1968 AUTOMATIC CLIMATE CONTROL

OPERATION, CONTROLS and TESTING

Ford

SERVICE TRAINING

COURSE 19005

DESCRIPTION

The Automatic Climate 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 select a control position, and the system will deliver heated or cooled air, 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 the interior climate of the vehicle is maintained in both summer and winter. In hot weather, it will cool the car to the pre-set comfort level and then modulate cooling to whatever degree is required to maintain the desired temperature.

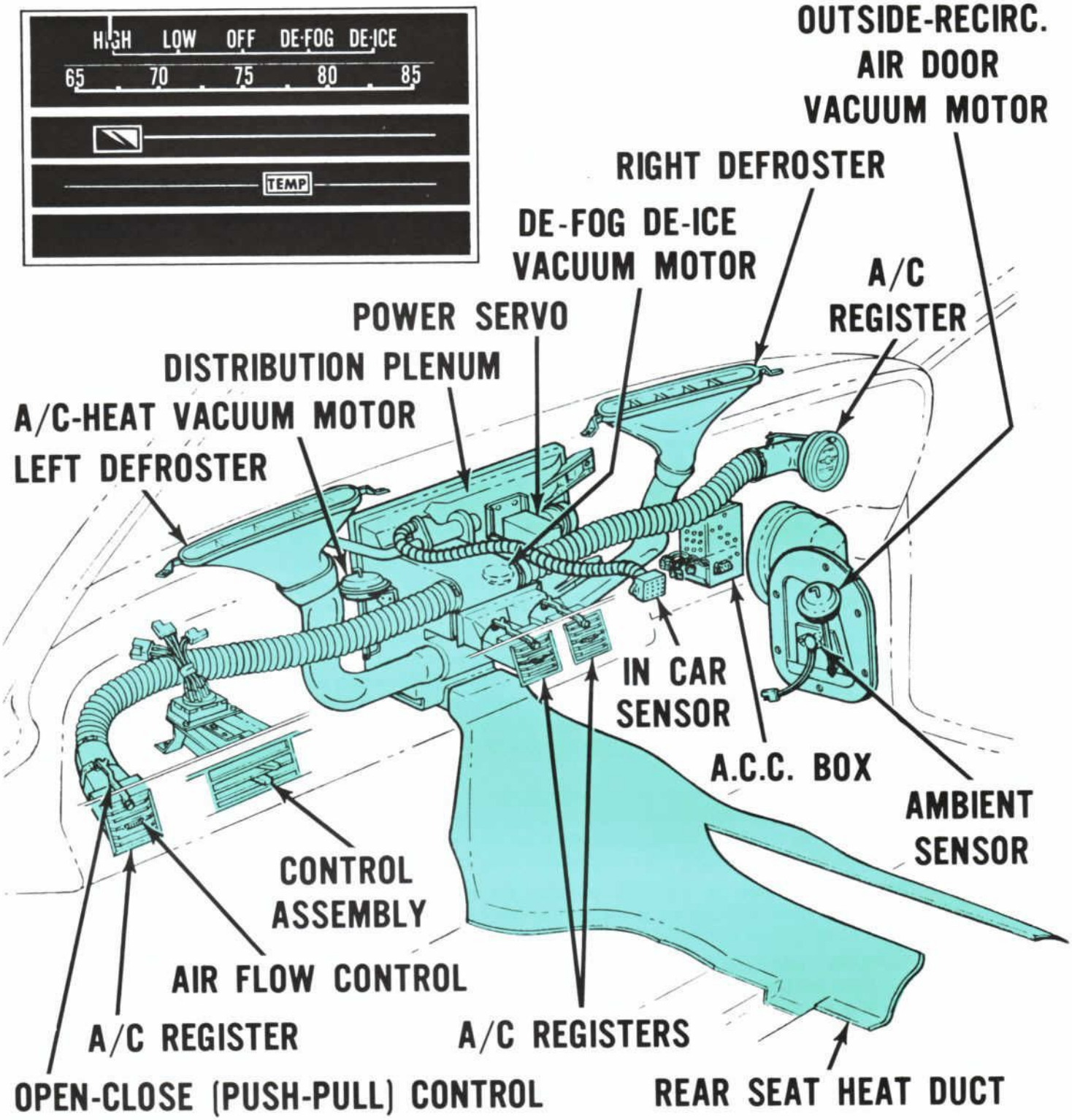
In mild weather, the interior of the vehicle remains comfortable without resetting the climate controls. In cold weather, provision is made to delay the operation of the system until engine coolant has warmed enough to minimize the duration of a cold air blast from the heater outlets. The system will then heat the car to the desired temperature, then 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 airflow 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, and is mixed in the distribution plenum. From here it is diverted to the heater outlets, the defroster nozzles, or the air conditioner 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 at minimum heat only. Air for defog operation is split between floor outlets and defroster nozzles and is automatically controlled to maintain a control setting. When cooler air is required to maintain the desired air temperature level, the air is distributed through the four adjustable registers on the instrument panel.

The Automatic Climate Control includes a functional control slide lever for HIGH, LOW, OFF, DE-FOG and DE-ICE that determines the manner in which the system will operate, and a temperature control slide lever. The controls are located to the left of the steering column. The desired temperature is selected by sliding the temperature lever to any position on the dial, which has a range between 65 and 85 degrees.



AUTOMATIC CLIMATE CONTROL ASSEMBLY

Ford SERVICE TRAINING

19005-1

CONTROL OPERATION

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, particularly when traveling in humid weather, limiting window fogging and interior condensation.

The Automatic Climate Control utilizes both electrical and vacuum controls. The controls on the instrument panel provide electrical signals to an Automatic Climate Control (A.C.C.) box and power servo. The A.C.C. box and power servo 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.

Each position of the functional control lever is detented (slightly restricted) for positive engagement. With the lever in the "OFF" position, the blower motor is off, the outside air recirculate door is closed to the outside air and the system is inoperative. With the lever in the "LOW" position, the system selects fresh air for heating, or cooling, and adjusts airflow with any one of five blower speeds. If the interior temperature is below the dial setting, warmed air is delivered through the heater outlets. Provision is made to delay the operation of the system until the engine coolant has warmed enough to minimize the duration of a cold air blast from the heater outlets.

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 sytem goes into operation, regardless of engine coolant temperature. This is done to provide a rapid cool-down rate.

System operation with the slide lever in "HIGH" position 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 slide lever in "DE-FOG" position, the system operation is the same as in "HIGH" except that the airflow is split. An airflow of 40 percent is discharged from the defroster nozzles, and 60 percent is discharged from the floor outlets, rather than the air conditioning registers. There is no water warm-up and blower delay in "DE-FOG." The temperature is controlled automatically.

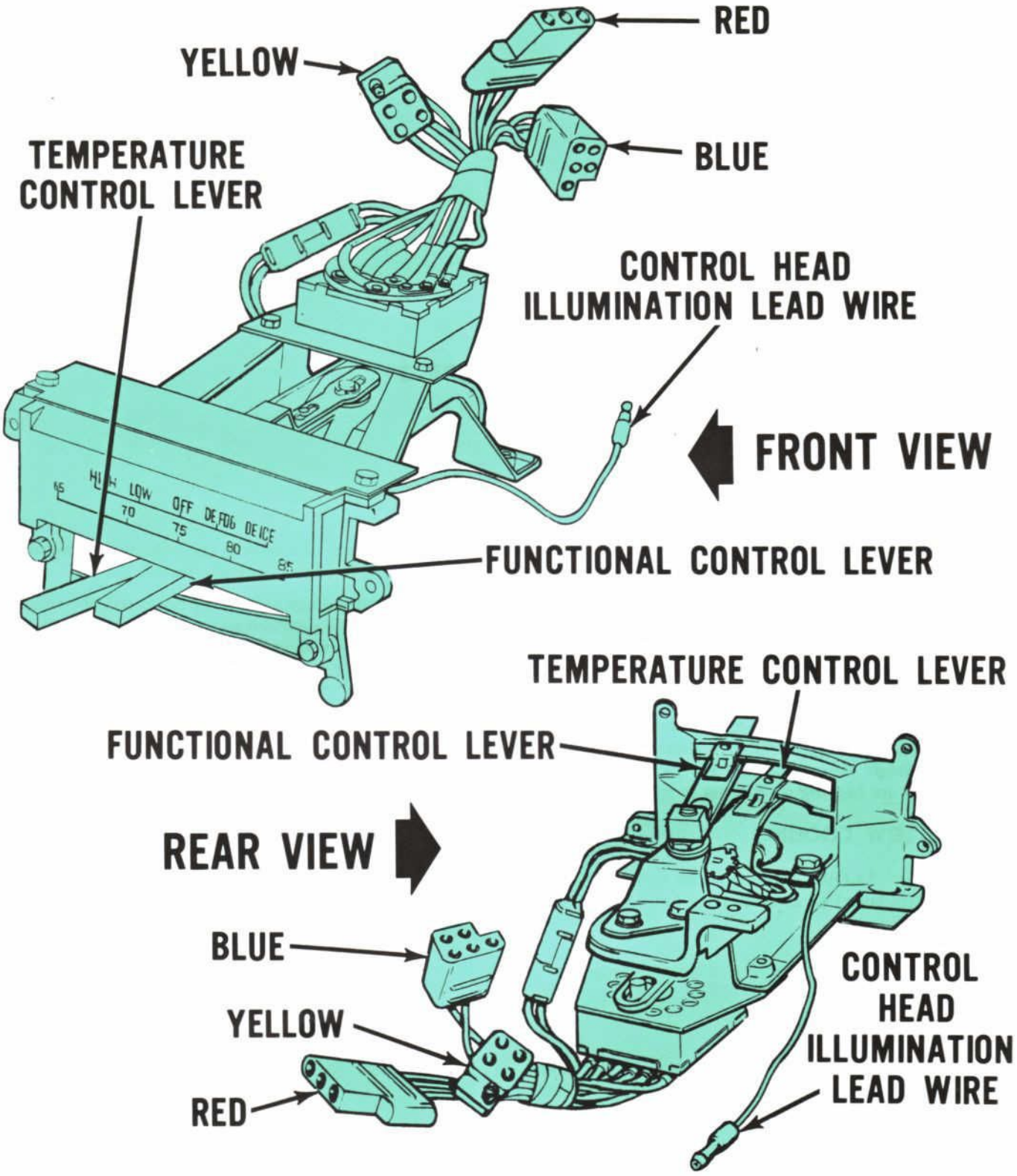
With the slide lever in "DE-ICE" position, the system selects the maximum heat available at the highest blower speed and the air is discharged from the defroster nozzles. In "DE-ICE," approximately 10 percent of the airflow is directed to the heat ducts.

In "LOW" and "HIGH," with heater-type operation, approximately 10 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 air conditioning-type (cooling) operation.

In "DE-FOG," both the temperature (heat) and blower speed are generally at maximum initially. 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 "DE-ICE," 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 slide the lever to the "HIGH" or to the "LOW" position. There is no blower delay in "DE-ICE" due to engine coolant temperature.

The register at each A/C outlet is adjustable for airflow direction by a wheel located in the center of the outlet. Individual outlets may also be shut off or airflow reduced by use of push-pull shut off dampers.



AUTOMATIC CLIMATE CONTROL— INSTRUMENT PANEL CONTROL

19005-2

SERVICE TRAINING

SYSTEM AIRFLOW

HIGH COOLING

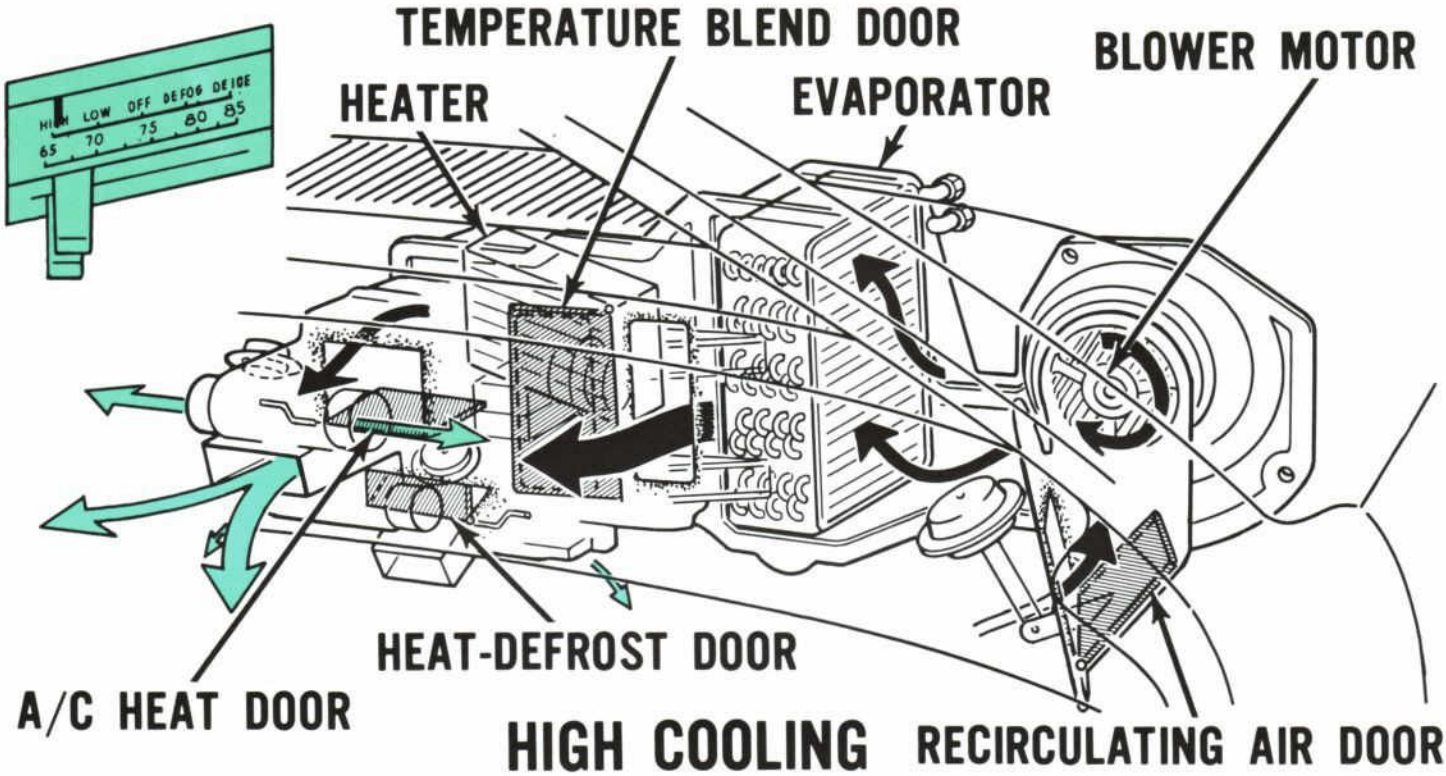
As the car interior temperature approaches the temperature dial setting, the outside-recirculate air door is actuated, closing off the recirculating air and admitting outside air as illustrated.

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 air conditioner ducts and registers.

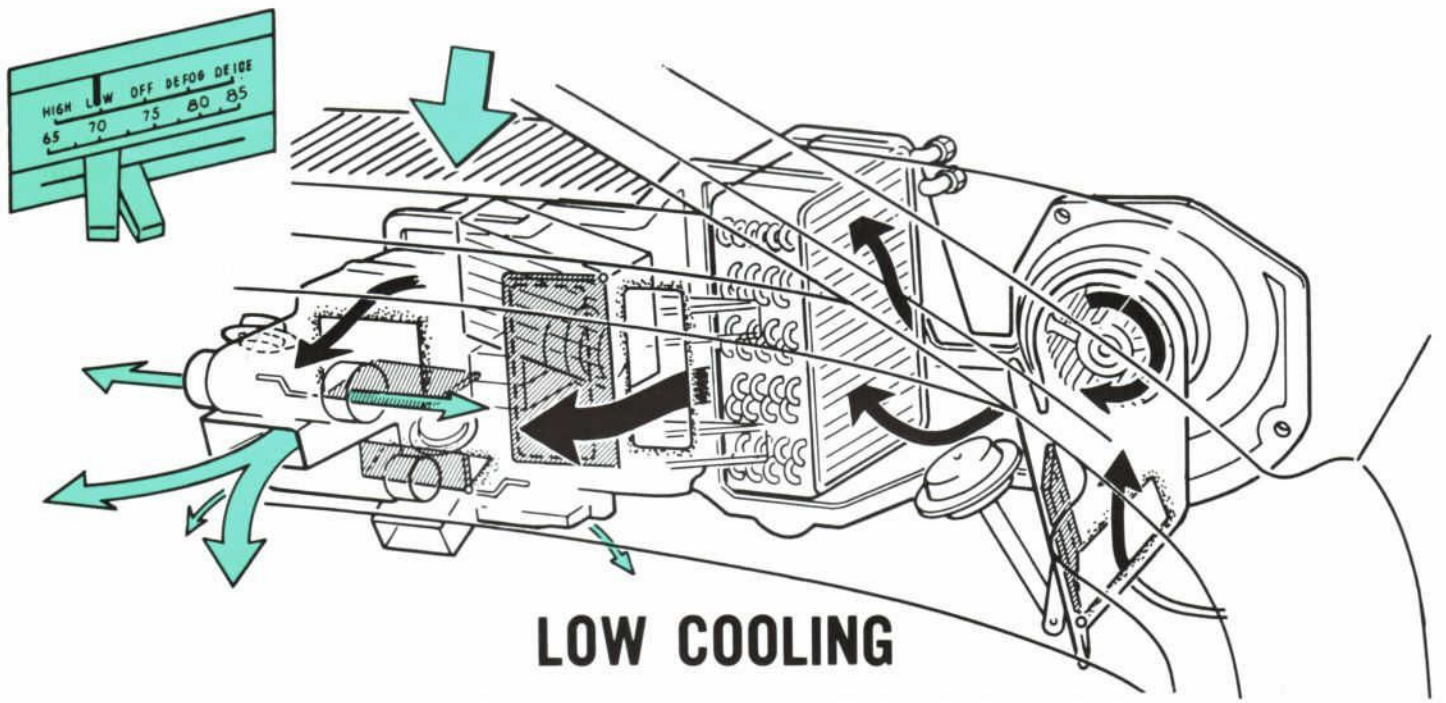
The position of the temperature blend door changes automatically to maintain the temperature selected on the dial; at the same time, blower speeds are reduced. If the in-car temperature rises above the dial setting, the blend door moves to admit more cool air and less warm air. If the in-car temperature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

LOW COOLING

"LOW" cooling is the same as "HIGH" maximum cooling except for lower blower speeds, and fresh (outside) air is used at all times in "LOW."



