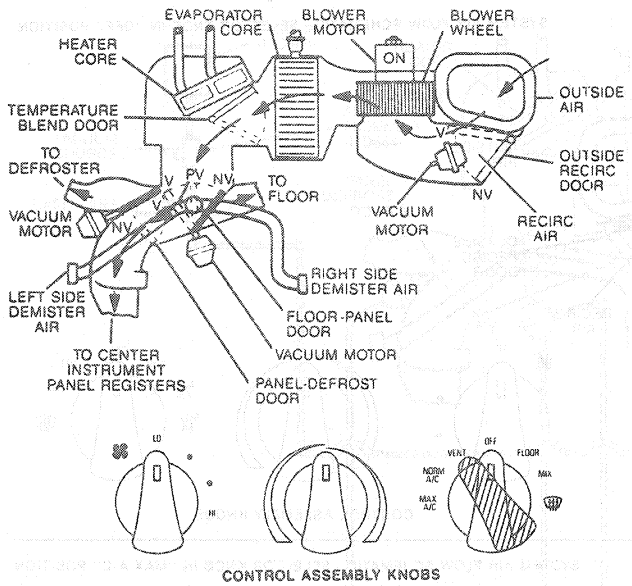


CONTROL ASSEMBLY KNOBS

CCL 2609-F

DESCRIPTION AND OPERATION (Continued)

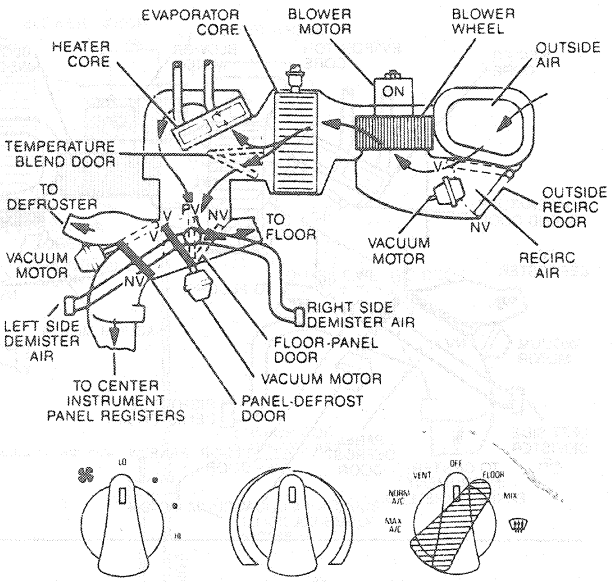
Airflow Chart 2 (VENT, FLOOR, MIX, DEFROST)



CONTROL ASSEMBLY KNOBS

NOTE: (1) NO REFRIGERATION CAN BE INTRODUCED WHEN THE SELECTOR KNOB IS IN THE VENT POSITION.
(2) THE TEMPERATURE SELECTOR MAY BE ROTATED TO HEAT OR COOL THE AIR FLOW AS DESIRED.

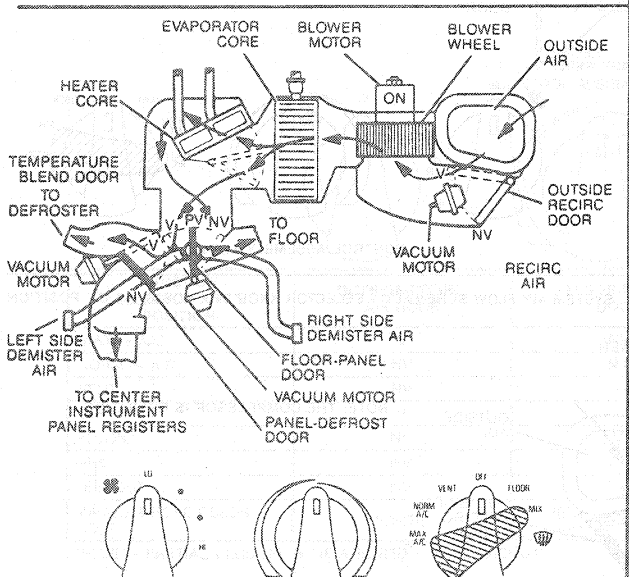
SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "VENT" POSITION



CONTROL ASSEMBLY KNOBS

NOTE: A SLIGHT AMOUNT OF HEATED AIR BY-PASSES THE FLOOR PANEL DOOR AND IS DIRECTED TO THE DEFROSTER.

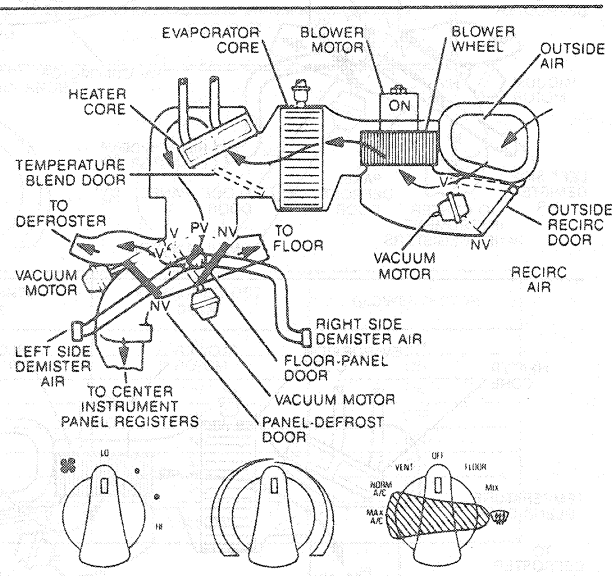
SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "FLOOR" POSITION



CONTROL ASSEMBLY KNOBS

NOTE: THE A/C CLUTCH IS OPERATING TO DEHUMIDIFY THE AIR AND MINIMIZE WINDSHIELD FOGGING.

SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "MIX" POSITION



CONTROL ASSEMBLY KNOBS

NOTE: (1) THERE IS A SLIGHT AIR BLEED TO THE FLOOR REGISTERS
(2) TEMPERATURE KNOB SETTING DETERMINES THE AMOUNT OF HEAT BEING INTRODUCED INTO THE SYSTEM
(3) THE A/C CLUTCH IS OPERATING TO DEHUMIDIFY THE AIR AND MINIMIZE WINDSHIELD FOGGING

SYSTEM AIR FLOW SCHEMATIC - SELECTOR KNOB IN "DEFROST" POSITION

CCL 2610-E

DESCRIPTION AND OPERATION (Continued)

MAX A/C (Recirculated Air)

When the function selector knob is in the MAX A/C position:

- The outside/recirc door is at full vacuum, closing off outside air.
- The floor-panel door is at no vacuum, blocking airflow to the floor registers.
- The panel-defrost door is at full vacuum, closing off airflow to the defrosters.
- Temperature control is usually set for maximum cold, but may be heated if desired.
- Air will be picked up at the recirc opening by the blower motor. Airflow across the evaporator core will be diverted past the heater core and then directed into the passenger compartment through the instrument panel registers.

The A/C System Schematic and Vacuum control Chart illustration shows the Function Selector Valve Detent Position chart and a schematic of mode selector knob functions.

Air flow charts 1 and 2 correlate specific airflow conditions which occur when a given function selector knob setting is made.

OFF

When the function selector knob is in the OFF position:

- The outside/recirc door is at full vacuum. As a result, outside air is closed off and recirc air is admitted to the system.
- The panel-defrost door and the floor-panel door are both at full vacuum, closing off the passages to the defrosters.

NORM A/C (Outside Air)

When the function selector knob is in the NORM A/C position:

- The outside/recirc door is set at no vacuum. This blocks the recirc passage and allows the admittance of outside air.
- All other door positions are the same as those previously described for the MAX A/C setting.
- Temperature setting can be changed manually as desired.
- The compressor will be operating when NORM A/C is selected.

VENT

When the function selector knob is in the VENT position:

- The outside/recirc door, with no vacuum being applied, will block recirculated air and admit outside air. From there, air flows through the system to the instrument panel registers.
- The floor-panel door is at no vacuum to block airflow to the floor registers.
- The panel-defrost door is at full vacuum, closing off airflow to the defrosters.
- The air conditioned airflow is admitted into the system when the function selector knob is in the VENT position, but the temperature control knob may be adjusted to heat the air, if desired.

FLOOR

When the function selector knob is in the FLOOR position:

- The outside/recirc door is in the no vacuum position, blocking recirc air and admitting outside air.
- The floor-panel door is in the vacuum position, closing off all but a minimum of airflow to the defrosters.
- The blend door is positioned to mix air flowing through the heater core and air from outside to achieve the desired temperature level.
- The panel-defrost door is in the no vacuum position, blocking air circulation to the panel registers.