HIGH COOLING



LOW COOLING

AUTOMATIC CLIMATE CONTROL

AIR FLOW—HIGH COOLING AND LOW COOLING

Ford SERVICE TRAINING

19005-3

SYSTEM AIRFLOW – Continued

OFF POSITION

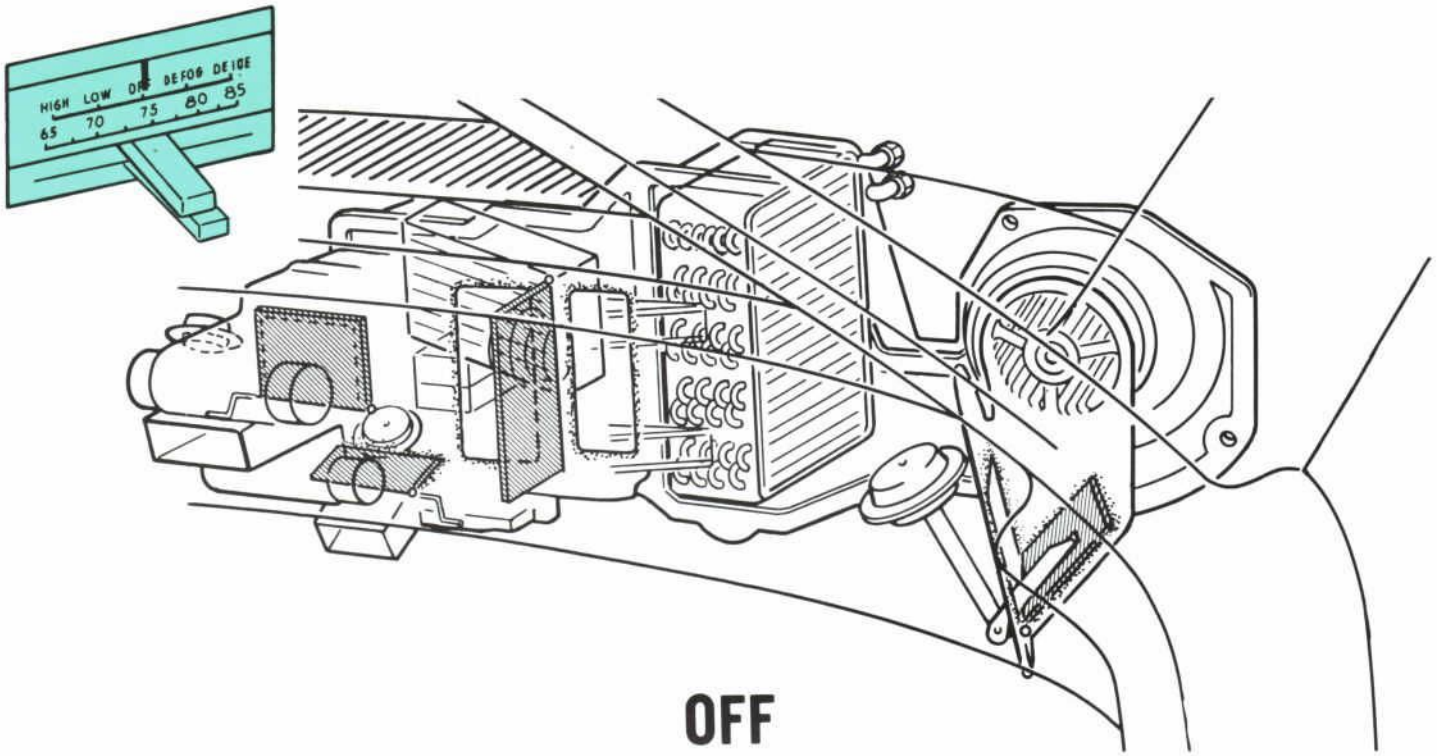
In "OFF," the outside-recirculate air door is closed to outside air and the temperature blend door remains in the last operational position; the A/C-heat door is in heat position; the heat-defrost door is in defrost position; the heater water valve is shut off. The blower is also turned off.

LOW OR HIGH HEATING

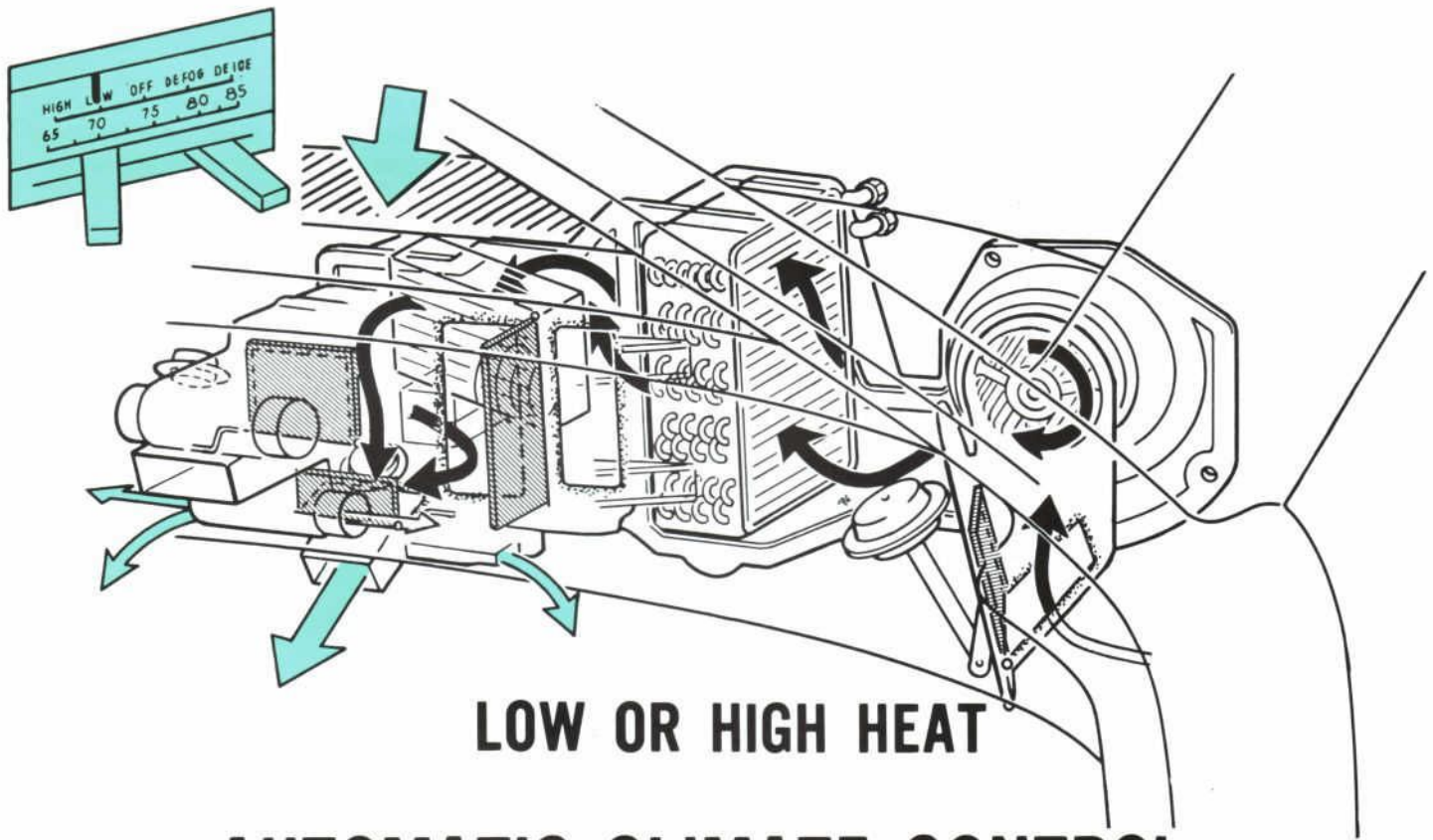
When the interior car temperature and the dial setting temperature are nearly balanced, the temperature blend door is actuated. As illustrated, the door has moved to a position so that only part of the air leaving the evaporator core is directed through the heater core where it is warmed. Blend air (the 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 10 percent of the "LOW" or "HIGH" heating airflow is diverted (routed) to the defroster nozzles.



OFF



LOW OR HIGH HEAT

AUTOMATIC CLIMATE CONTROL — AIR FLOW

Ford
SERVICE TRAINING

19005-4

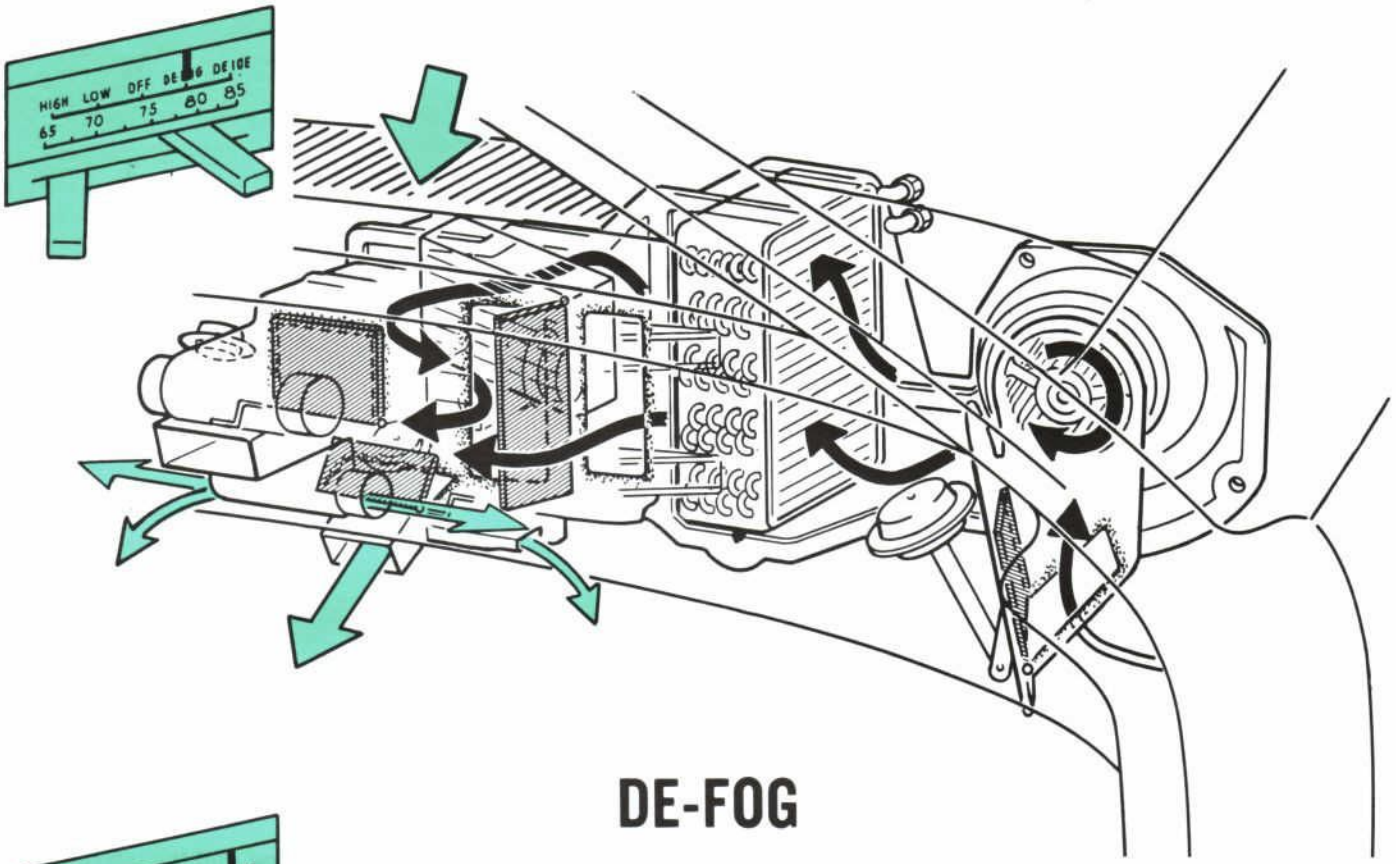
SYSTEM AIRFLOW — Continued

DE-FOG POSITION

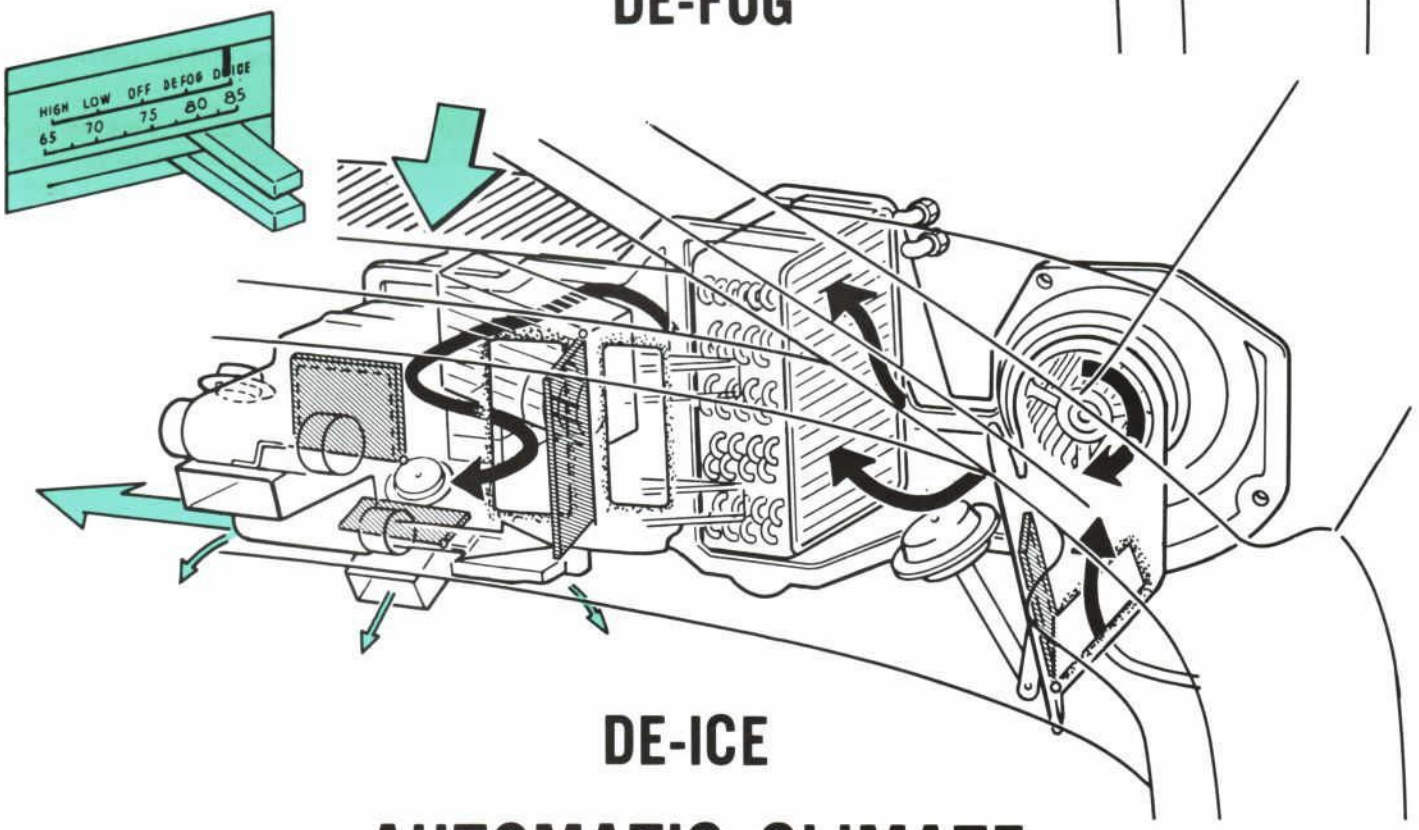
In "DE-FOG," operation is the same as in HIGH HEATING, except that the heat-defrost door is in mid-defrost position. Forty percent of the airflow is to the defroster nozzles, with the remainder directed to the heat ducts. There is no system operational delay in "DE-FOG" due to engine coolnt temperatures.