MIX

When the function selector knob is in the MIX position:

- The outside/recirc air door and the panel-defrost door are in the no vacuum position.
- The floor-panel door is in the partial vacuum position, allowing airflow to both panel registers and floor duct.
- The A/C compressor operates to dehumidify the air and reduce windshield fogging.

DEFROST

When the function selector knob is in the DEFROST position:

- The outside/recirc door is in the no vacuum position, admitting outside air.
- Both the floor-panel and the panel-defrost doors are in the no vacuum position, so that the most of the incoming air is directed to the defroster nozzles. There is a slight air bleed to the floor registers.
- The temperature control knob setting will determine the amount of heat introduced into the airflow.
- The A/C clutch will also operate when the DEFROST position is selected. This dehumidifies incoming air and reduces windshield fogging.

Components

Control Assembly

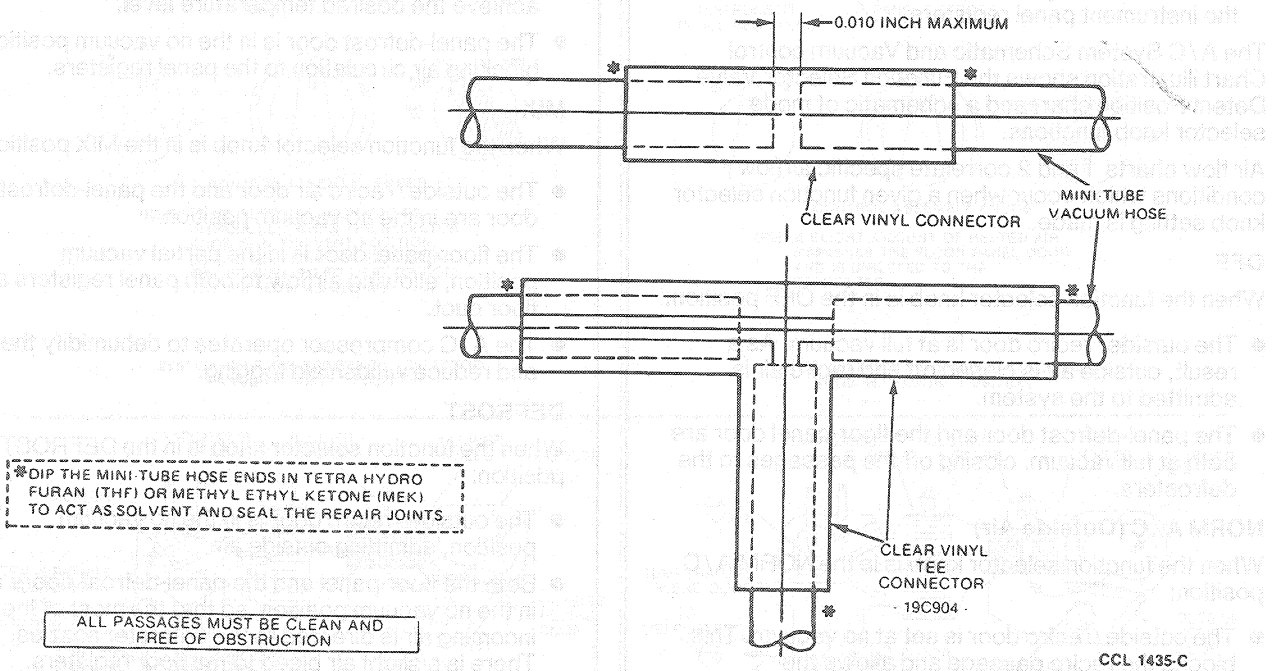
The control assembly consists of three main parts:

- The function selector knob, a vacuum selector valve combined with an internal electrical switch
- Blower switch, an electrical switch that provides four speeds of blower operation
- The temperature control knob, which controls the position of the electric blend door actuator mounted on evaporator assembly

DESCRIPTION AND OPERATION (Continued)

1. The vacuum selector valve directs source vacuum to various vacuum motors. Refer to the A/C System Schematic and Vacuum Control Chart. Two internal single pole electrical switches are also controlled by the selector. The combination of these electrical switches controls the electrical supply to the A/C clutch and blower switch.
2. The temperature control knob is electrically connected to the temperature blend door by a blend door actuator. Movement of the control knob from COOL to WARM causes a corresponding movement on the temperature blend door and determines the temperature that the system will maintain.

Mini-Tube Vacuum Hose Service



Mini-Tube Vacuum Hoses

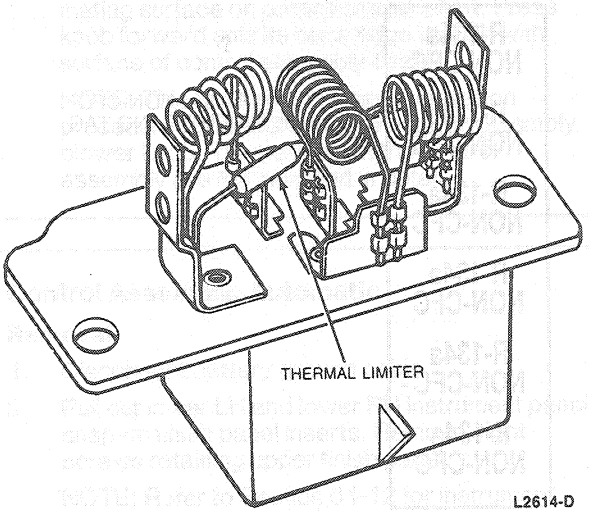
Mini-tube vacuum hoses are used in the vacuum harness assemblies. They provide greater flexibility with less tendency to collapse and are less susceptible to pinching. Repairs are easily made using a short piece of standard 3mm (1/8 inch) ID vacuum hose and inserting the cut ends of the mini-tube into the ends of the standard 3mm (1/8 inch) ID vacuum hose.

Thermal Limiter Resistor Assembly

The blower motor thermal limiter resistor assembly is located on the passenger side of the evaporator case behind the glove compartment. There are three resistance elements mounted on the resistor board to provide four blower speeds. Depending on the blower switch position, series resistance is added or bypassed in the blower motor circuit to decrease or increase blower motor speed.

DESCRIPTION AND OPERATION (Continued)

Thermal Limiter Resistor Assembly



The thermal limiter resistor assembly is similar to a standard resistor assembly, except an overheating protective device (thermal limiter) has been added to prevent heat damage to the evaporator case assembly. Overheating of the resistor coil(s) will occur when the system airflow is stopped as a result of the blower wheel being locked.

When the thermal limiter resistor circuit has opened as a result of excessive heat, it should be replaced only with an identical replacement thermal limiter resistor assembly. It must not be substituted with a standard resistor assembly which does not include a thermal limiter device.

Thermal Limiter

The thermal limiter, used in the thermal limiter resistor assembly, serves as a temperature protecting fuse. Located a predetermined distance from the resistor coils and in series with the coil circuit, it will open the resistor coil circuit when the temperature of the thermal limiter reaches 121°C (250°F) interrupting blower operation in all speeds except high blower. Internal spring-loaded contacts are held closed with wax material which has a melting point of 121°C (250°F). When the wax softens, the spring contacts separate, opening the resistor circuit. The spring contacts cannot be closed again. It will be necessary to replace the entire thermal limiter resistor assembly.

Register Assemblies

The rectangular register assembly consists of a set of horizontal louvers in front and a set of vertical louvers behind the front louvers. The control knob moves up and down and slides side-to-side to direct air in all directions.

Register Assemblies, LH

Sable

The assembly is an integral part of the cluster finish panel with the housing moulded as part of it. A knob, located on the RH side, controls an air shutoff door installed in the register housing assembly.

Register Assembly, RH

Taurus/Sable

The housing has four flexible tabs (two on the top and two on the bottom) that lock the assembly into the instrument panel. A knob, located on the LH front of the register assembly, controls an outlet shutoff door installed in the register housing assembly.

Register Assembly, LH and Center

Taurus

The assemblies are a part of the cluster finish panel and attached to the panel with two screws for the LH assembly and two screws and two heat stakes for the center assembly. A knob, located on the RH front of the register assembly, controls an air outler shutoff door installed in the register housing assemblies.

Register Assembly, Center

Sable

The two center assemblies are an integral part of the center finish panel (moulded as a part of it) and attached to the instrument panel. Knobs located on the edges of the finish panel, control air shutoff doors installed in the register housing assembly.

Refrigerant System

Refer to Section 12-00 for a description and service procedures for refrigerant system components.

Constant Control Relay Module (CCRM)

A constant control relay module (CCRM) is used on all engines with air conditioning. The CCRM cycles the engine cooling fan on whenever the A/C compressor is operating. The controller also allows for engine cooling fan operation whenever the engine coolant temperature reaches approximately 105°C (221°F).