DE-ICE POSITION

When the functional control slide lever is in the "DE-ICE" position, 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. When the lever is positioned at "DE-ICE," the system operates on high blower only. Ten percent of this airflow is bled to the heater floor outlets.



DE-FOG



DE-ICE

AUTOMATIC CLIMATE CONTROL AIRFLOW

Ford
SERVICE TRAINING

19005-5

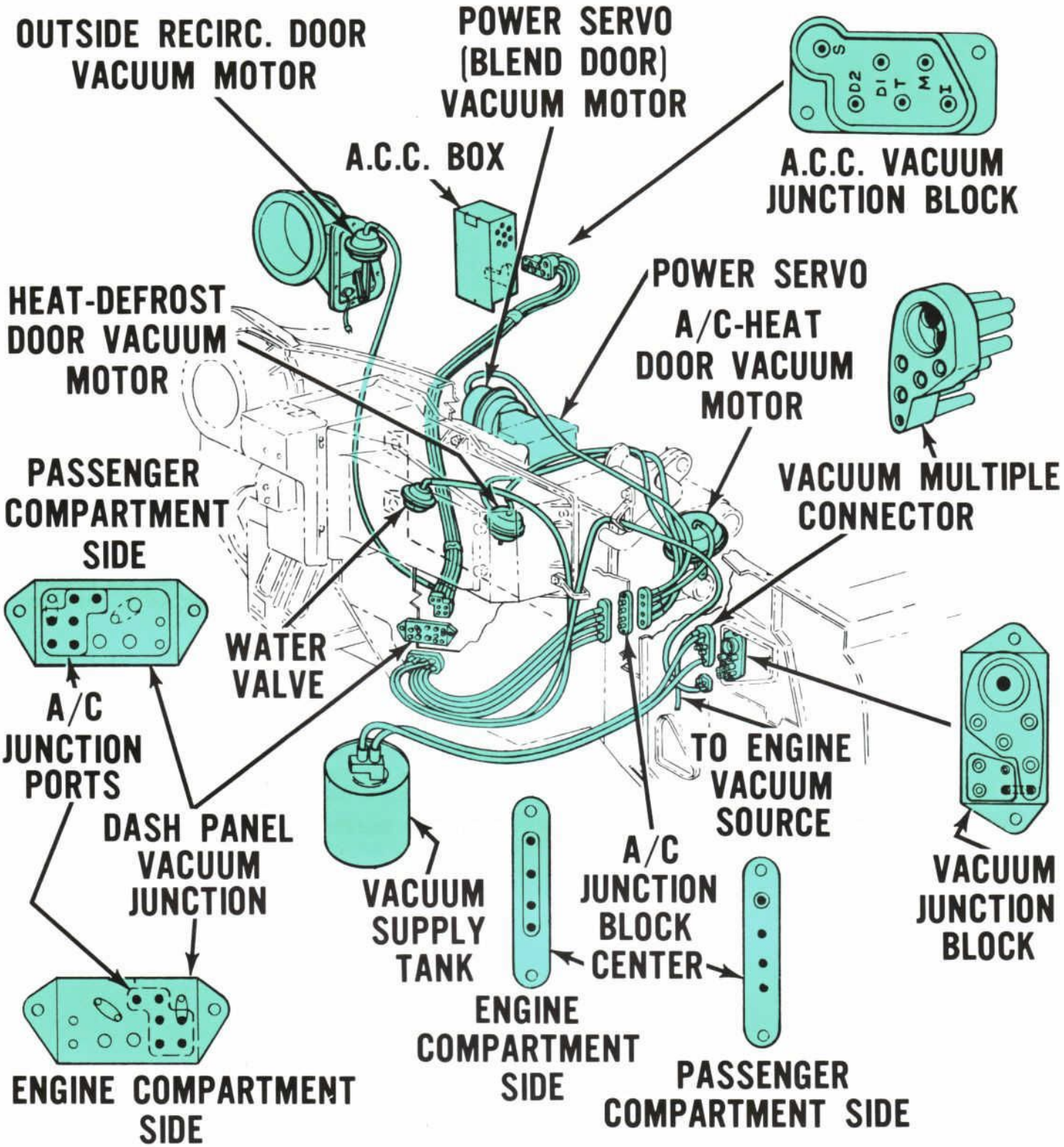
VACUUM CONTROL SYSTEM

DESCRIPTION

Pictorial views of the Automatic Climate Control (A.C.C.) vacuum hose routing and the interior of the A.C.C. box are shown in illustrations 19005-6 and 19005-7.

The vacuum control system (illustration 19005-6) consists of a vacuum reserve tank, check valve, water control valve, three vacuum motors, A.C.C. box (Automatic Climate Control), power servo, and the required vacuum tubing and junction blocks to connect the components. The vacuum reservoir and integral check valve is located on the front of the left fender apron.

All air control doors are vacuum operated. The controls on the instrument panel provide electrical signals to the A.C.C. box (illustration 19005-7). The A.C.C. box, in turn, supplies vacuum signals (application) through the applicable color coded vacuum hoses to the required vacuum motors and power servo which open and close the respective air doors.



AUTOMATIC CLIMATE CONTROL— VACUUM HOSE ROUTING

Ford SERVICE TRAINING

19005-6

VACUUM CONTROL SYSTEM – Continued

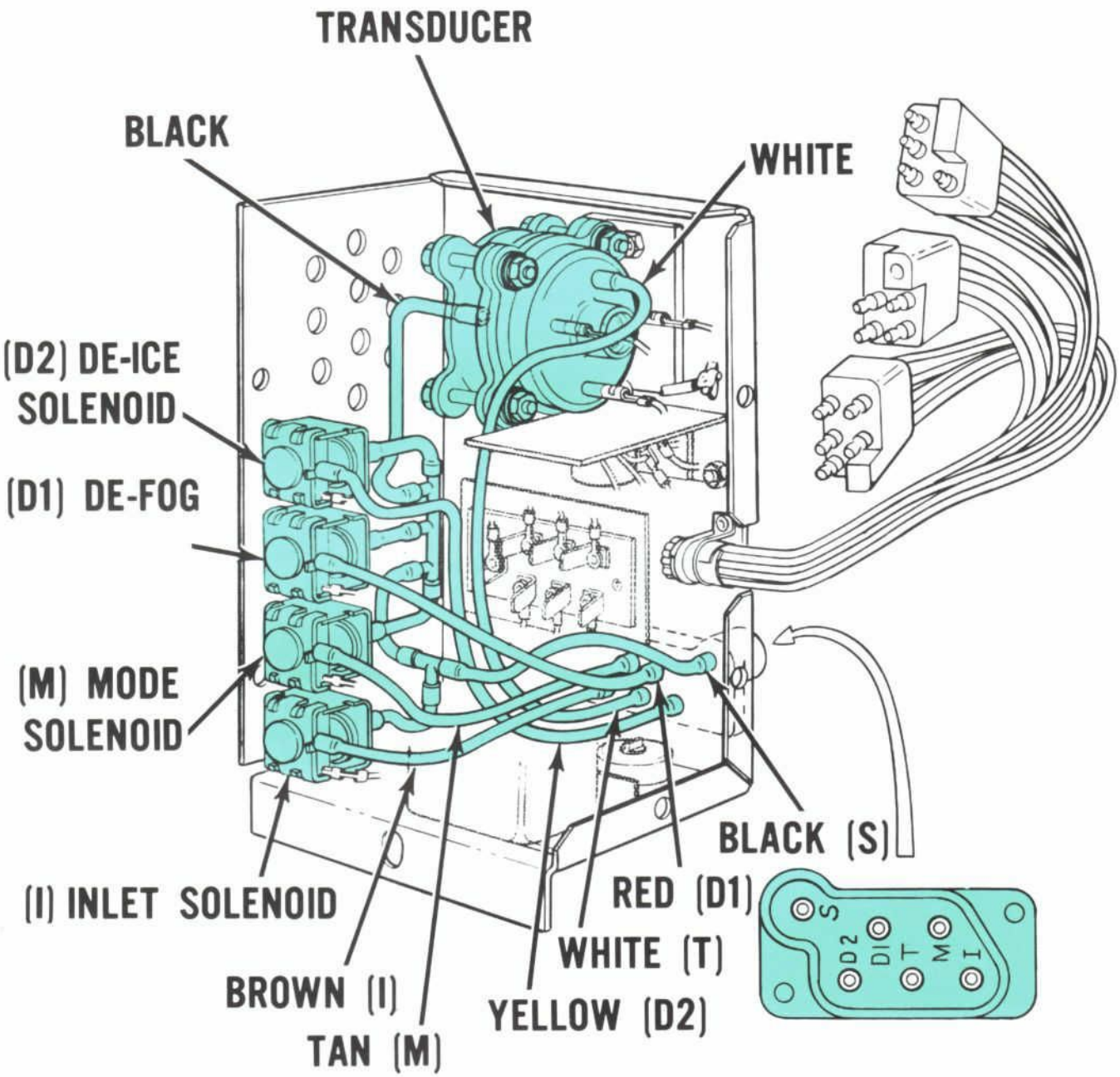
DESCRIPTION – Continued

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

When the system calls for maximum cooling, the blend door is closed at a minimum of 10" vacuum (Hg) and all air bypasses the heater core. The A/C-heat door is in the A/C position at a minimum of 10" vacuum (Hg) and all air is distributed through the air conditioning and ducts.

When the system calls for maximum heating, the blend door is fully open (0 vacuum Hg) and all air passes through the heater core. The A/C-heat door is in the heat position (0" vacuum Hg) and the heat-defrost door is in the heat position at a minimum of 10" vacuum (Hg) and air is distributed through heater floor outlets with approximately 10 percent going to the defrosters.

When the in-car temperature approaches the desired temperature setting, the A/C-heat door may change from A/C to heat position, or from heat to A/C if the temperature blend door reaches approximately mid-position. The A/C-heat door is positioned by signals from the power servo to direct air to the registers for air temperatures (blended air) of 80° - 90° and lower. Above 80° - 90°, the door directs the blended air to the heater floor outlets.



AUTOMATIC CLIMATE CONTROL— AUTOMATIC CLIMATE CONTROL (A.C.C.) BOX

Ford SERVICE TRAINING

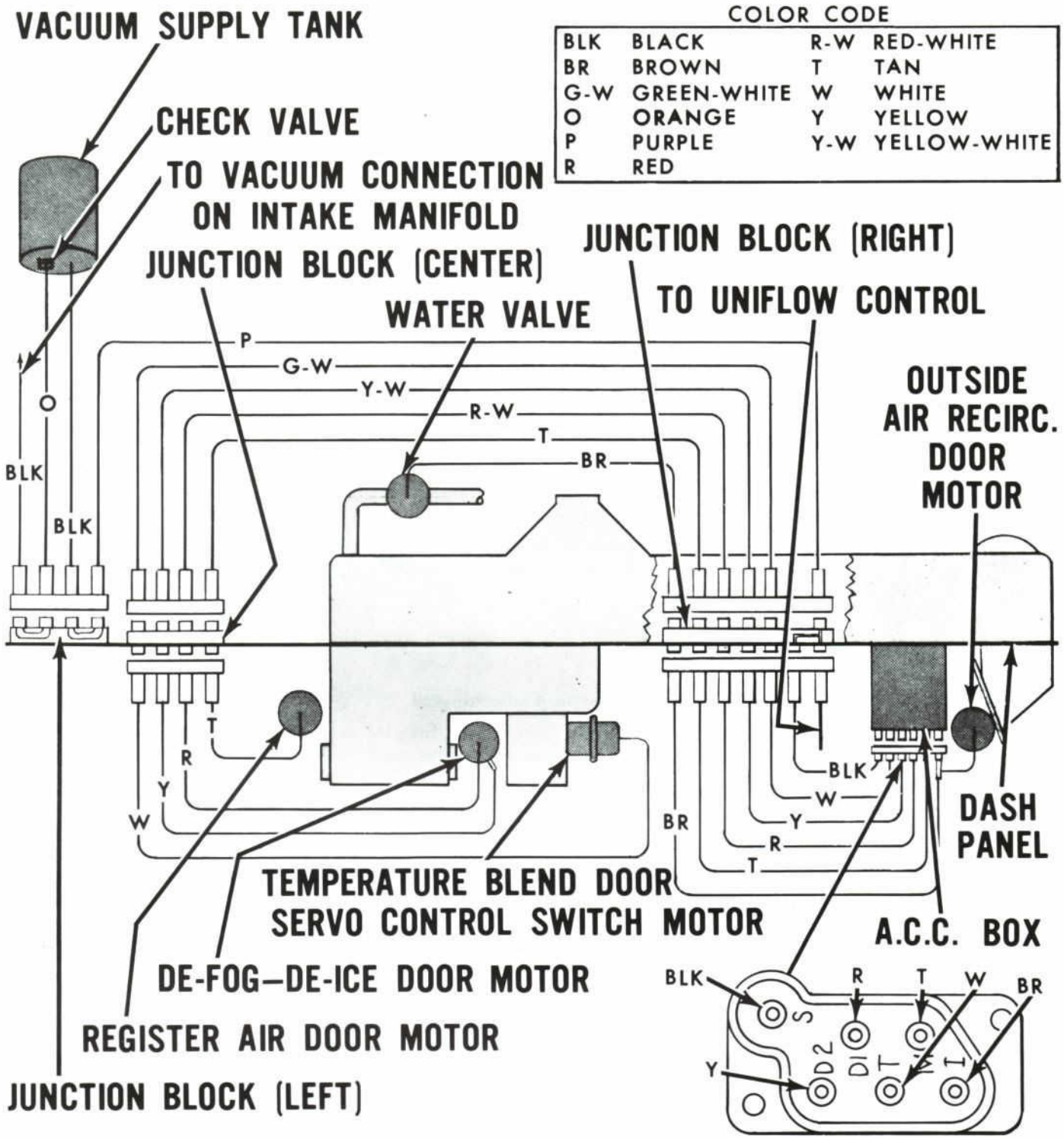
19005-7

VACUUM CONTROL SYSTEM — Continued

DESCRIPTION — Continued

An A.C.C. vacuum system schematic illustration is provided to show the routing and color coding of the vacuum system components.

Reference to the Automatic Temperature Control Vacuum System Operating Conditions chart (Page 19005-19) and (illustration 19005-19) will provide visibility of vacuum system controls under all operating conditions.



COLOR CODE

BLK	BLACK	R-W	RED-WHITE
BR	BROWN	T	TAN
G-W	GREEN-WHITE	W	WHITE
O	ORANGE	Y	YELLOW
P	PURPLE	Y-W	YELLOW-WHITE
R	RED		

AUTOMATIC CLIMATE CONTROL VACUUM SYSTEM SCHEMATIC DIAGRAM

Ford SERVICE TRAINING

19005-8

VACUUM CONTROL SYSTEM – Continued

VACUUM MOTORS – DESCRIPTION

Three vacuum motors (actuators), the A/C-heat door, outside-recirc. door and power servo are two position motors; the Defroster is a three position vacuum motor. The temperature blend door motor is combined with the power servo.

VACUUM MOTOR ADJUSTMENT

The heat-defrost door vacuum motor cannot be adjusted.

The temperature blend door vacuum motor is an integral part of the power servo. Refer to the "Power Servo Removal and Installation Procedure" for adjustment.