The CCRM is located on the radiator support. A schematic of the electrical components and circuits involved is shown in previous CCRM circuit and pinouts illustration.

DIAGNOSIS AND TESTING

Refer to Section 12-00.

REMOVAL AND INSTALLATION

Refrigerant 134a (R-134a) Systems

In effort to avoid the use of CFC refrigerants that may harm the ozone layer of the atmosphere, Ford Motor Company has introduced a new refrigerant system on some 3.0L Taurus vehicles that requires the use of a Non-CFC based refrigerant known as R-134a. This new type of refrigerant has many of the same properties as R-12 and is similar in form and function. However, R-134a is a hydrofluorocarbon (HFC) based refrigerant while R-12 is a chlorofluorocarbon (CFC) based refrigerant. Because of the absence of chlorine in its molecular structure, the use of R-134a refrigerant will not have any harmful effects on the ozone layer of the atmosphere.

Most Taurus / Sable vehicles use A / C systems that require the use of R-12 as a refrigerant. If there are no special R-134a identifying tags on the A / C system components and refrigerant lines, the system requires the use of R-12 refrigerant.

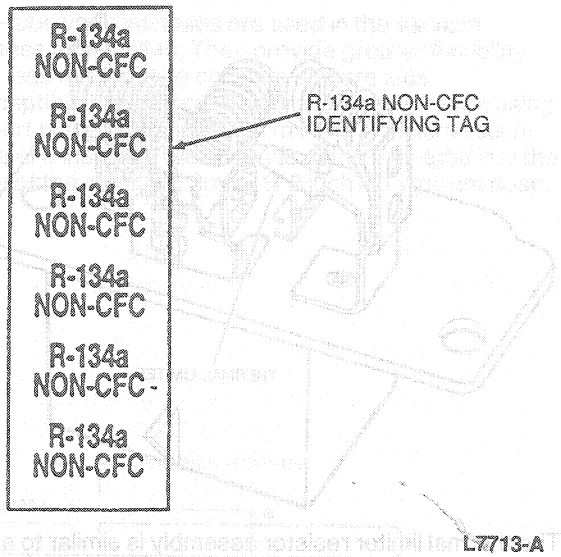
Ford Motor Company has begun producing some 3.0L Taurus vehicles that have new A / C systems requiring the use of R-134a refrigerant. R-134a A / C systems have special service requirements that will be outlined later. R-12 refrigerant and components can only be used in R-12 systems while R-134a refrigerant and components can only be used in R-134a systems.

Identifying R-134a and R-12 Systems

CAUTION: Do not add R-12 refrigerant to an A / C system that requires the use of R-134a refrigerant. Do not add R-134a refrigerant to an A / C system that requires the use of R-12 refrigerant. These two types of refrigerant should never be mixed. Doing so may cause damage to the A / C system.

NOTE: R-134a A / C systems can also be identified by a gold colored A / C compressor clutch and green colored O-rings used throughout the system.

In order to determine which type of A / C system a particular vehicle has, inspect the A / C system major components and refrigerant lines. If the system components have yellow R-134a NON-CFC tags as shown below, it is an R-134a system requiring the use of R-134a refrigerant.



If the A / C system has any of the R-134a identifying characteristics outlined, R-134a refrigerant is the only type of refrigerant that can be used in the A / C system. If the A / C system is not identified as an R-134a system as previously outlined, it is an R-12 system requiring the use of R-12 refrigerant.

R-134a System Components

CAUTION: R-12 and R-134a components are not interchangeable. Do not replace components from an R-134a system with components for an R-12 system and vice versa. Mixing components from these two types of systems may cause component failure and damage to the A / C system.

The major components of R-134a A / C systems are similar to those used previously on Ford R-12 fixed orifice tube type systems. R-12 and R-134a components are similar in design and function. As a result, all Removal and Installation procedures outlined for R-12 components can be used for R-134a components.

Control Assembly Blower Knob, Manual A / C

Removal and Installation

1. Grasp blower knob and pull it rearward from control assembly bezel.

   NOTE: Do not use a sharp instrument to pry the knob off the potentiometer shaft as damage to the surface of the bezel is likely to occur.

2. If the D-shaped spring clip which seats inside back end of knob remains on potentiometer shaft when knob is pulled off, remove it using needlenose pliers.

REMOVAL AND INSTALLATION (Continued)

3. To install knob, align its keyed surface with mating surface on potentiometer shaft. Press knob forward until its back edge is flush with surface of control assembly bezel.

   NOTE: This knob removal and installation procedure applies only to the control assembly blower knob. The buttons on the control assembly are not serviced in detail.

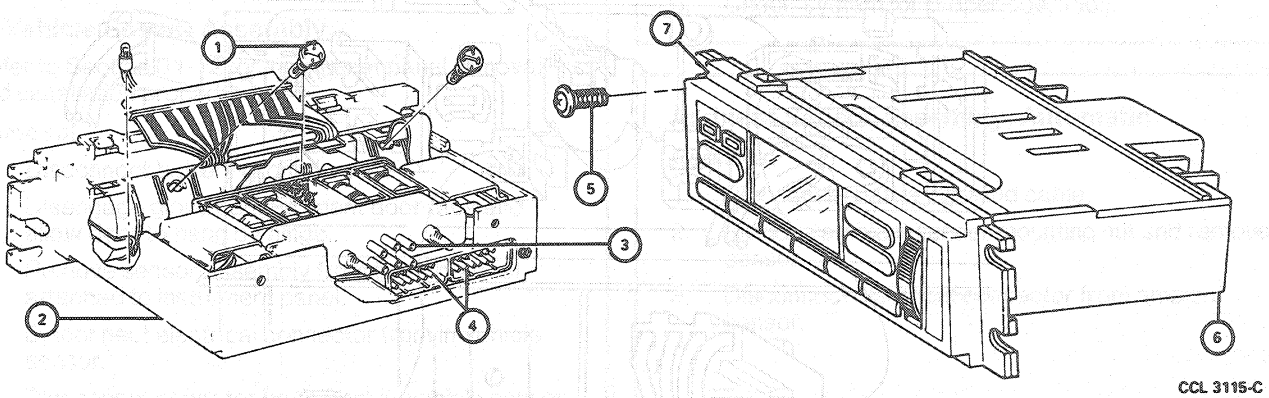
Control Assembly, Automatic

Removal

1. Disconnect battery ground cable.
2. Pull out lower LH and lower RH instrument panel snap-on finish panel inserts. Remove eight screws retaining upper finish panel.

   NOTE: Refer to Section 01-12 for instrument panel removal and installation procedures.
3. Pull lower edge of upper finish panel away from instrument panel. It is best to grasp finish panel from lower LH corner and pull panel away by walking hands around panel in a clockwise direction.
4. Remove four Torx® head screws retaining control head. Pull control head away from instrument panel into a position which provides access to rear connections.
5. Disconnect two harness connectors from control assembly by depressing latches at top of connectors and pulling.
6. Remove two nuts retaining vacuum harness. Pull control assembly away from instrument panel.

Control Head Attachment



CCL 3115-C

ITEM	DESCRIPTION
1.	GENERAL ILLUMINATION BULB - NO. 2043
2.	AIR TEMPERATURE CONTROL ASSY - 18C612
3.	VACUUM CONTROL VALVE
4.	ELECTRICAL CONNECTIONS

ITEM	DESCRIPTION
5.	SCREW (4 REQ'D.) - N803876
6.	CONTROL ASSY - 18C612
7.	BEZEL

Installation

1. Connect two harness connectors to control assembly. Push keyed connectors in until a click is heard.
2. Attach vacuum harness to vacuum port assembly. Secure harness by tightening two nuts.
3. Position control assembly into instrument panel opening and install four retaining Torx® head screws. Ensure that, as control is positioned, locating posts are correctly aligned with their respective holes.
4. Carefully place instrument panel applique into its assembly position. Note that spring clips are aligned with their proper holes. Press applique into place. Ensure that all spring clips are secure.
5. Install eight screws retaining upper finish panel. Insert lower LH and lower RH instrument panel snap-on finish panel inserts.
6. Connect battery ground cable.

REMOVAL AND INSTALLATION (Continued)

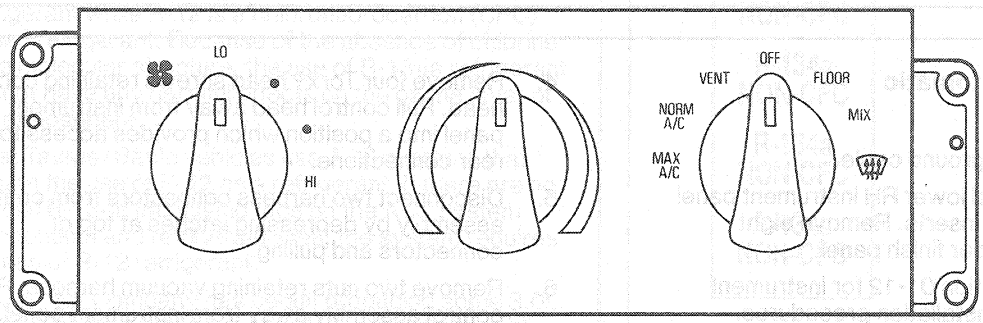
Control Assembly, Manual A/C—Heater

Removal

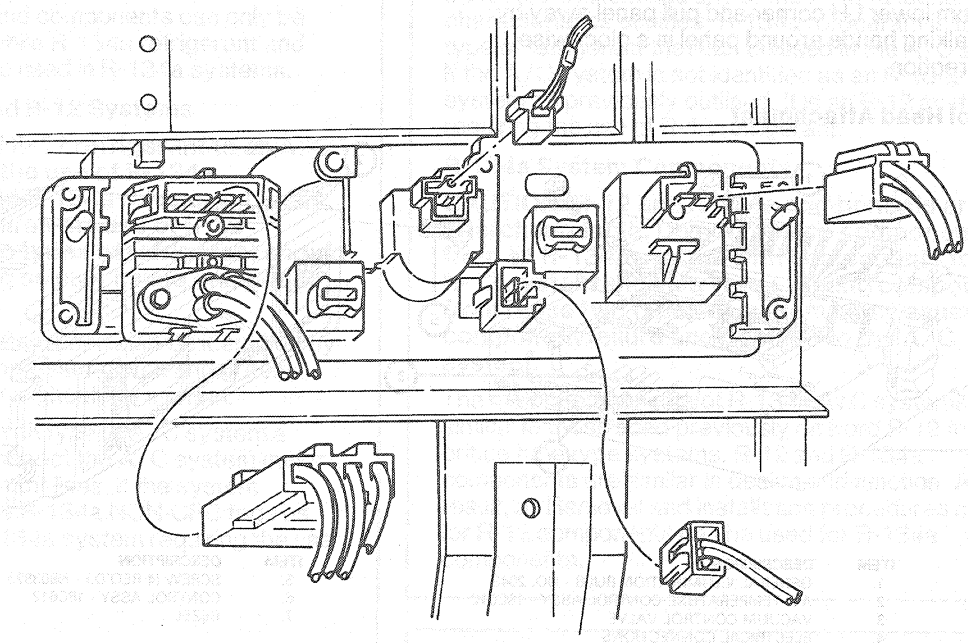
1. Disconnect battery ground cable.

Control Assembly Removal

2. Remove the instrument panel finish applique.
3. Remove four screws attaching control assembly to instrument panel.



FRONT VIEW



REAR VIEW

CCL 3546-D

4. Remove four Torx® head screws retaining control head. Pull control head away from instrument panel into a position which provides access to rear connectors.
5. Disconnect two harness connectors from control assembly by depressing latches at top of connectors and pulling.

Installation

CAUTION: Push on the vacuum harness retaining nuts. Do not attempt to screw them onto the post.

1. Connect wire connectors and vacuum harness to control assembly using new pushnuts.
2. Position control assembly to instrument panel opening and install four retaining screws.

REMOVAL AND INSTALLATION (Continued)

3. Install the instrument panel finish applique.
4. Connect battery ground cable.
5. Check system for proper operation.

Sunload Sensor Assembly

Removal

1. Disconnect battery ground cable.
2. Remove RH upper, outer finish panel assembly and remove sunload sensor assembly from two mounting studs.
3. Disconnect electrical connector from sunload sensor.

Installation

1. Connect electrical connector to sunload sensor.
2. Install sunload sensor assembly to LH speaker grille by pushing sunload sensor firmly over two mounting studs.
3. Install LH radio speaker grille assembly.
4. Connect battery ground cable.

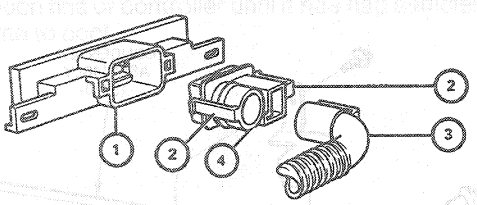
In-Vehicle Sensor Assembly

Refer to Section 01-12 for instrument panel removal and installation procedures.

Removal

1. Disconnect battery ground cable.
2. Disengage glove compartment door tabs and allow door to hang by hinge.
3. Remove sensor assembly from back bracket, attached to instrument panel.
4. Disconnect electrical connector from in-vehicle sensor.
5. Disconnect aspirator hose from in-vehicle sensor by carefully disengaging elbow latch.

In-Vehicle Temperature Sensor Installation



ITEM DESCRIPTION
1. BRACKET - 19D668
2. DEPRESS ELBOW LATCH TO REMOVE
3. ASPIRATOR HOSE - 19D888
4. SENSOR - 19C734

CCL 3126-C

Installation

1. Connect electrical connector to in-vehicle sensor.
2. Connect aspirator hose to in-vehicle sensor. Ensure elbow latch engages locking ramp on sensor.
3. Position in-vehicle sensor assembly into bracket of instrument panel.
4. Replace glove compartment assembly.
5. Connect battery ground cable.
6. Check system for proper operation.

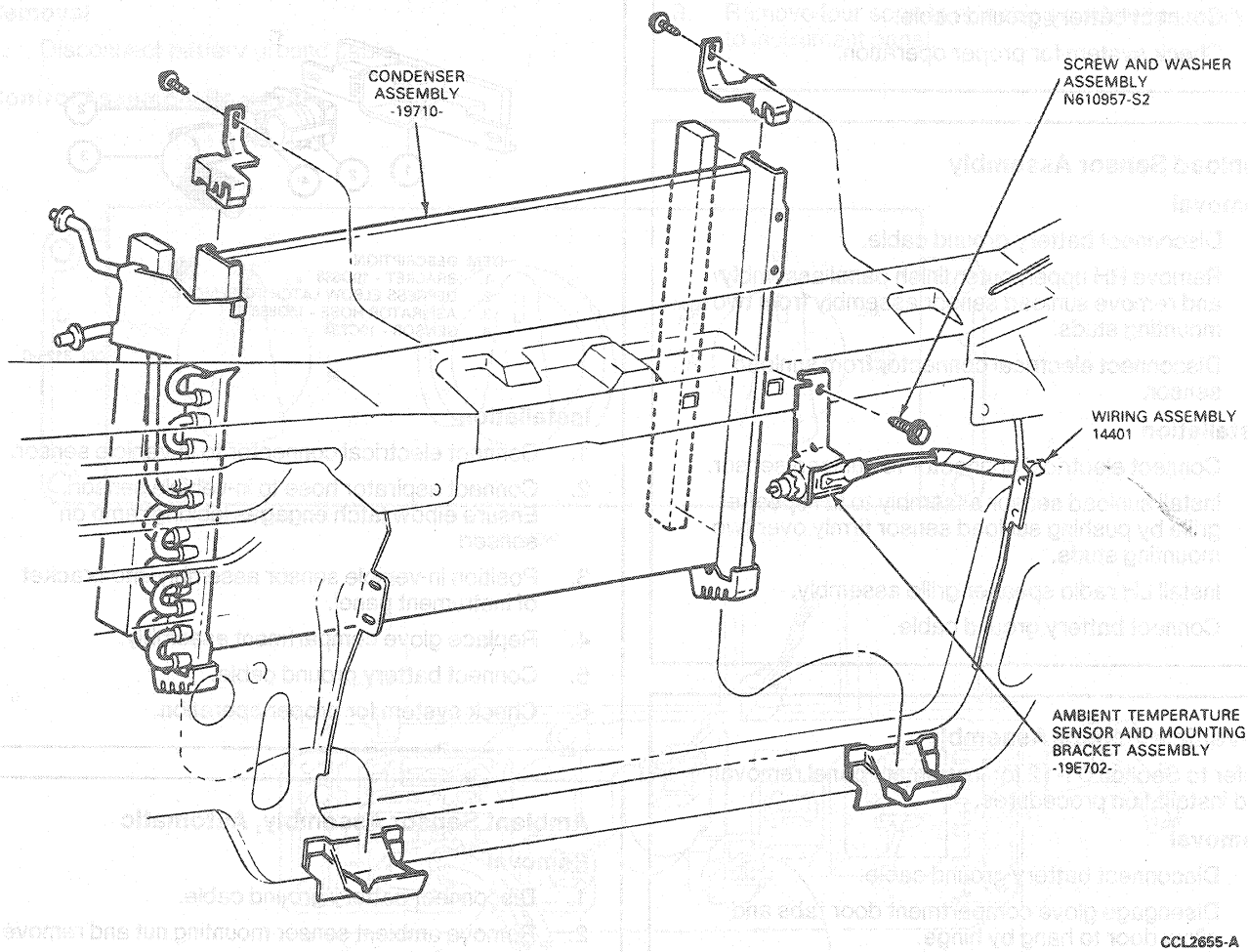
Ambient Sensor Assembly, Automatic

Removal

1. Disconnect battery ground cable.
2. Remove ambient sensor mounting nut and remove sensor.
3. Disconnect electrical connector from ambient sensor.