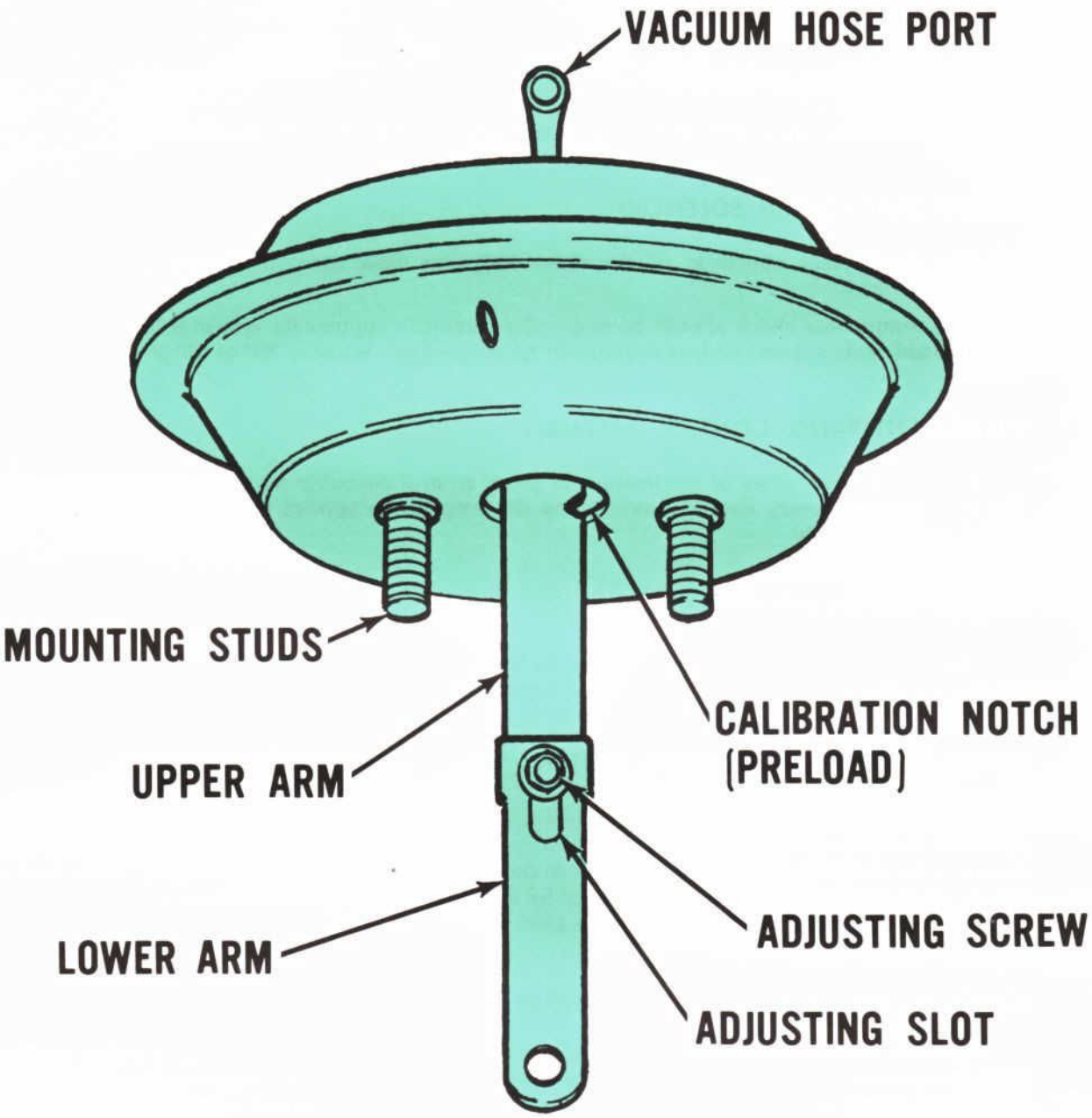
The A/C-heat door and outside-recirculating air door are adjusted with the adjusting screw and slot on the two-piece actuating shaft assembly as follows:

1. Position the outside-recirculating air door in the outside position, with no vacuum applied.

   If the A/C-heat door is to be adjusted, position the door in the heat position with no vacuum applied.

2. Loosen the adjusting screw.

3. Hold the door in the applicable outside or heat position, and adjust the shaft so the preload indicator (notch) is flush with the motor body. Tighten the adjusting screw.



AUTOMATIC CLIMATE CONTROL— VACUUM MOTOR

Ford
SERVICE TRAINING

19005-9

ELECTRICAL SYSTEM

DESCRIPTION AND OPERATION

The electrical components of the Automatic Climate Control System are shown.

COMPRESSOR CLUTCH SOLENOID

The compressor clutch is of the same design as those used on manual heater-air conditioner equipped vehicles.

The compressor clutch should be engaged (activated) anytime the system is turned on and the ambient (outside atmosphere) and/or evaporator fin temperature is above 30° to 35° F.

INSTRUMENT PANEL CONTROL ASSEMBLY

Front and rear views of the instrument panel control assembly are shown in illustration 19005-2. The five-position rotary electrical switch and the temperature control lever with slide rule dial are included in the assembly.

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 is accessible after removing the glove box.

WATER TEMPERATURE CONTROL SWITCH

A circuit from the engine water temperature switch to the Automatic Climate Control (A.C.C.) box provides a delay in the operation of the heater system until the engine coolant has warmed enough to minimize the duration of a cold air blast from the heater ducts. In "LOW" or "HIGH" when heat is called for, a relay in the A.C.C. box is energized by the water temperature switch to prevent blower operation until the engine coolant temperature reaches 130° F.

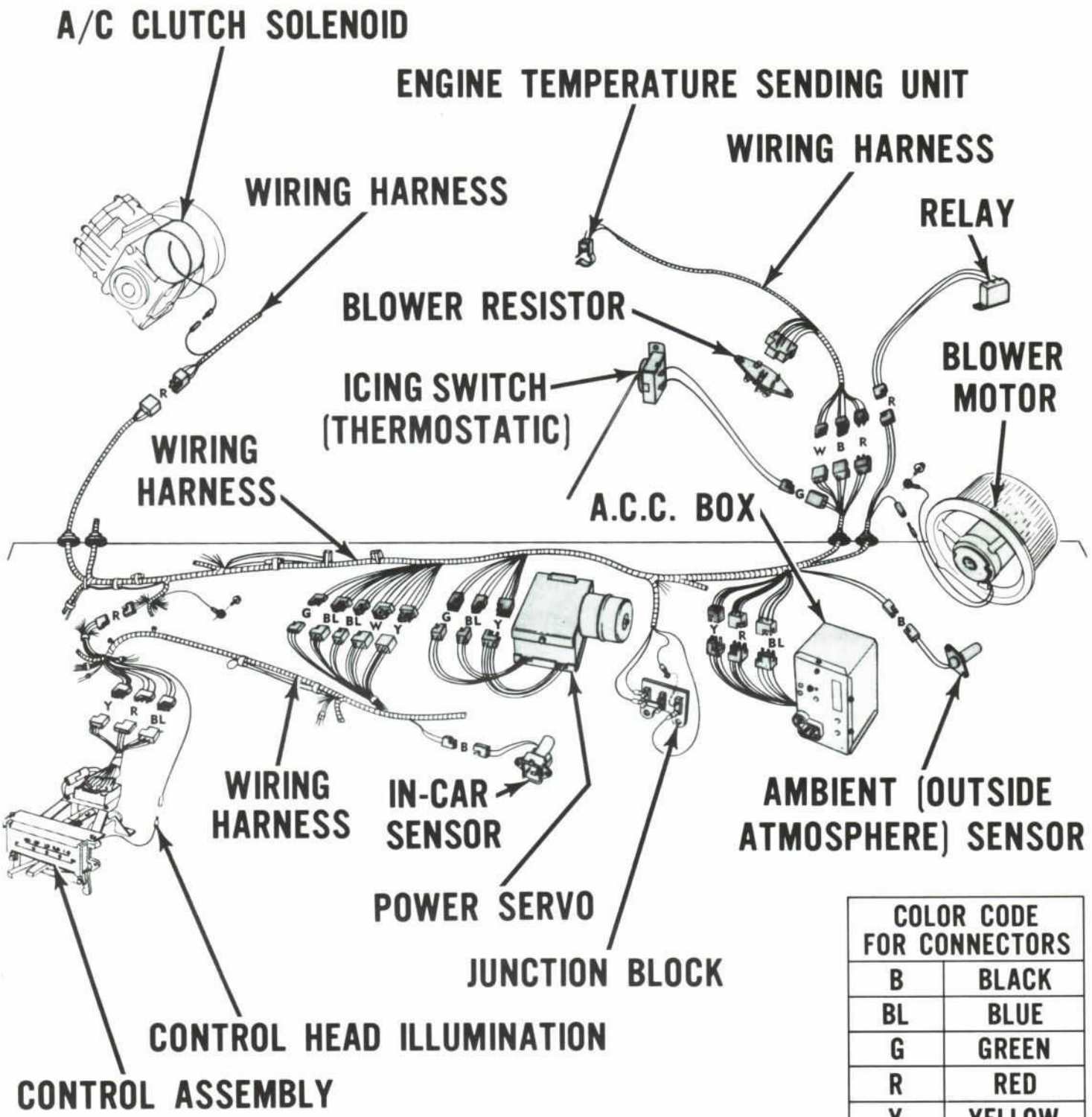
ICING (THERMOSTATIC) CONTROL SWITCH

The icing control switch is located inside the evaporator core cover. The icing switch capillary tube is positioned within the evaporator core fins to sense evaporator core fin temperatures. Sensing tube fluid pressure operates an electrical switch to disengage the compressor clutch whenever the fin temperature falls below 30° F. The switch closes when the temperature exceeds 35° F.

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

HIGH-RANGE RELAY

The high-range relay is located on the right fender apron, close to the dash panel. The relay, when energized, bypasses the control head switch and the low range resistor, and supplies power directly to the air conditioner portion of the servo switch blower control. The relay also supplies power to the heat portion of the switch by way of the cold-engine relay in the A.C.C. box. Failure of this relay will result in no blower speed change when shifting from high automatic to low automatic when the servo switch is calling for higher blower speeds.



COLOR CODE FOR CONNECTORS	
B	BLACK
BL	BLUE
G	GREEN
R	RED
Y	YELLOW
W	WHITE

AUTOMATIC CLIMATE CONTROL—ELECTRICAL SYSTEM COMPONENTS

Ford SERVICE TRAINING

19005-10

ELECTRICAL SYSTEM – Continued

TEMPERATURE SENSORS AND ASPIRATOR

The Automatic Climate Control System makes use of two temperature sensing devices (called thermistors) for its operation.

An ambient (outside atmosphere) sensor is located in the Outside-Recirculating Air door to sense the temperature of the incoming air.

The second sensor is located behind the grille in the instrument panel to sense in-car air temperature.

The resistance of the sensors change with temperature and provide electrical signals to the A.C.C. box. The sensors are wired in series with the temperature control dial rheostat. When the combined resistance is low, the A.C.C. box will call for air conditioning. When the combined resistance is high, the A.C.C. box will call for heat. The ambient (outside atmosphere) sensor is encased to provide a thermal delay to prevent the system from following momentary changes in ambient (outside atmosphere) temperature.

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

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

POWER SERVO

The power servo switch assembly is a vacuum actuated electrical rotary switch connected to the temperature blend door by means of a crank arm and mechanical linkage. The switch assembly contains mechanical linkage connecting the vacuum motor, electrical switch, potentiometer and crank arm.

The feedback potentiometer signals to the amplifier in the A.C.C. box the position of the crank arm and the position of the temperature blend door.

- The switch assembly is divided into three sections:
- Function — A/C-heat door and outside-recirculate air door
- Blower motor control during air delivery through the floor outlets (warm air)
- Blower motor control during air delivery through the registers (cool air).

AUTOMATIC CLIMATE CONTROL (A.C.C.) BOX

The key element of the Automatic Climate Control System is the A.C.C. box located under the instrument panel to the right of the plenum chamber.

The A.C.C. box contains a transistorized DC amplifier, a transducer to convert the amplifier electrical output to a vacuum signal, one relay and four vacuum control solenoids.

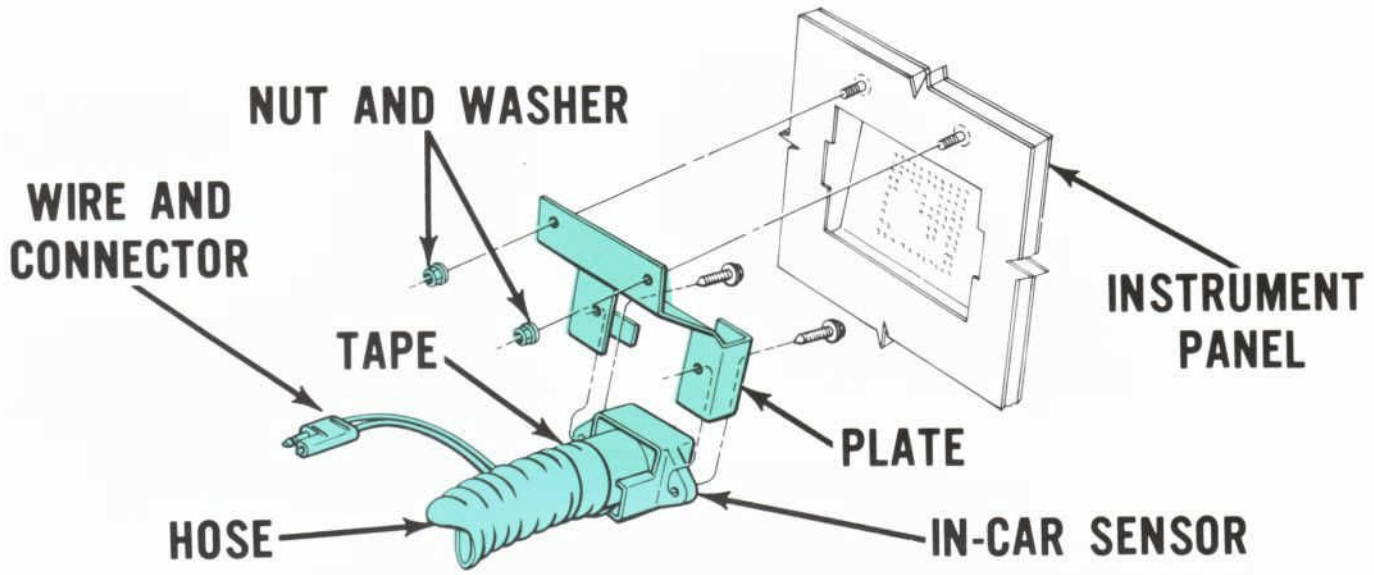
A temperature calibration control is located on the bottom of the A.C.C. box which provides approximately 30°F. of adjustment. This control is pre-set at the factory. **In case of customer complaints that the car is too cool or too hot for a given temperature dial setting, an adjustment may be made to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

The A.C.C. Control box is serviced as an assembly. If a malfunction occurs in the unit, it must be replaced.

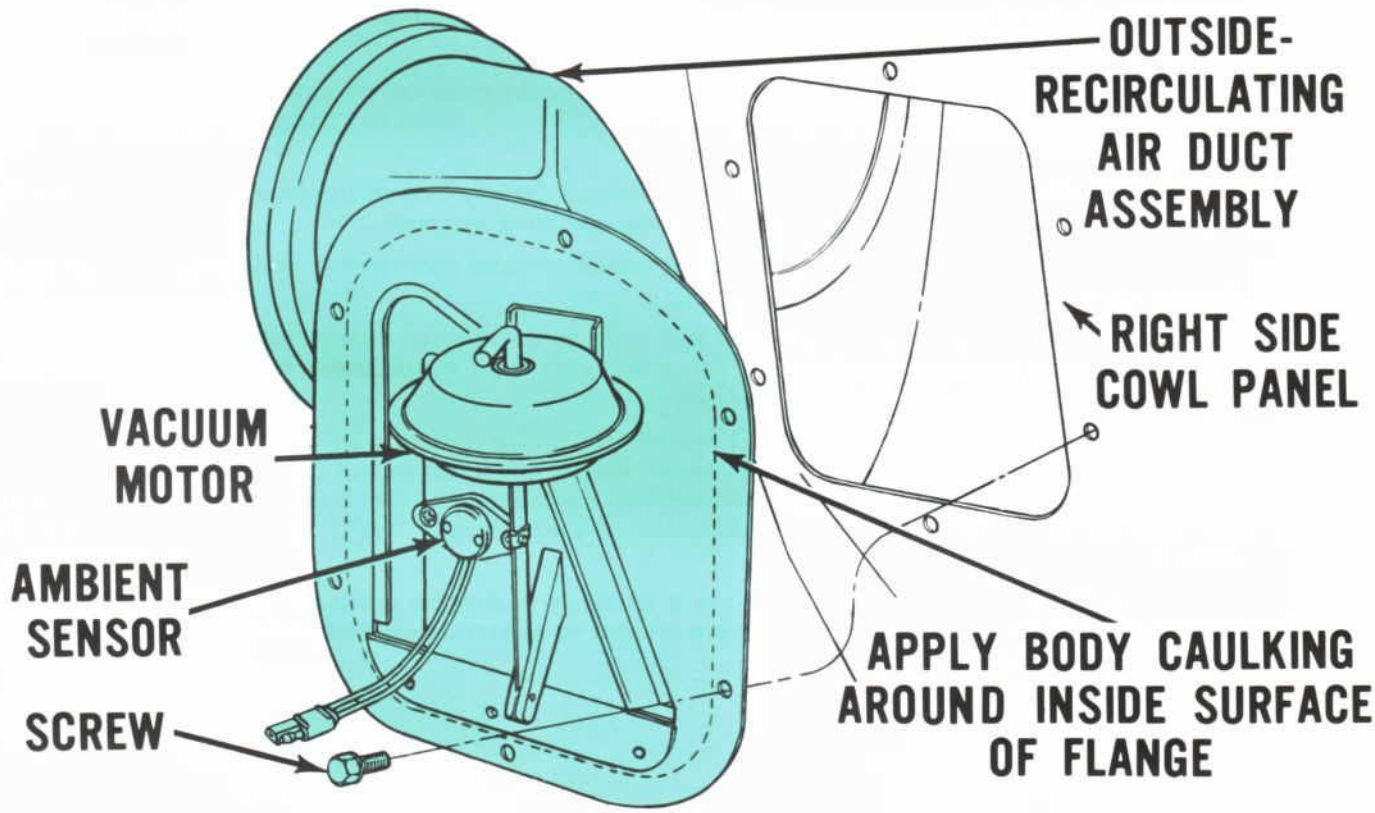
BLOWER MOTOR AND RESISTOR

The blower motor is located in the forward portion of the right side cowl.

The blower motor resistor is located in the blower housing duct between the blower outlet and the evaporator core. There are five resistance elements mounted to the resistor board. Depending on the blower speed called for by the A.C.C. box and through the power servo switch, series resistance is added to or cut out of the blower motor circuit to decrease or increase speed.



IN-CAR SENSOR



AMBIENT (OUTSIDE ATMOSPHERE) SENSOR

TEMPERATURE SENSORS AND ASPIRATOR

Ford SERVICE TRAINING

ELECTRICAL SYSTEM – Continued

OPERATING SEQUENCES

Although the A.C.C. box cannot be overhauled, it is helpful to know how the sealed-in components function to coordinate climate control system operation.

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 usable vacuum signal to accomplish the required automatic operating sequences.

Transducer vacuum controls a modulated vacuum operated servo switch, and the temperature blend door which regulates temperature.

The vacuum operated servo switch located at the temperature blend door selects blower speeds and operates vacuum solenoids which control air distribution through the heater outlets or air conditioning registers, and also controls the outside air door.

Assuming an initial cold weather operation, the system functions as follows: Set the control for "HIGH" if weather is extremely cold, and set the dial in a comfort setting (approximately 75°F.). The heating system will be automatically positioned for maximum heat and high blower operation, but will not turn on until engine water temperature reaches approximately 130°F. (This normally takes 3-5 minutes of engine operation.)

The cold temperature sensors will have a relatively high series resistance, controlling the amplifier and transducer in the A.C.C. box in such a manner so as to produce a minimum output vacuum. This calls for maximum heater operation.

ELECTRICAL SYSTEM – Continued

OPERATING SEQUENCES – Continued

As the vehicle interior warms up, the in-car sensor resistance value decreases, resulting in an increased transducer vacuum output. As vacuum output increases, 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 high vacuum. Under these conditions the transducer vacuum is at its highest value (at or above 10 inches Hg) calling for maximum air conditioning (high blower and recirculated air). As the car cools down, the in-car sensor resistance values increases causing decreased transducer vacuum output. This results in the system changing from recirculated air to outside air and in reduced blower speeds. The blend door position will change causing some air to flow through the heater core for temperature regulation.

ELECTRICAL SYSTEM – Continued

OPERATING SEQUENCES – Continued

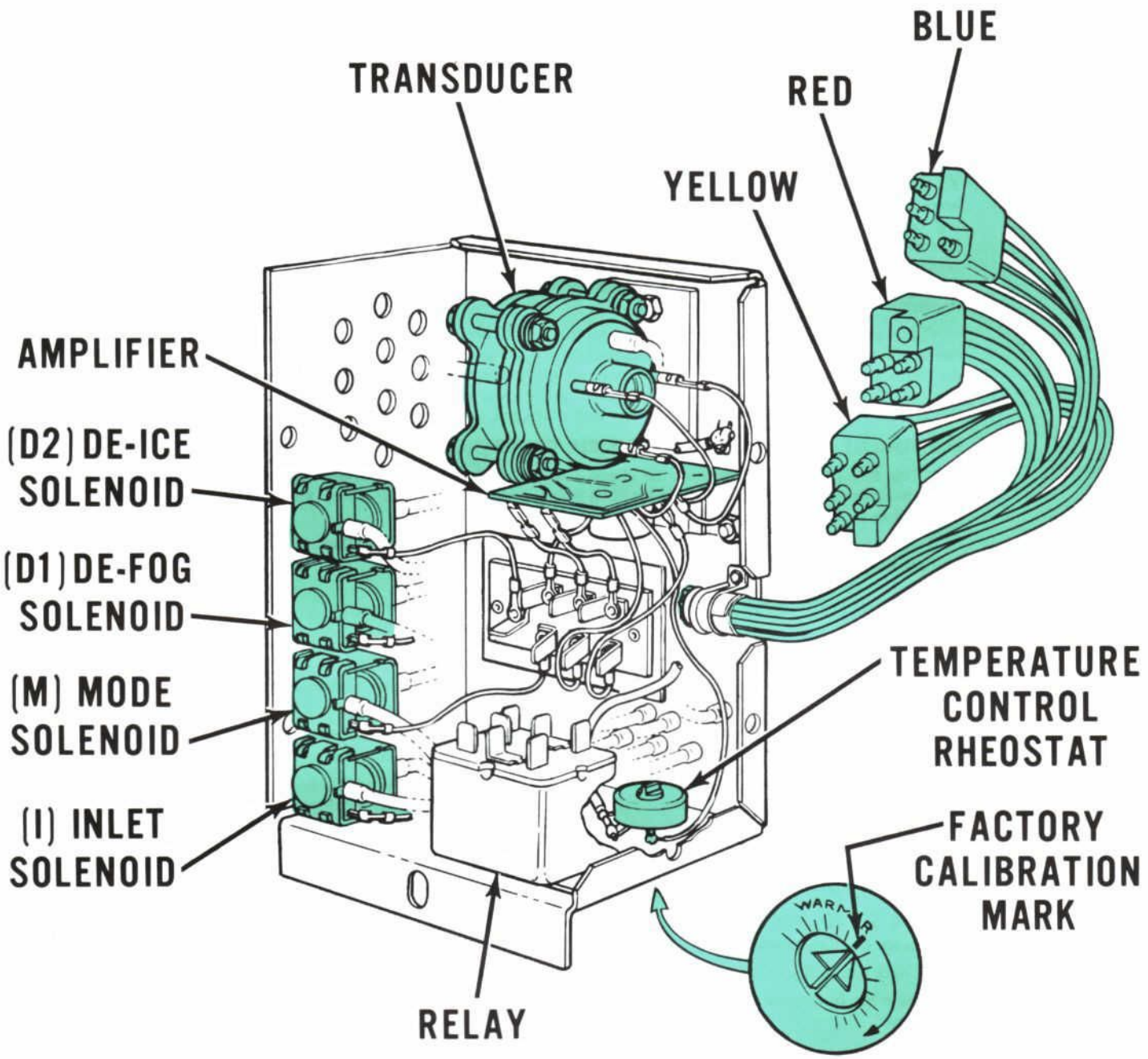
For mid-ambient (atmospheric temperature) conditions, the control should be set at 75°F. and the "LOW" button pushed in. Automatic control in "LOW" is similar to "HIGH" except that the system is locked on outside air, and the blower speeds are reduced.

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

In "DE-FOG," system operation is the same as in "HIGH" except that outside air is used at all times and the heat-defroster door is in the mid-defrost position. In de-ice, an electrical system is supplied directly to the amplifier, overriding all other temperature signals and resulting maximum heat-high blower operation.

Temperature adjustment of individual preference in the range of 65 to 85 degrees is provided by the temperature control lever, 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 decreases 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 lever 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 "DE-FOG," the instrument panel control eliminates the two lowest switch steps and activates a relay to cut out an additional resistor, giving three higher blower voltages and speeds.



TEMPERATURE CALIBRATION ADJUSTMENT

AUTOMATIC CLIMATE CONTROL BOX ELECTRICAL COMPONENTS

Ford SERVICE TRAINING

19005-12

AUTOMATIC CLIMATE CONTROL ELECTRICAL SYSTEM ADJUSTMENTS

A.C.C. BOX – TEMPERATURE CALIBRATION

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

The temperature calibration control is located on the bottom of the A.C.C. box which provides approximately 30°F. of adjustment (illustration 19005-12). 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 readjustment. Each calibration division is approximately 2°F.

After servicing, and with the system operating correctly, tape an accurate thermometer to the padded instrument panel to measure temperature at the in-car sensor opening. Set the temperature control to 75° F., slide the control lever to "HIGH" 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 under safe driving conditions. Note the stabilized thermometer temperature reading. To satisfy the average driver, the thermometer should read 80° for 75° dial setting. **The system is designed for this initial calibration.** If necessary, readjust the control, 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.

If it should become necessary to remove the A.C.C. box, disconnect the battery ground cable. Remove glove box. Disconnect the right defroster duct and right register duct for accessibility and disconnect the three wiring harness connectors. Disconnect the vacuum hose multiple connector from the bottom of the A.C.C. box and remove one screw retaining the lower edge of the box to the dash panel. To remove the control box, carefully lift the box up and rearward, to clear the top mounting tab, then downward.

INSTRUMENT PANEL CONTROL ASSEMBLY CALIBRATION AND ADJUSTMENT

The five-position switch may be checked with a continuity tester. There should be electrical continuity between the indicated terminals for each switch position. If not, the rotary switch is defective and the calibration and adjustment procedure will not be effective.

The control assembly may be calibrated by varying the relationship between the temperature lever and the temperature control rheostat.

TEMPERATURE CONTROL RHEOSTAT ADJUSTMENT

The temperature control rheostat may be adjusted as follows: Loosen the coupling between the temperature lever and the rheostat shaft. Set the temperature lever at 75°F. Connect an ohmmeter between the black and the white leads of the two-wire connector. (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 temperature setting is at 75°F. and the rheostat resistance is 268 ohms.

If it should be necessary to remove the instrument panel control assembly, disconnect the air vent control assembly from the lower instrument panel by removing the three retaining screws. Disconnect the headlight switch from the instrument panel. Remove the left register and face plate assembly. Remove the four control head mounting screws from the front of the instrument panel and disconnect the three electrical multiple connectors from the control switch and single connector from the control dial lamp. Slide the control assembly forward toward the front of the car and down behind the lower instrument panel.

POWER SERVO SYSTEM OPERATIONAL CHECKS AND ADJUSTMENT

Maximum Cooling Checks

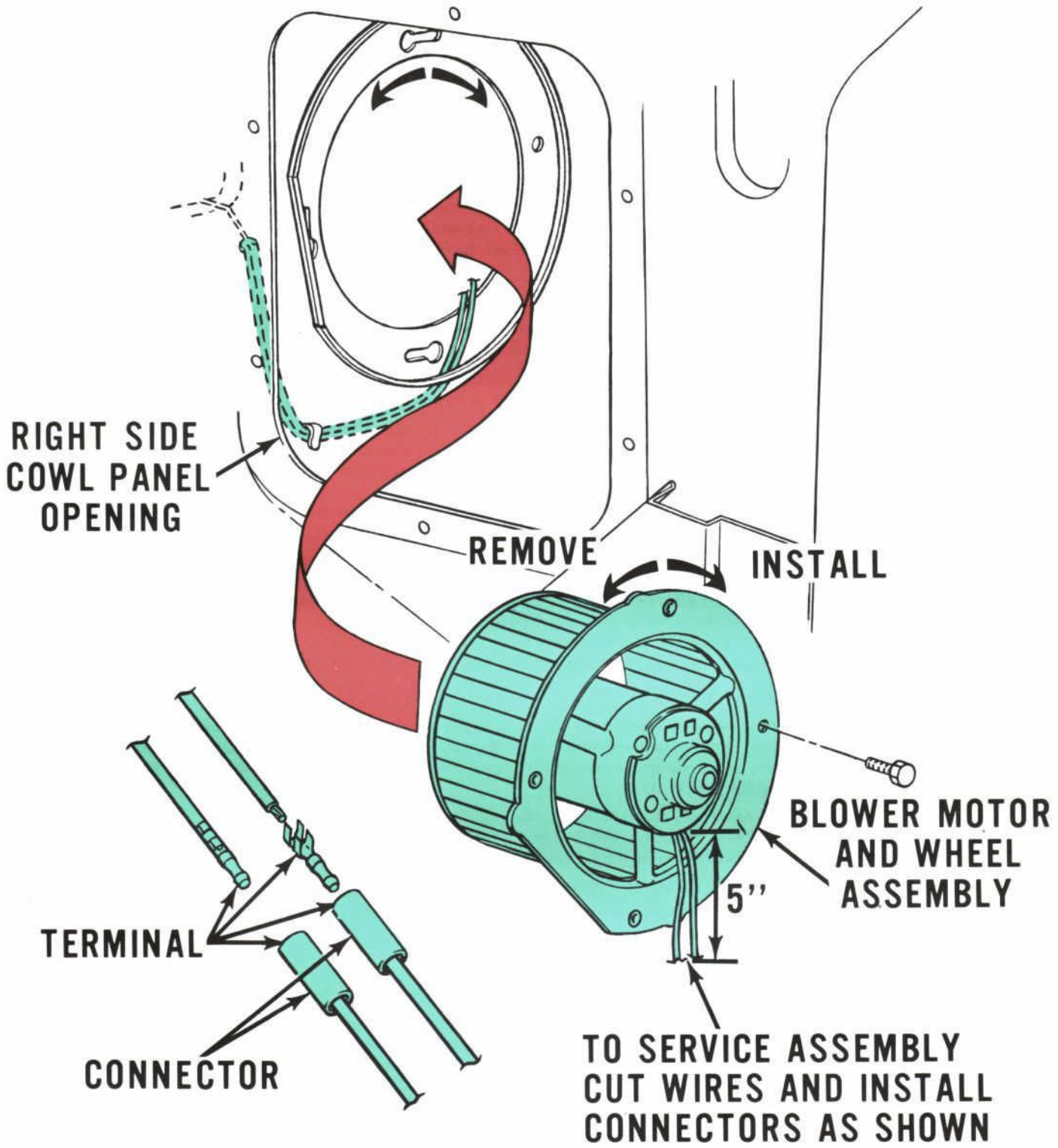
Check the ability of the power servo to provide "Maximum Cooling," as follows:

1. Slide the functional control lever to "HIGH." Install the vacuum gauge in the power servo vacuum hose.
2. Connect a voltmeter from the blower motor supply line (orange wire in the engine compartment) to ground.
3. Start the engine. Make sure a minimum of 12 inches of vacuum is supplied to the servo vacuum motor. (If 12 inches of vacuum is not available, check the vacuum system for a malfunction.) Check the following items for a malfunction:
   a. Blower should go to high speed. Three blower speeds are possible as the servo switch moves. (8 ± 1V, 9-1/2 ± 1V and 11 ± 1V).
   b. Recirculate should go to recirculating air position (full-vacuum).
   c. The link between the servo crank and temperature door should be pulled out of the plenum. (Maximum cooling position).

Maximum Heat Checks

To check the ability of the power servo to provide "MAX. HEAT", perform steps 1 through 3 noted above. Start the engine. Make sure there is no vacuum (0" Hg) to the servo vacuum motor. Check the following items for a malfunction:

1. Blower should go to high-speed.
2. Recirculate door should go to outside air (no vacuum) position.
3. The link between the servo crank and temperature blend door should be pushed into the plenum (Max. Heat position).



AUTOMATIC CLIMATE CONTROL BLOWER MOTOR AND WHEEL

Ford SERVICE TRAINING

19005-13

POWER SERVO OPERATION CHECKS AND ADJUSTMENT

POWER SERVO ADJUSTMENT

Adjust the servo switch in the mounting bracket slots until both ends (maximum cooling and maximum heat) are satisfactory.

If it should become necessary to replace the power servo unit, disconnect the battery ground cable. Remove the glove box and disconnect the right defroster duct and right register duct for accessibility. Disconnect the three wiring harness connectors and the vacuum hose. Remove the push-on locknut from the crank arm. Remove three screws from the bottom of the servo mounting bracket and carefully lift the power servo crank arm pin out of the door connecting link.

To install the power servo unit, attach the power servo assembly to the mounting bracket with three mounting screws. DO NOT TIGHTEN THE SCREWS. Connect the crank arm to the connecting link on the door and install the push-on nut. Push the servo toward the dash panel firmly so that crank arm pressure (2 pound minimum force) is applied to the connecting link on the door. Hold the servo in this position and tighten the three mounting screws. (The temperature blend door is now in the full-heat position.) Connect the three wiring harness connectors and attach the vacuum hose to the servo motor. Check the power servo for proper adjustment. Install the air ducts and glove box.

BLOWER MOTOR CURRENT DRAW TEST

There are five resistor elements mounted to the resistor board. Depending on the blower speed called for by the A.C.C. box and through the power servo switch, series resistance is added to or cut out of the blower motor circuit to decrease or increase speed.

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 12-23 amps.

If it is necessary to remove the blower motor and wheel assembly, disconnect the vacuum hose from the fresh air recirc. vacuum motor. Disconnect the ambient sensor electrical connector. Remove six duct mounting flange screws and remove the duct assembly. Cut the two-blower motor wires about 5 inches from the motor. Remove one screw on the motor mounting plate, rotate the motor mounting plate counterclockwise to unlock the plate from the case and remove the motor and wheel assembly through the opening in cowl side panel.