REMOVAL AND INSTALLATION (Continued)

Ambient Sensor Assembly



Installation

1. Connect electrical connector to ambient sensor.
2. Position ambient sensor and install retaining nut. Tighten to 6.2-7.3 N·m (55-64 lb-in).
3. Connect battery ground cable.
4. Check system for proper operation.

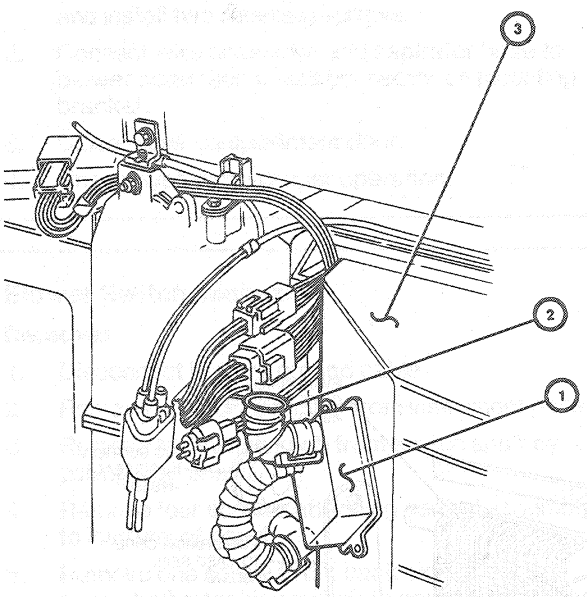
Blower Motor Speed Controller, EATC

Removal

1. Disengage glove compartment door tabs and allow door to hang by hinge.
2. Working through glove compartment opening, disconnect electrical snap-lock connector and aspirator hose at blower motor controller. Also, disconnect snap-lock connector from its mounting bracket.

REMOVAL AND INSTALLATION (Continued)

Blower Motor Speed Controller



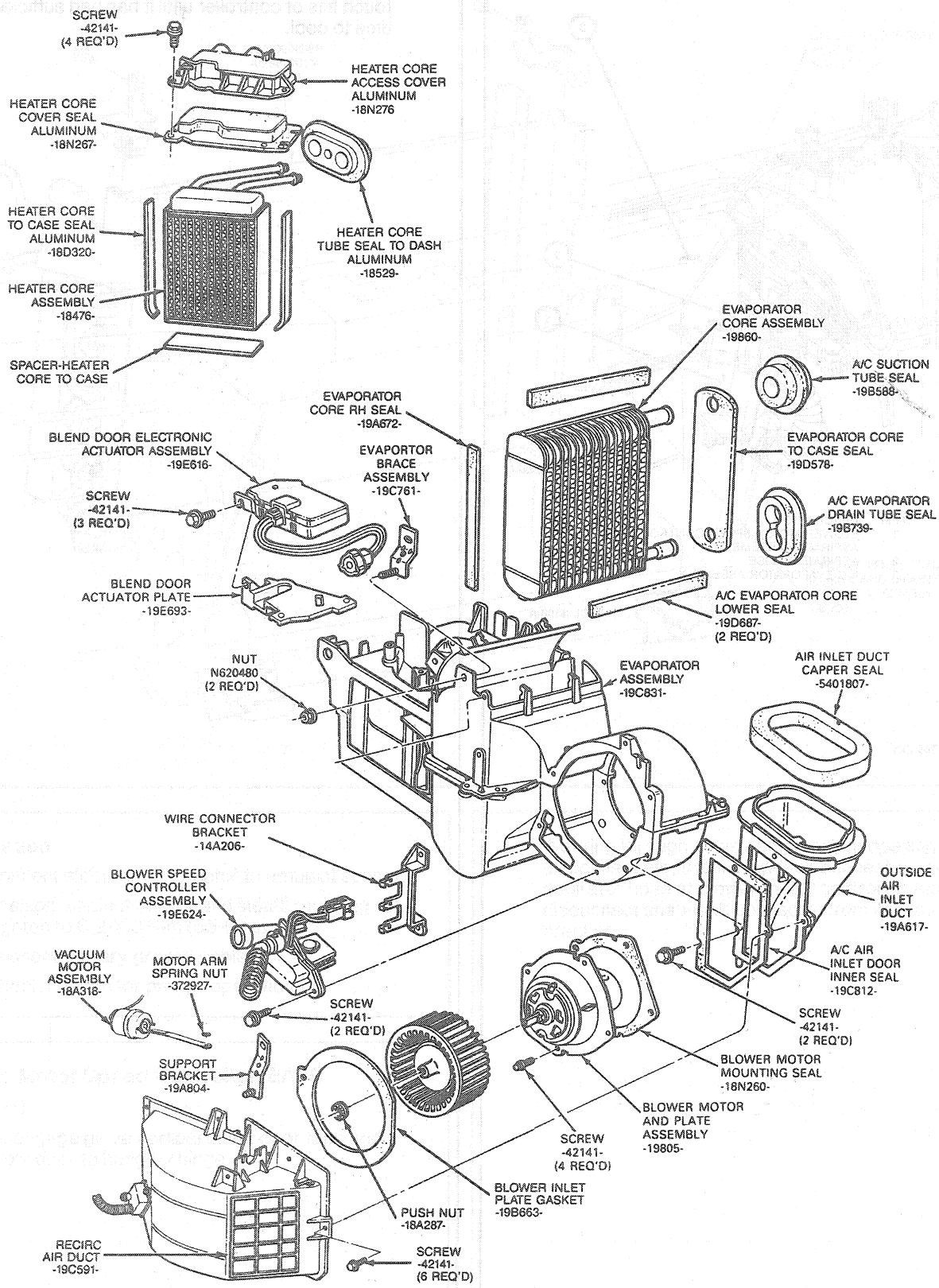
ITEM	DESCRIPTION
1	BLOWER MOTOR SPEED CONTROLLER AND ASPIRATOR ASSEMBLY
2	ASPIRATOR HOSE
3	A/C EVAPORATOR ASSEMBLY

CCL 3556-A

3. Remove two screws retaining blower controller to evaporator case and remove controller. Do not touch fins of controller until it has had sufficient time to cool.

REMOVAL AND INSTALLATION (Continued)

EATC Evaporator Assembly—Disassembled View



REMOVAL AND INSTALLATION (Continued)

Installation

1. Position blower controller on evaporator case and install two retaining screws.
2. Connect wire connector and aspirator hose to blower controller. Install connector on mounting bracket.
3. Close glove compartment door.
4. Check system for proper operation.

Blower Switch, Manual

Removal

1. Disconnect battery ground cable.
2. Remove control assembly from instrument panel.
3. Remove fan switch knob from switch shaft by pulling it off shaft.
4. Remove four screws attaching control assembly to instrument panel.
5. Remove one screw (from back side of control assembly) attaching switch to control assembly.
6. Disconnect wire connector from switch, rotate from locked position and remove switch.

Installation

1. Position switch in control assembly and rotate to lock into place.
2. Install screw attaching switch to control assembly.
3. Connect wire harness connector to switch.
4. Position control assembly in instrument panel opening. Install four retaining screws.
5. Place switch knob on switch shaft, push it all the way on.
6. Connect battery ground cable.
7. Check system for proper operation.

Vacuum Selector Switch, Manual

Removal

1. Remove control assembly.
2. Pull function selector knob off of shaft.
3. Remove one screw attaching vacuum switch to control assembly. Remove vacuum selector switch (refer to Control Assembly removal illustration).

Installation

1. Position vacuum selector switch on control assembly bracket.
2. Install one screw attaching vacuum switch to control assembly.
3. Install function selector knob by pushing it on shaft.
4. Install control assembly.

Instrument Panel

Refer to Section 01-12.

Louver Assemblies, Manual

Removal and Installation

1. Rotate louver assembly until it is in true horizontal position (not flush with applique).
2. Pull louver assembly out of the housing.
3. To install louver assembly, position it in the true horizontal positions and snap it into the housing.