To install the blower motor and wheel assembly, install new electrical connectors on each blower motor wire and crimp them securely. A plug in wire connector is being released as a running change to correct this condition, shortly after vehicle introduction. Install the blower motor. Rotate the motor mounting plate clockwise to lock the plate to the case. Connect the two wires at the new connectors. Install the duct assembly. Use body caulking to seal between the duct flange and cowl panel to insure against cowl air leaks. Connect the ambient sensor wiring connector and hook up the hose to the vacuum motor.

HIGH RANGE RELAY CHECK

The high range relay is located on the right fender apron, close to the dash panel. The relay when energized, bypasses the control head switch and the low range resistor. It supplies power directly to the A/C portion of the servo switch blower control and also to the heat portion of the switch by way of the cold engine relay in the A.C.C. box.

Failure of the relay will result in no blower speed change when shifting from "HIGH" automatic to "LOW" automatic, when the servo switch is calling for higher blower speeds. To check this, the temperature should be set for maximum heating or maximum cooling.

If the blower does operate, but there is no change in speed as the control is moved from "HIGH" automatic to "LOW" automatic, or vice versa, it indicates the relay is not functioning properly and should be replaced.

ICING CONTROL SWITCH CHECK

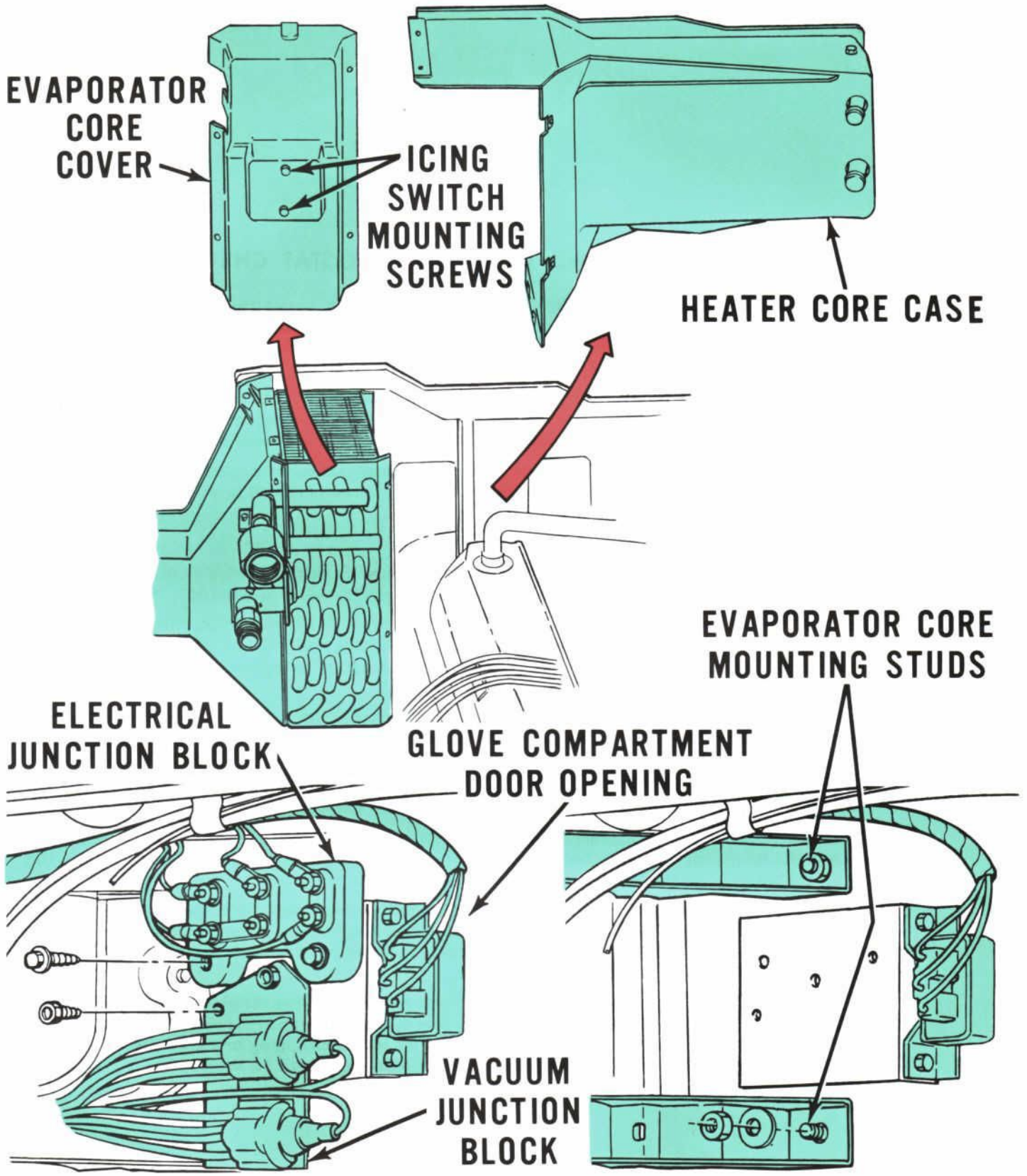
The icing control switch is located inside the evaporator core cover in the engine compartment.

The icing control is used to turn off current to the air conditioner compressor clutch whenever temperature at the evaporator falls below 35°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, setting the control lever at "LOW" 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.

If it is necessary to remove the evaporator core, remove the heater core. Discharge the refrigerant from the A/C system. Unwrap the expansion valve, disconnect the capillary tube bulb, and disconnect refrigerant lines. Remove the glove box. Disconnect electrical and vacuum junction blocks on the inner dash panel and set aside. Remove two evaporator stud nuts and slide the evaporator core forward and upward from the case in the engine compartment. Reverse the above procedure to install a new core. Charge the system with 2-1/4 pounds of Refrigerant 12.

If it becomes necessary to remove the icing control switch, disconnect the two wire connectors leading to the icing switch. Remove transmission dipstick and tube assembly. Remove evaporator core cover. **The icing switch capillary tube is inserted straight into the evaporator core through a hole in the tube sheet.** Remove the icing switch from inside the cover.



EVAPORATOR CORE REMOVAL

SERVICE TRAINING

19005-14

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. Slide the temperature control lever to 75° and the functional control lever to "HIGH" position 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 opening properly. The resistance of the sensors change with temperature. The car and sensors should be at a temperature of approximately 70°F. to 80°F. for accurate test results:

1. Disconnect the car battery.
2. Set the temperature control dial at 75°F. Disconnect the red electrical wiring from the A.C.C. Box. Connect an ohmmeter between the green wire of the electrical harness and ground.
3. Observe the resistance. With the ambient temperature between 70° 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 at 85°F. Then set the temperature control at 65°F. and again note the resistance reading. The difference in resistance between 65°F. and 85°F. 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. 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°F. 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.

If it should become necessary to remove the in-car sensor: Remove the glove box. Disconnect the right register air duct and position it away from the in-car sensor. Disconnect the electrical connector and aspirator tube from the sensor. Remove the two nuts from the sensor mounting bracket studs. Remove the sensor from the mounting bracket. Reverse the removal procedure to install the sensor.

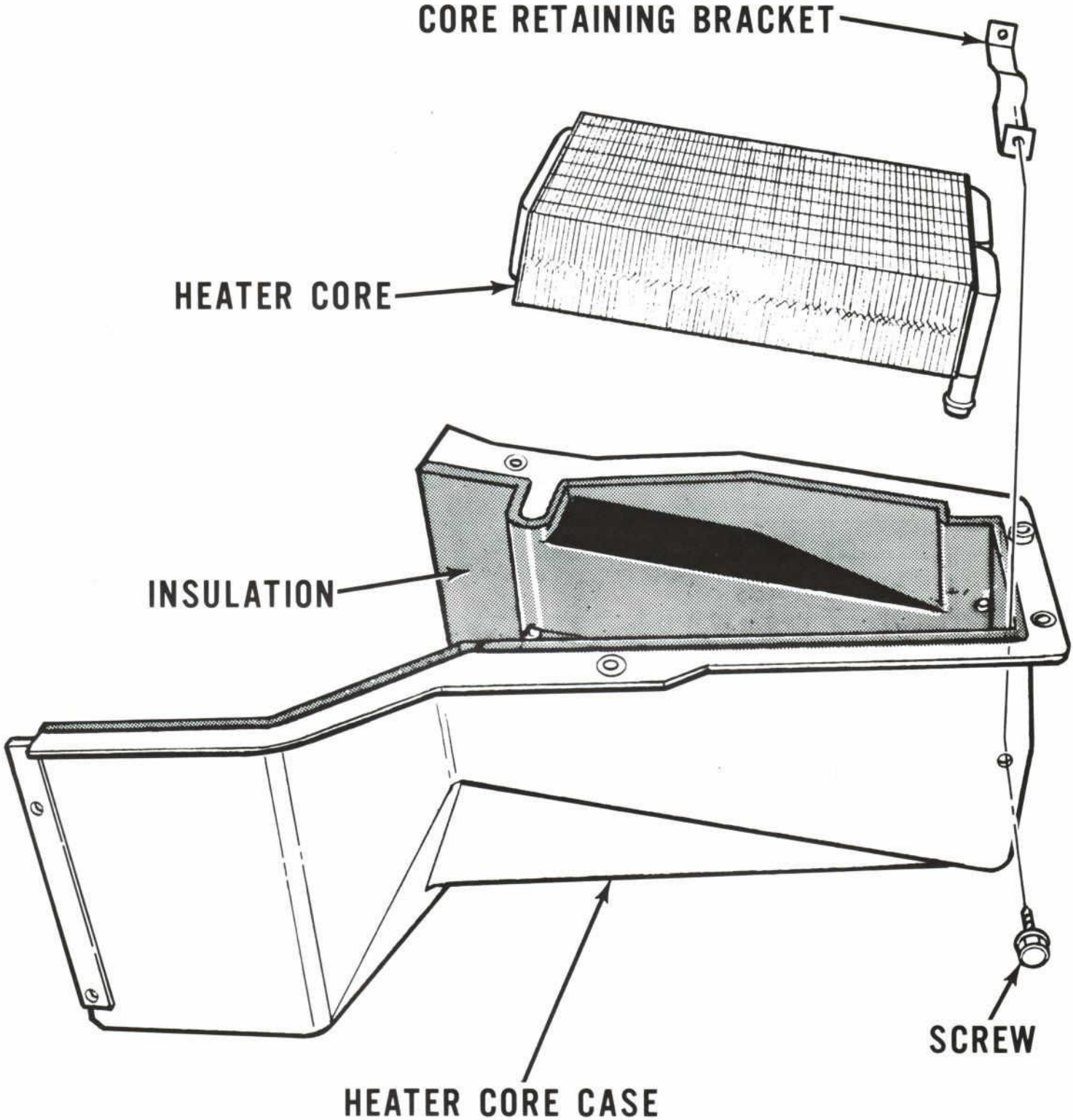
HEATER WATER CONTROL VALVE CHECK

The heater water control valve is used to cut off the flow of coolant through the heater core when the A.C.C. box and power servo calls for maximum air conditioning with recirculated air. The valve is also closed in the "OFF" position.

To check the water control valve, set the control for 85°F. With the functional control lever set at "LOW", run the engine until the 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 the air is not warm, check the water valve by removing the 1/8 inch vacuum line from the valve and noting if a vacuum signal is available. If a vacuum signal is available and no heat is noted, the water valve is defective. If no vacuum is noted, refer to the vacuum control system for corrective action.

HEATER CORE

If required, the heater core can be serviced by removing the transmission dipstick, air cleaner and hood. Drain the coolant from the engine and disconnect the heater hoses at the heater core. Disconnect the multiple connector leading to the A/C thermostat switch inside the case cover. Remove evaporator case front cover (5 screws). **The A/C switch capillary tube is inserted straight into the evaporator core through a hole in the tube sheet.** Remove the heater core case cover and core retaining bracket. Remove the heater core from case. Reverse the removal procedure to install the core.



HEATER CORE REMOVAL

Ford SERVICE TRAINING

19005-15

AUTOMATIC CLIMATE CONTROL SYSTEM DIAGNOSIS

WIRING CIRCUITS DIAGNOSIS

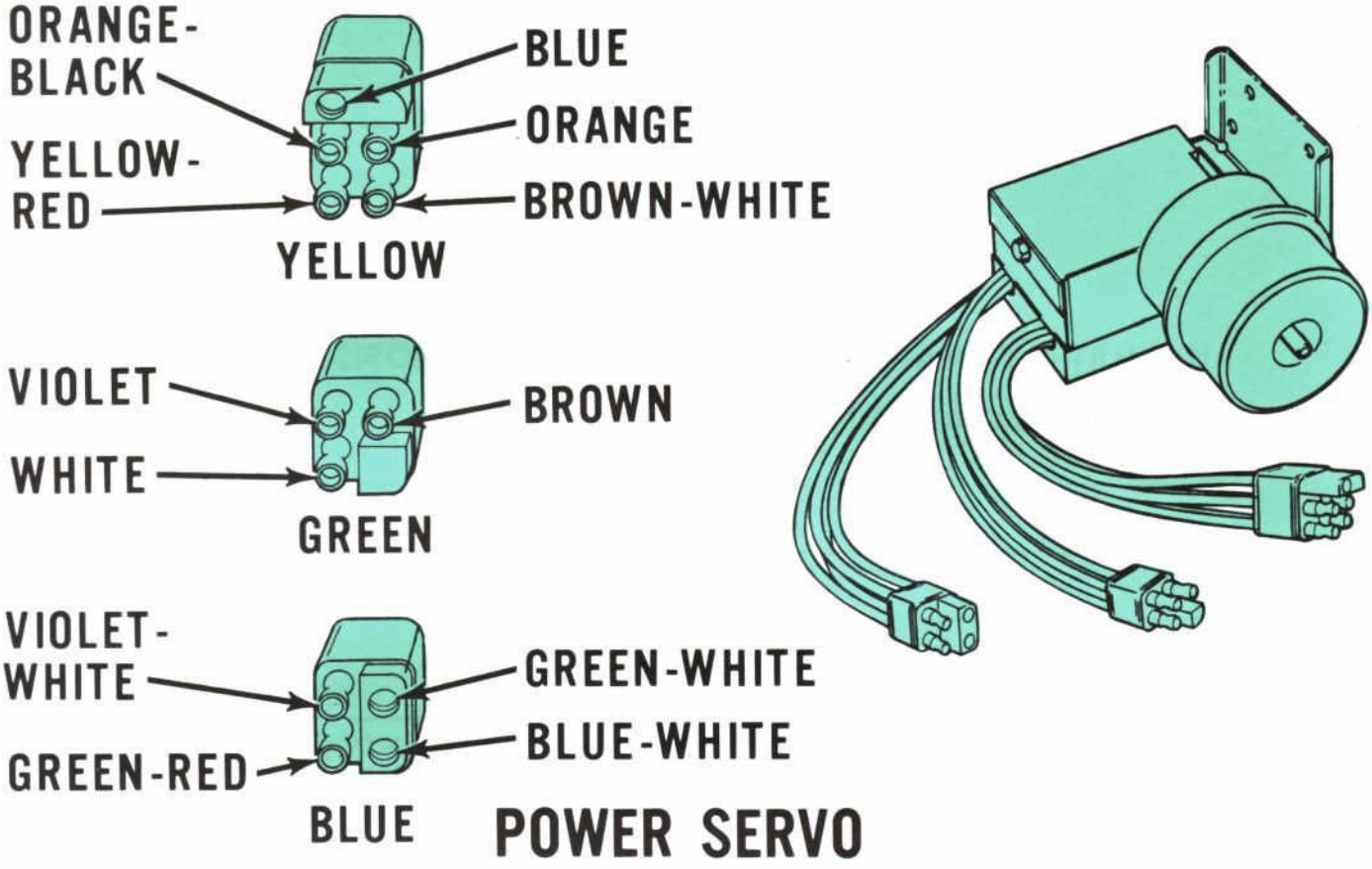
Reference to the listed component parts, terminal numbers and wiring color codes of the following Automatic Climate Control (A.C.C.) charts and illustrations (19005-16 and 17) will provide information to aid in diagnosis of the A.C.C. electrical system.

POWER SERVO

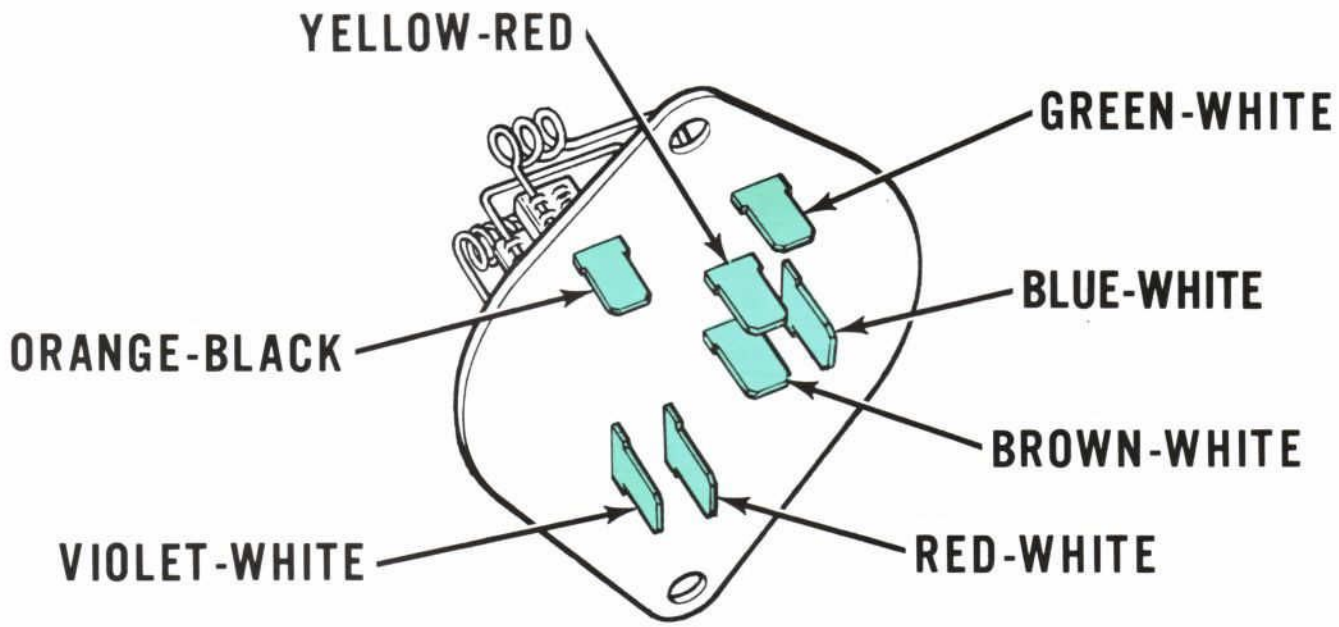
WIRING TERMINALS AND CIRCUITS	
Terminal Numbers	CIRCUIT
①	From Blower Resistor ⑤ and to Blower Motor
②	To Blower Resistor ④
③	From Control Head ⑧ and to Blower Resistor ③
④	To Blower Resistor ②
⑤	To Control Head ⑦ and from A.C.C. Box ③ and to Blower Resistor ①
⑥	From Blower Resistor ⑦ , and Relay, and to A.C.C. Box ① (Lower Relay Armature or Inlet Solenoid)
⑦	To A.C.C. Box ⑤ and from Control Head ③
⑧	To A.C.C. Box ⑬ Mode Solenoid Valve
⑨	To Control Head ④
⑩	To A.C.C. Box ⑥ (Amplifier Feed Back)
⑪	To A.C.C. Box ⑦ (Amplifier Feed Back)
⑫	To A.C.C. Box ⑧ (Amplifier Feed Back)

BLOWER RESISTOR

WIRING TERMINALS, BLOWER MOTOR SPEEDS AND CIRCUITS	
Terminal No. and Blower Motor Speed	CIRCUIT
① Low	From A.C.C. Box ③ Relay to Power Servo ⑤ , and to Control Head ⑦
② Low-Medium	From Power Servo ④
③ Medium	From Control Head ⑧ , and from Power Servo ③
④ High-Medium	From Power Servo ②
⑤ High	To Blower Motor and from Power Servo ①
⑥ Low Range	From Control Head ②
⑦ High-Range	From High Range Relay to Blower Relay in A.C.C. Box ① , and to A/C Feed in Power Servo ⑥



POWER SERVO



BLOWER RESISTOR

SERVICE TRAINING

AUTOMATIC CLIMATE CONTROL SYSTEM DIAGNOSIS – Continued

WIRING CIRCUIT DIAGNOSIS – Continued

AUTOMATIC CLIMATE CONTROL BOX	
WIRING TERMINALS AND CIRCUITS	
Terminal Numbers	CIRCUIT
①	From High Range Relay and Blower Resistor ⑦ (Low Range) to Power Servo ⑥ (A/C Blower Feed) and to Blower Relay Contact or Inlet Vacuum Solenoid
②	From Control Head ⑤
③	To Control Head ⑦ to Power Servo ⑤ (Blower Feed - Heat), to Blower Resistor ① (Low Speed)
④	Grounds A.C.C. Box ④
⑤	From Power Servo ⑦ (Function Feed) from Control Head ③
⑥	From Power Servo ⑩ (Feed Back Potentiometer) to Amplifier
⑦	From Amplifier to Power Servo ⑪ (Feed Back Potentiometer)
⑧	From Power Servo ⑫ to Amplifier
⑨	From Control Head ⑨ to De - Ice Solenoid
⑩	From Amplifier to Ambient Sensor
⑪	From Control Head ⑩ to Amplifier
⑫	From Control Head ① and Icing Switch to Amplifier
⑬	From Power Servo ⑧ (Mode Function)
⑭	From Relay Coil to Thermal Switch

AUTOMATIC CLIMATE CONTROL SYSTEM DIAGNOSIS – Continued

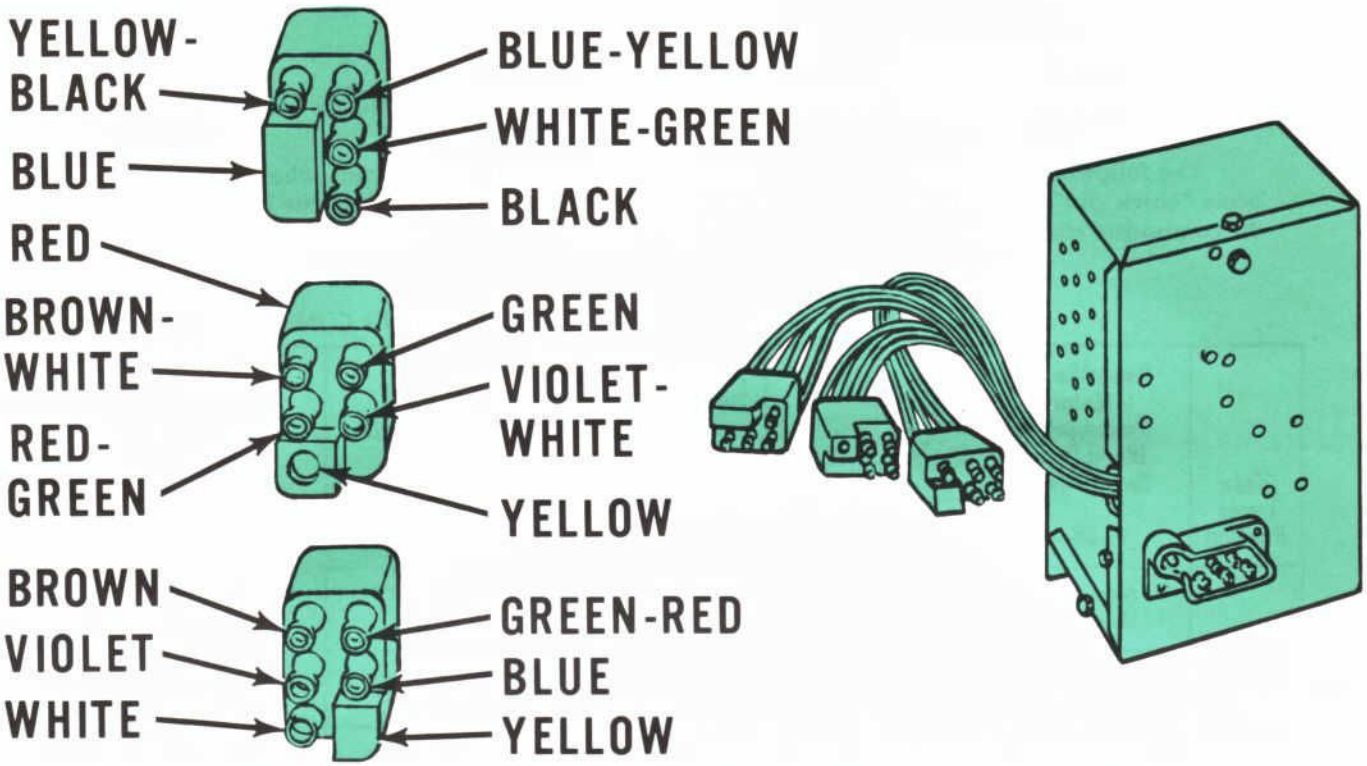
WIRING CIRCUIT DIAGNOSIS – Continued

AUTOMATIC CLIMATE INSTRUMENT PANEL CONTROL WIRING COLOR CODE	
WIRING TERMINALS AND CIRCUITS	
Terminal Numbers	CIRCUIT
(1)	To A.C.C. Box (12) (Supply to Transducer and Amplifier) and to Icing Switch
(2)	To Blower Resistor (6) (Low Range)
(3)	To A.C.C. Box (5) (De-Fog Vacuum Solenoid and Relay Coil) and to Power Servo (7) (Function Feed)
(4)	From Power Servo (9) (Recirc. Function)
(5)	To A.C.C. Box (2) (Inlet Solenoid via Relay)
(6)	To Coil of High Range Relay
(7)	From A.C.C. Box (3) (Relay Blower Contact), to Power Servo (5) (Blower Feed-Heat) and to Blower Resistor (3) (Med. Blower)
(8)	To Power Servo (3) (Med. Blower Speed) and to Blower Resistor (3) (Med. Blower)
(9)	To A.C.C. Box (9) (De-Ice Solenoid Valve)
(10)	To A.C.C. Box (11) (Amplifier – Full Heat)
(11)	Grounds Temperature Control Theostat on Control Head
(12)	From In-Car Sensor
(B)	From 30-Amp Circuit Breaker on Junction Block

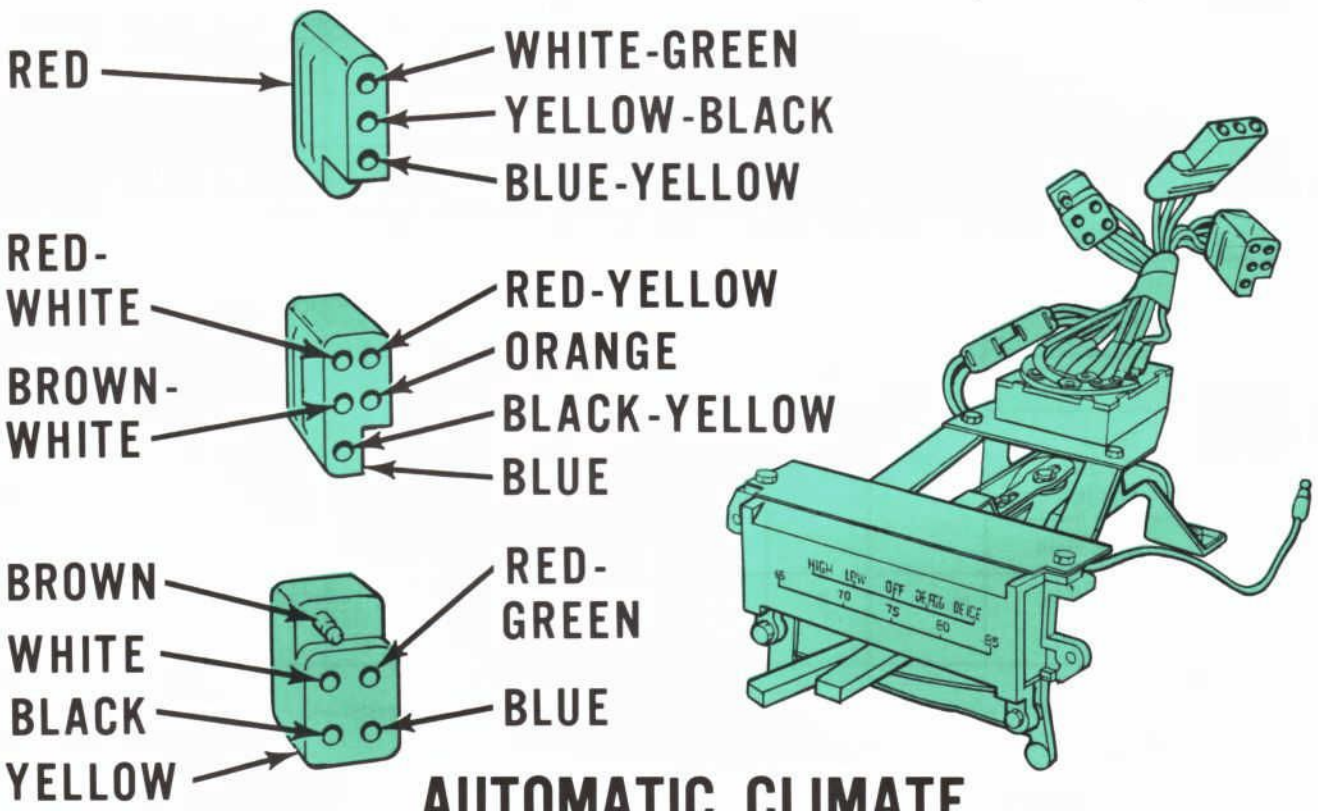
AUTOMATIC CLIMATE CONTROL SYSTEM DIAGNOSIS – Continued

WIRING CIRCUIT DIAGNOSIS – Continued

MISCELLANEOUS AUTOMATIC CLIMATE CONTROL COMPONENTS		
Component	Wiring Color Code	CIRCUIT
In-Car Sensor	White	To Control Head (12) Theostat
	Blue	From Ambient Sensor
Ambient Sensor	Green	From A.C.C. Box (10) Amplifier
	Blue	To In-Car Sensor
Blower Motor	Orange-Black	From Blower Resistor (5) and from Power Servo (1)
	Black	To Ground
Icing Switch	White-Green	From Control Head (1) and to A.C.C. Box (12)
	Black	To A/C Clutch Solenoid
A/C Clutch	Black	From Icing Switch
Thermal Switch	Yellow	From A.C.C. Box (14) Relay Coil
	Black	To Ground
Relay	Violet-White	From Blower Resistor (7) to Power Servo (6) and to A.C.C. Box (1)
	Black-Yellow	From Control Head (6)
	Black-Yellow	From Battery
Harness	Black	Feed from Battery



AUTOMATIC CLIMATE CONTROL (A.C.C.) BOX



AUTOMATIC CLIMATE INSTRUMENT PANEL CONTROL

Ford SERVICE TRAINING

19005-17

AUTOMATIC CLIMATE CONTROL SYSTEM DIAGNOSIS – Continued

The following table and the air conditioner vacuum schematic diagram, when used with the diagnosis "check out" procedures and the "A.C.C. Functional Check," will provide the repair procedures and the component conditions for any given Automatic Climate Control System operational procedure.