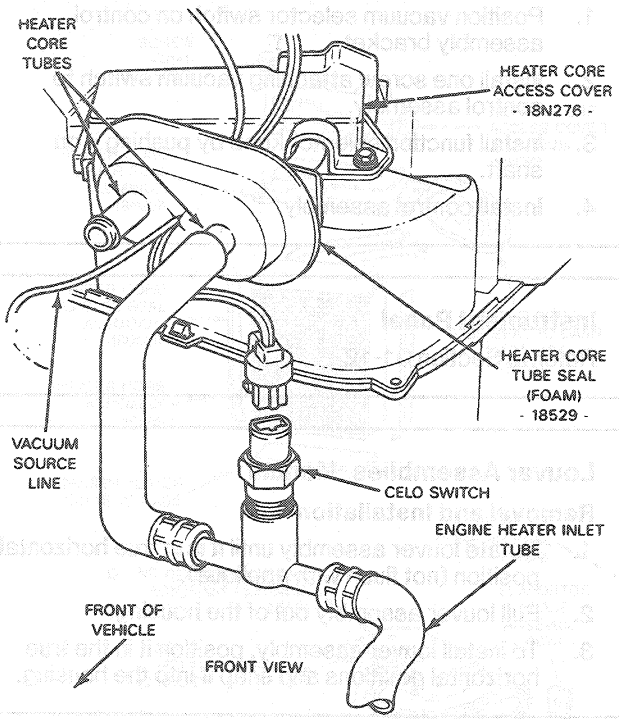
Cold Engine Lock Out Switch (CELO)

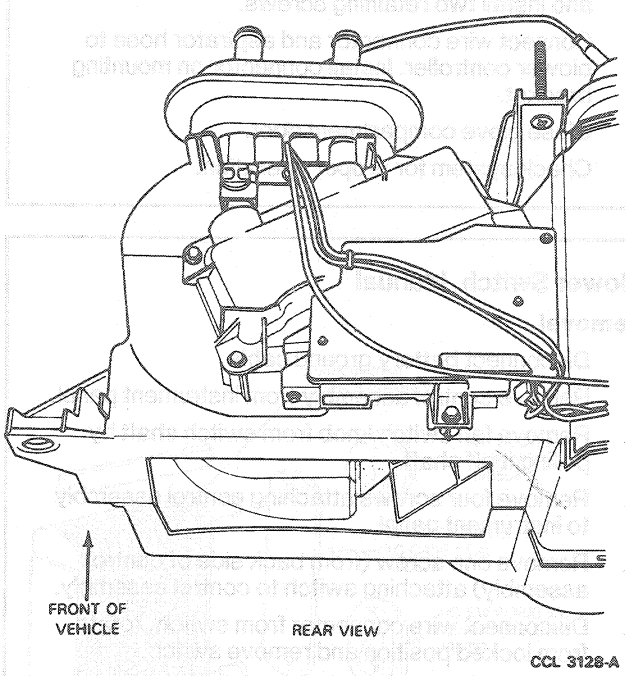
Replacement

1. The cold engine lock out (CELO) switch screws into a fitting in the heater core inlet tube in the engine compartment.
2. To replace the switch, disconnect the two wire connectors from the receptacle in the switch.
3. Partially drain the coolant from the radiator.
4. Unscrew the switch body from the fitting in the heater inlet tube.
5. Apply Pipe Sealant with Teflon® D8AZ-19554-A (ESG-M4G194-A) to the threads in the replacement switch and install it in the fitting. Tighten the switch to 19 N·m (14 lb-ft).
6. Attach the electrical connector to the top of the switch.
7. Refill the radiator with specified coolant.

REMOVAL AND INSTALLATION (Continued)

Cold Engine Lock Out Switch Replacement





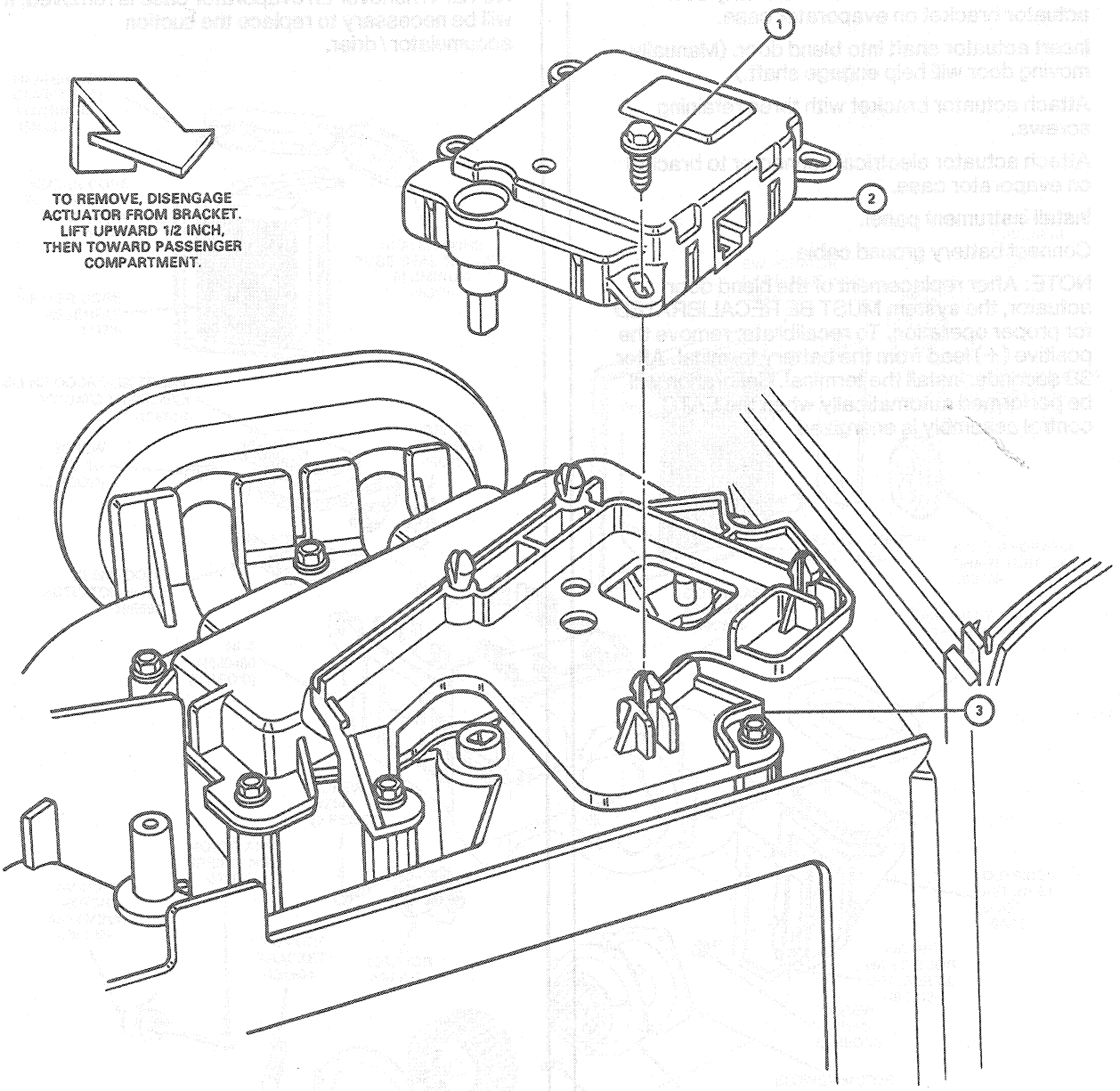
Blend Door Actuator

Removal

1. Disconnect battery ground cable.
2. Loosen instrument panel and pull back from cowl.
   NOTE: Refer to Section 01-12 for instrument panel removal and installation procedure.
3. Remove blend door actuator electrical connector from bracket on evaporator case.

REMOVAL AND INSTALLATION (Continued)

Electric Blend Door Actuator Attachment



ITEM	DESCRIPTION
1.	SCREW - 42141 (2 REQ'D.)
2.	BLEND DOOR ACTUATOR MOTOR ASSEMBLY - 19E616
3.	BLEND DOOR ACTUATOR MOTOR MOUNTING PLATE - 19E693

CCL 2658-E

4. Remove three actuator retaining screws.

5. Lift actuator vertically approximately 12mm (1/2 inch) to disengage it from bracket and blend door shaft, then pull actuator back toward passenger compartment.

   NOTE: The mounting bracket remains in place on the evaporator case.

REMOVAL AND INSTALLATION (Continued)

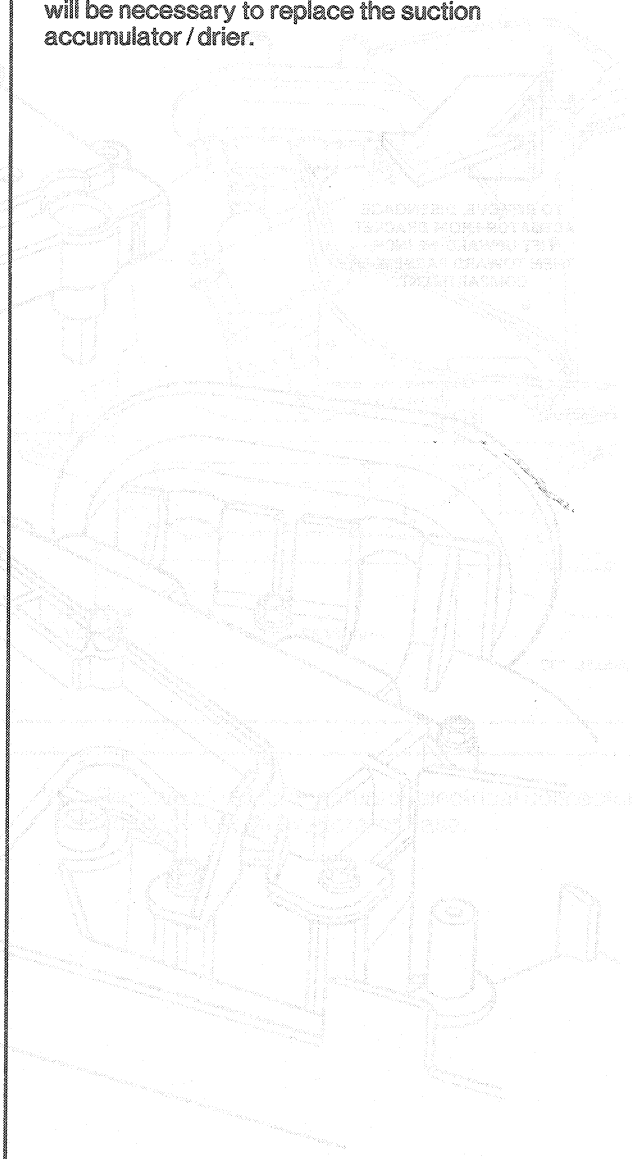
Installation

1. Insert blend door actuator horizontally over actuator bracket on evaporator case.
2. Insert actuator shaft into blend door. (Manually moving door will help engage shaft.)
3. Attach actuator bracket with three retaining screws.
4. Attach actuator electrical connector to bracket on evaporator case.
5. Install instrument panel.
6. Connect battery ground cable.

NOTE: After replacement of the blend door actuator, the system MUST BE RECALIBRATED for proper operation. To recalibrate, remove the positive (+) lead from the battery terminal. After 30 seconds, install the terminal. Calibration will be performed automatically when the EATC control assembly is energized.

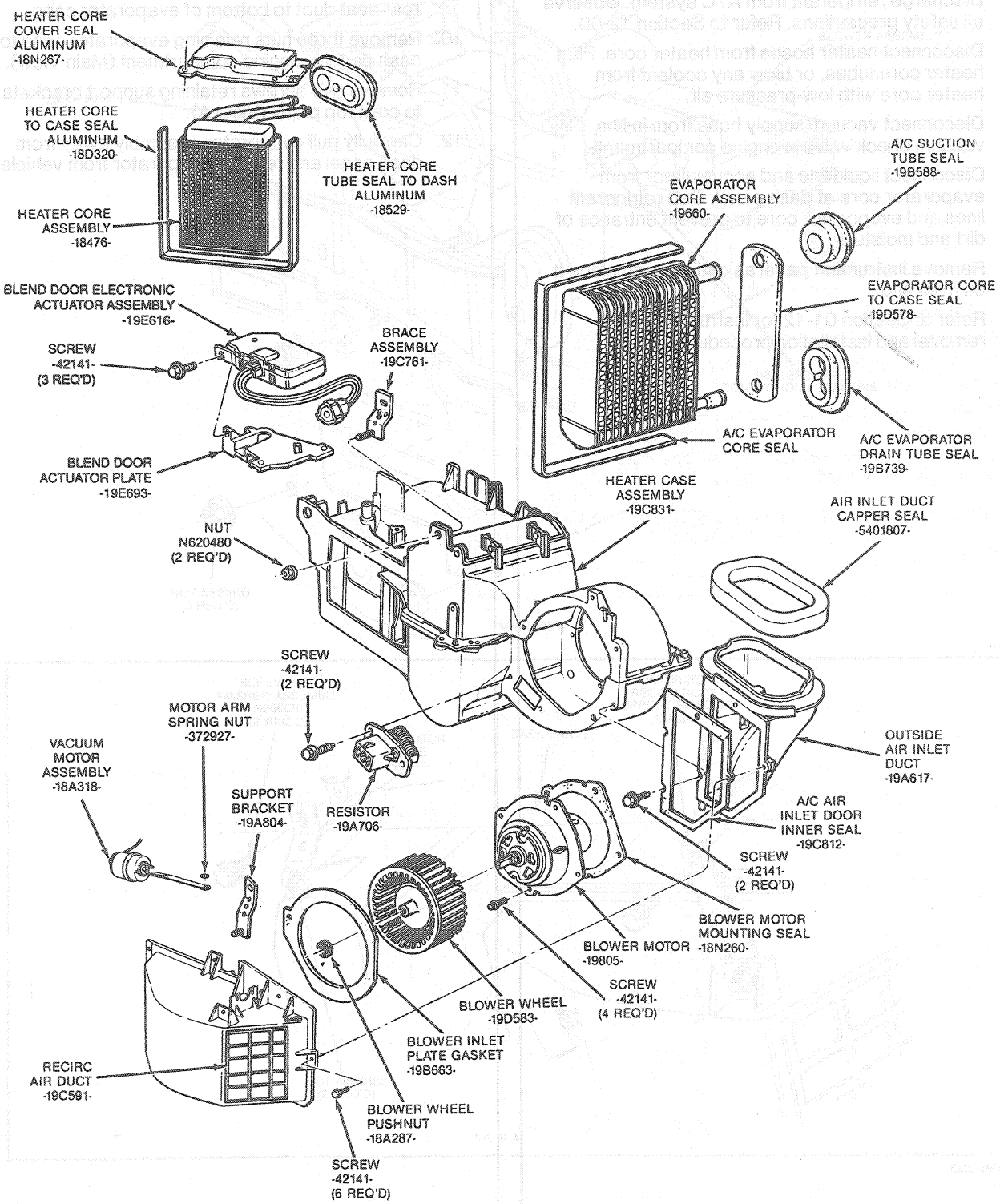
Evaporator Case Assembly

NOTE: Whenever an evaporator case is removed, it will be necessary to replace the suction accumulator / drier.



REMOVAL AND INSTALLATION (Continued)

Heater and Evaporator Installation, Manual

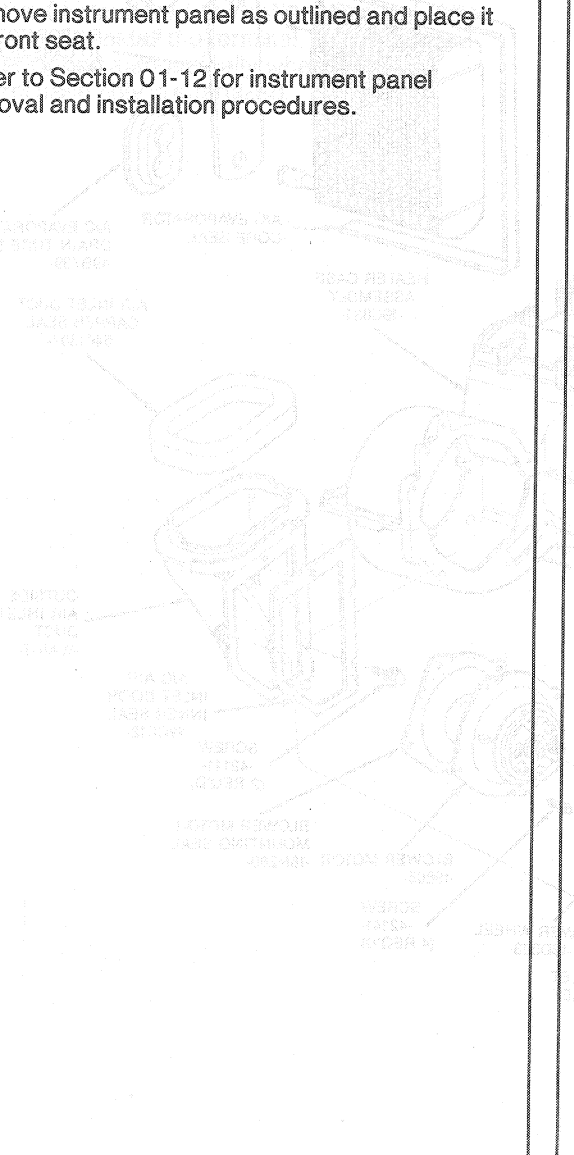


REMOVAL AND INSTALLATION (Continued)

Removal

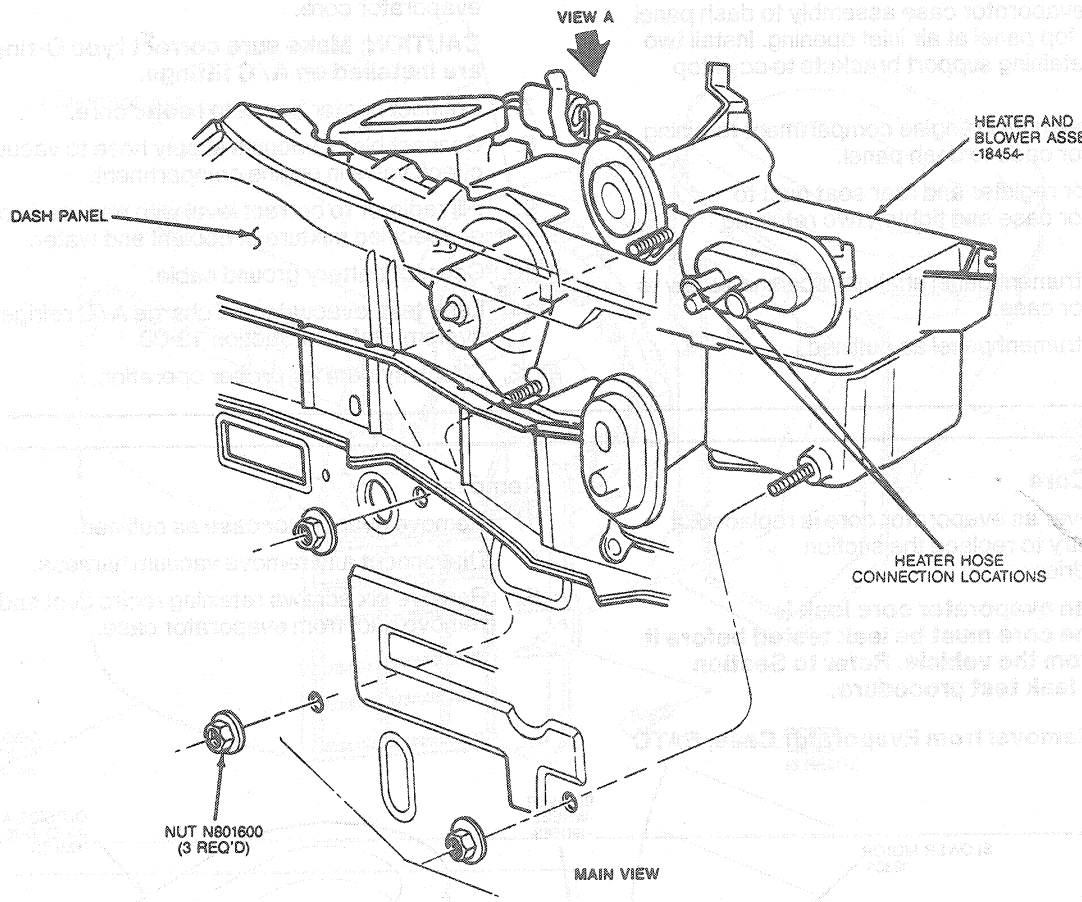
1. Disconnect battery ground cable.
2. Drain coolant from radiator into a clean container.
3. Discharge refrigerant from A/C system. Observe all safety precautions. Refer to Section 12-00.
4. Disconnect heater hoses from heater core. Plug heater core tubes, or blow any coolant from heater core with low-pressure air.
5. Disconnect vacuum supply hose from in-line vacuum check valve in engine compartment.
6. Disconnect liquid line and accumulator from evaporator core at dash panel. Cap refrigerant lines and evaporator core to prevent entrance of dirt and moisture.
7. Remove instrument panel as outlined and place it on front seat.

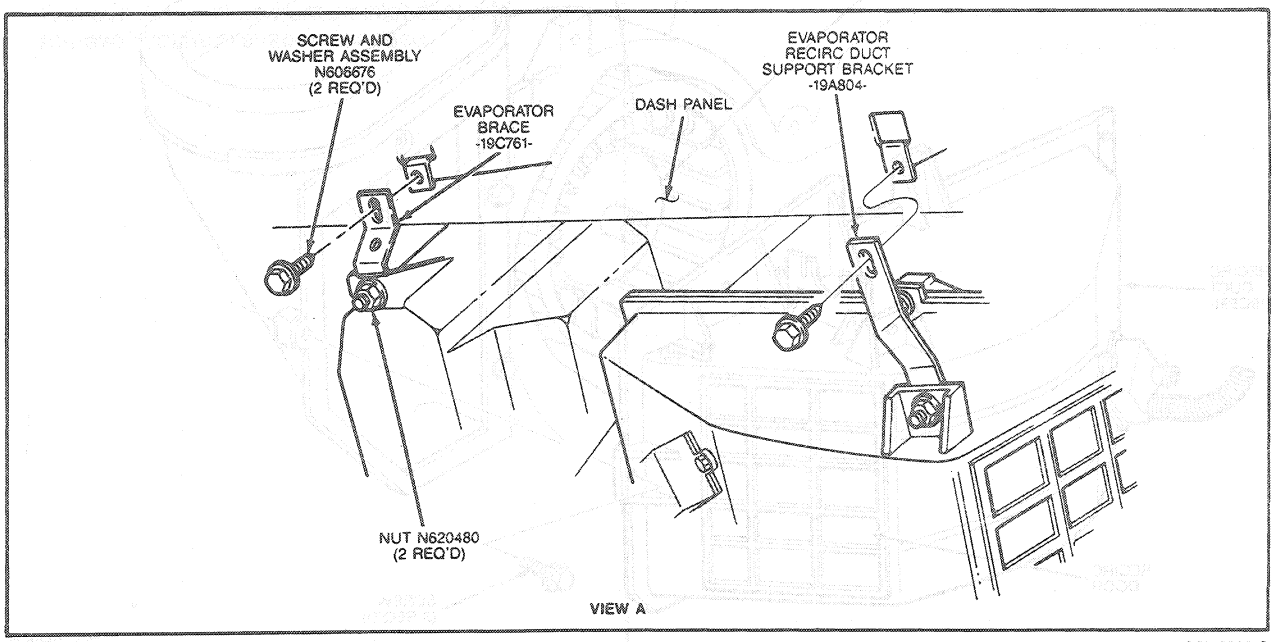
   Refer to Section 01-12 for instrument panel removal and installation procedures.
8. Remove screw holding instrument panel shake brace to evaporator case and remove instrument panel shake brace.
9. Remove two screws retaining floor register and rear seat duct to bottom of evaporator case.
10. Remove three nuts retaining evaporator case to dash panel in engine compartment (Main View).
11. Remove two screws retaining support brackets to cowl top panel (View A).
12. Carefully pull evaporator assembly away from dash panel and remove evaporator from vehicle.



REMOVAL AND INSTALLATION (Continued)

Heater and A/C Evaporator Installation





CCL 2596-C

REMOVAL AND INSTALLATION (Continued)

Installation

1. Position evaporator case assembly to dash panel and cowl top panel at air inlet opening. Install two screws retaining support brackets to cowl top panel.
2. Install three nuts in engine compartment retaining evaporator case to dash panel.
3. Install floor register and rear seat duct to evaporator case and tighten two retaining screws.
4. Install instrument panel shake brace and screw to evaporator case.
5. Install instrument panel as outlined.
6. Connect liquid line and suction accumulator to evaporator core.

   CAUTION: Make sure correct type O-rings are installed on A/C fittings.
7. Connect heater hoses to heater core.
8. Connect black vacuum supply hose to vacuum check valve in engine compartment.
9. Fill radiator to correct level with removed coolant or specified mixture of coolant and water.
10. Connect battery ground cable.
11. Leak test, evacuate and charge A/C refrigerant system. Refer to Section 12-00.
12. Check system for proper operation.

Evaporator Core

NOTE: Whenever an evaporator core is replaced, it will be necessary to replace the suction accumulator/drier.

CAUTION: If an evaporator core leak is suspected, the core must be leak tested before it is removed from the vehicle. Refer to Section 12-00 for the leak test procedure.

Removal

1. Remove evaporator case as outlined.
2. Disconnect and remove vacuum harness.
3. Remove six screws retaining recirc duct and remove duct from evaporator case.

Recirc Duct Removal from Evaporator Case, EATC