AUTOMATIC CLIMATE CONTROL VACUUM SYSTEM OPERATING CONDITIONS

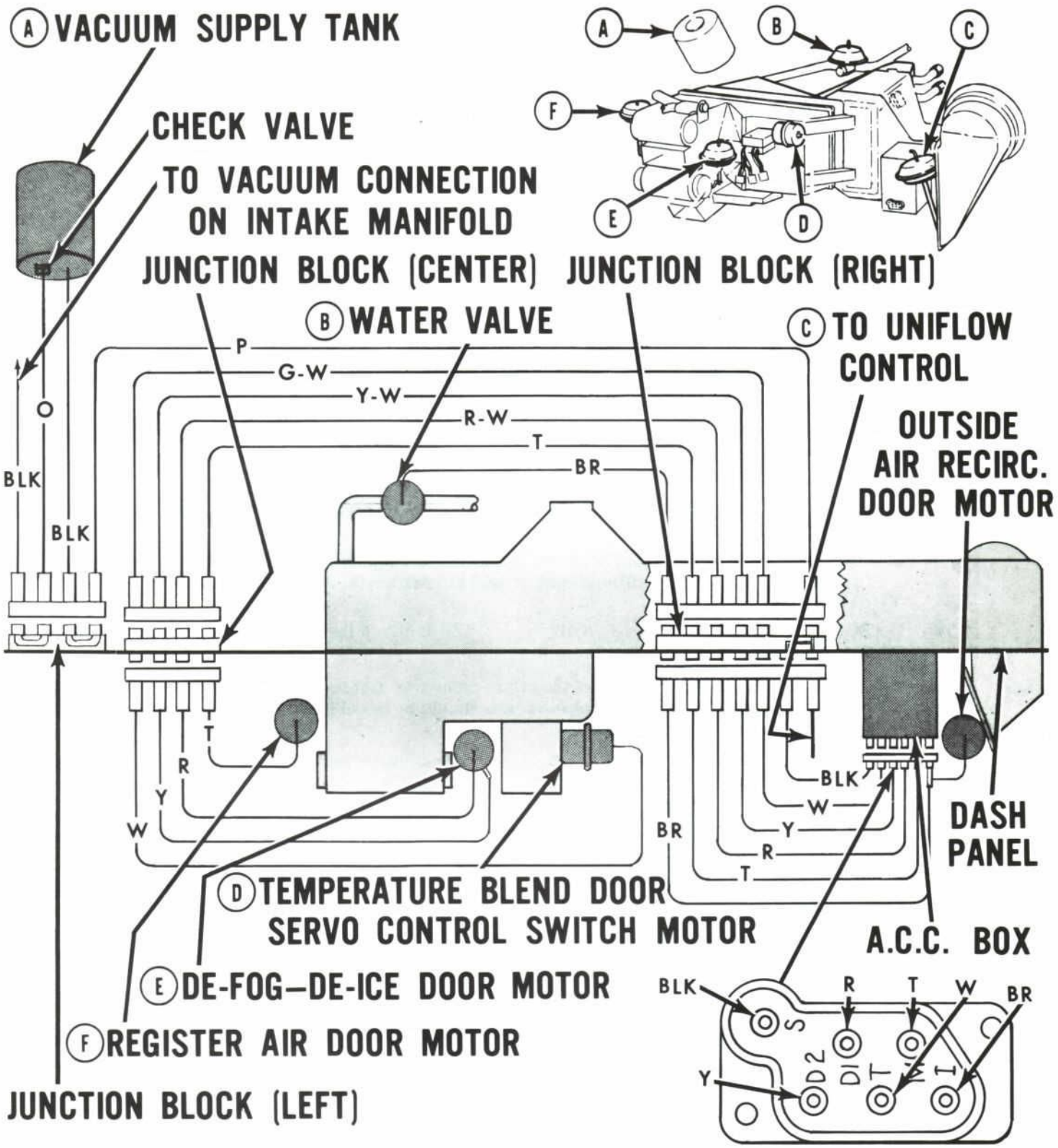
Slide Lever Position	Power Servo Motor (Temperature Blend Door) Green-White Position	Register Air Door Tan		Heat-Defrost Door De-Fog – Red-White De-Ice – Yellow-White		Fresh Air Recirc. Air Door Brown		Heater Water Valve Brown		A/C Thermostat Switch (Clutch)
		Position	Vac. ("Hg)	Position	Vac. ("Hg)	Position	Vac. ("Hg)	Position	Vac. ("Hg)	
High	Max. Cool (Recirc.)	A/C	10+	Heat	10+	Recirc.	10+	Off	10+	Clutch On
	Max. Cool (Outside)	A/C	10+	Heat	10+	Outside	0	On	0	
	Temp. Control Range	A/C ✪	10+	Heat	10+	Outside	0	On	0	
		Heat ✪	0	Heat	10+	Outside ●	0	On ●	0	
Low	Max. Heat	Heat	0	Heat	10+	Outside ●	0	On ●	0	
	Max. Cool	A/C	10+	Heat	10+	Outside	0	On	0	
	Temp. Control Range	A/C ✪	10+	Heat	10+	Outside	0	On	0	
		Heat ✪	0	Heat	10+	Outside ●	0	On ●	0	
	Max. Heat	Heat	0	Heat	10+	Outside ●	0	On	0	
Off	Stays in Last Used Setting	Heat	0	Defrost	0	Recirc.	10+	Off	10+	Clutch Off
De-Fog	Max. Cool	Heat	0	Partial Defrost	10+ To Red — 0 To Yellow	Outside	0	On	0	Clutch On
	Temp. Control Range									
	Max. Heat									
De-Ice	Max. Heat	Heat	0	Full Defrost	0	Outside	0	On	0	

1 Vacuum figures are for vacuum increasing from 0" Hg to 12+" Hg. With vacuum decreasing from 12+" Hg to 0" Hg, subtract 1/2" Hg from vacuum figures listed.

✪ A/C – REGISTERED changes from A/C to HEAT as the air temperature increases.

Max. = Maximum A/C = Air Conditioning Vac. ("Hg) = Vacuum in inches of mercury

● Min. = Minimum Recirc. = Recirculate



AUTOMATIC CLIMATE CONTROL
VACUUM SYSTEM SCHEMATIC DIAGRAM

Ford SERVICE TRAINING

19005-18

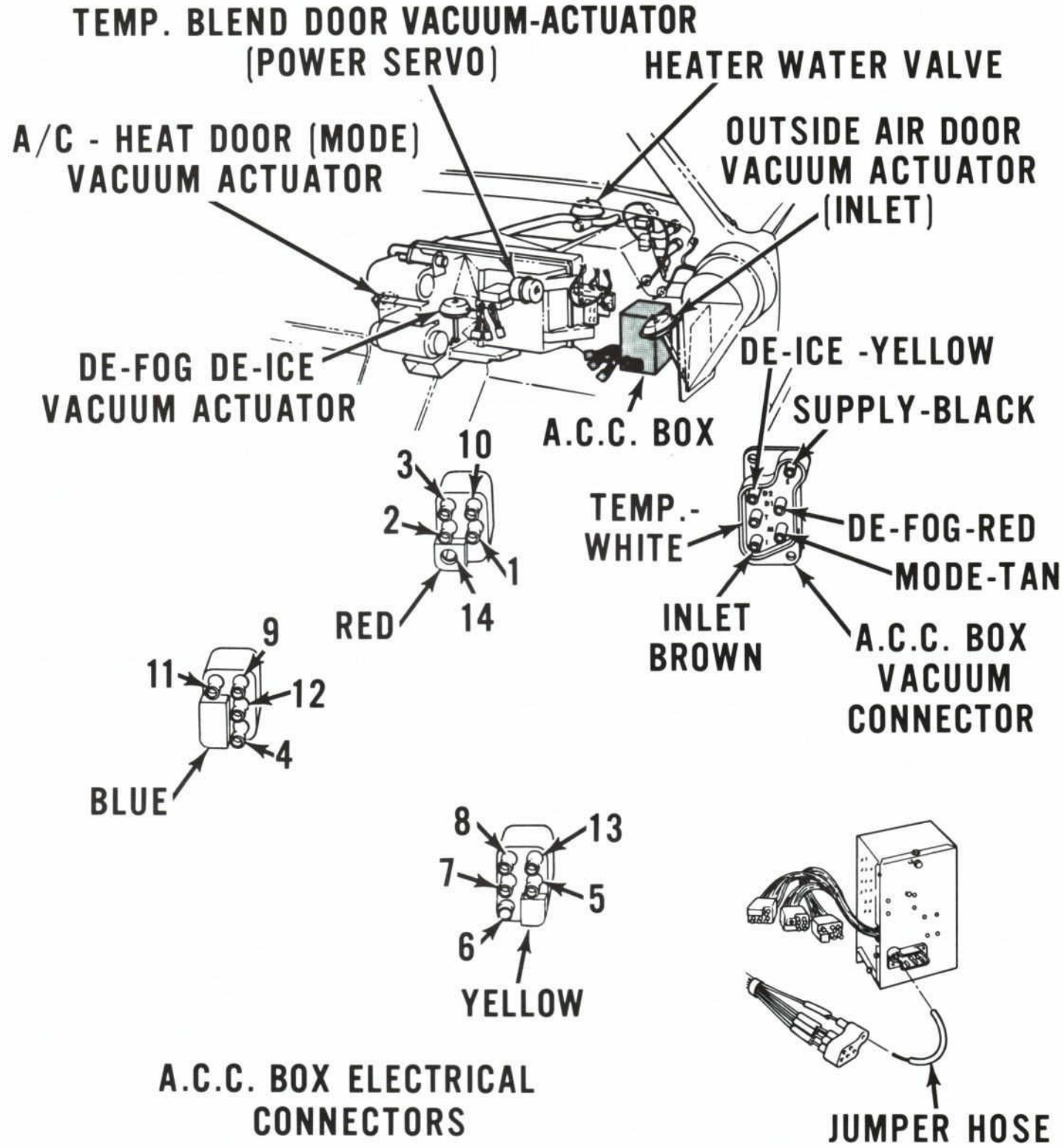
AUTOMATIC CLIMATE CONTROL (A.C.C.) BOX CHECKOUT PROCEDURE

The A.C.C. box can be quickly checked for a malfunction with the following equipment:

- A 6-inch jumper wire with an alligator clip on one end and a double female connector on the other end.
- A jumper wire for ground, 3 feet long with an alligator clip on each end.
- A 12-volt jumper wire with a female connector on one end and an alligator clip on the other end.
- A vacuum gauge, one 1/8" X 2 foot vacuum hose, two vacuum connectors and one 1/8" X 3" vacuum hose.

If the A.C.C. box fails to pass any one of the following tests, the A.C.C. box must be replaced. If the A.C.C. box passes all the tests, there is trouble elsewhere in the system.

1. Remove the glove box to improve accessibility to the A.C.C. box. Ground the A.C.C. box.
2. Disconnect the three electrical multiple connectors from the A.C.C. box. Disconnect the vacuum harness from the A.C.C. box. Connect the short (1/8 X 3") vacuum supply jumper hose between the harness and the A.C.C. box ("S" black). Operate the vehicle at 1500 rpm.
3. CHECK THE "INLET" DOOR SOLENOID . . . . . The ability of the A.C.C. box to operate the outside air door vacuum actuator:
   a. Apply 12 volts to terminal "2" of the red connector. Connect a vacuum gauge to vacuum port "1" on the A.C.C. box. A solenoid click should be heard in the A.C.C. box and vacuum indicated on the gauge.
4. CHECK THE "DE-FOG" SOLENOID . . . . . The ability of the A.C.C. box to operate the de-fog portion of defroster vacuum actuator:
   a. Apply 12 volts to terminal "5" of the yellow connector. Connect the vacuum gauge to port "D1" of the A.C.C. box connector. A solenoid click should be heard in the A.C.C. box and vacuum indicated on the gauge.
5. CHECK THE "DE-ICE" SOLENOID . . . . . The ability of the A.C.C. box to operate the de-ice portion of defroster vacuum:
   a. Apply 12 volts to terminal "9" of the blue connector. Connect the vacuum gauge to port "D2." A solenoid click should be heard in the A.C.C. box and vacuum should be indicated on the vacuum gauge.
6. CHECK THE MODE SOLENOID . . . . . The ability of the A.C.C. to operate the A/C — Heat door vacuum actuator:
   a. Apply 12 volts to terminal "13" of the yellow connector. Connect a vacuum gauge to port "M" of of the A.C.C. box connector. A solenoid click should be heard in the A.C.C. box and vacuum indicated on the gauge.
7. CHECK THE OPERATION OF THE COLD WATER BLOWER CUT-OFF RELAY:
   a. Apply 12 volts to terminal "5" of the yellow connector and ground the terminal "14" of the red connector. A relay click should be heard in the A.C.C. box when grounding the wire.
8. CHECK THE TRANSDUCER . . . . . The ability to heat and to cool:
   a. Connect the yellow multiple connector to the A.C.C. box. Connect the vacuum gauge to port "T" of the A.C.C. box connector. Apply 12 volts to terminal "12" of the blue connector. There should be no vacuum reading on the gauge.
   b. Ground terminal "10" of the red connector. There should be a full vacuum reading on the gauge.
9. Connect the red and blue multiple connectors on the wiring harness to the A.C.C. box. Install the glove box.



AUTOMATIC CLIMATE CONTROL (A.C.C.) BOX CHECKOUT PROCEDURE

19005-19

SERVICE TRAINING

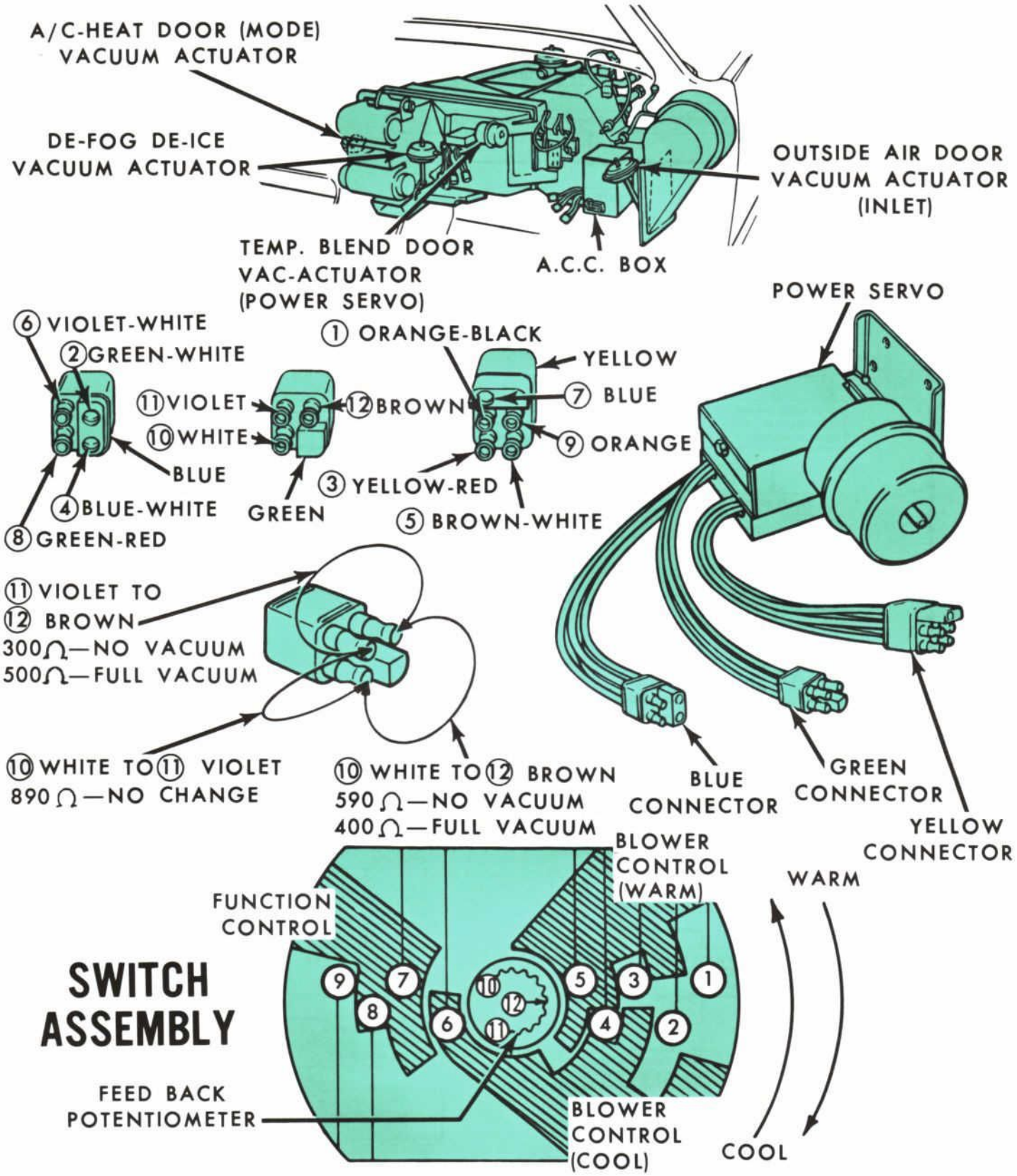
AUTOMATIC CLIMATE CONTROL (A.C.C.) POWER SERVO CHECKOUT PROCEDURE

The A.C.C. power servo can be checked quickly with the following equipment:

- An ohmmeter to check resistance.
- A test lamp to check continuity.
- A vacuum probe (outisde vacuum source).

Refer to illustration 19005-20, and perform the checking procedure in the following sequence.

1. Disconnect the three miltiple connectors (green, blue and yellow) from the power servo. Connect the vacuum probe to an outside vacuum source. Turn the ignition switch to the accessory position.
2. CHECK THE POTENTIOMETER FOR OPEN OR SHORT CIRCUITS.
   a. Check the resistance from 10 to 11, 11 to 12 and 10 to 12 of the green connector. Check the terminals with no vacuum and then with vacuum applied. The resistance should be as illustrated, ± 10 percent or ± 60 ohms, whichever is greater.
3. CHECK THE POTENTIOMETER FOR WEAR.
   a. Check the resistance from terminals 12 to 10, or from 12 to 11 of the green connector while vacuum is slowly increasing from zero to maximum. The readings should be smooth and continuous.
4. CHECK THE SWITCH FOR OPEN OR SHORT CIRCUITS.
   a. Check the resistance from terminals 10, 11 or 12 to ground and to all terminals of the yellow and blue connectors. All readings should be open (one megohm or higher).
5. CHECK THE SWITCH FOR WARM OPERATION WITH NO VACUUM.
   a. Check the continuity from terminal 5 to terminals 1, 2, 3, 4 and 6. Continuity should exist to terminals 1, 2, 3 and 4 but number 6 should be open.
6. CHECK THE SWITCH FOR WARM OPERATION WITH INCREASING AND DECREASING VACUUM.
   a. Check the continuity from terminals 5 to terminals 1, 2, 3 and 4 while vacuum is slowly increased. Circuits 5 to 1, 5 to 2, 5 to 3 and 5 to 4 should each open in sequence. Circuit 5 to 4 should open before the crank reaches midway position. The reverse should occur to the circuits as vacuum is decreased.
7. CHECK THE SWITCH FOR COOL OPERATION WITH NO VACUUM.
   a. Check the continuity from terminal 6 to terminals 1, 2, 3, 4 and 5. All five circuits checks should show open.
8. CHECK THE SWITCH FOR COOL OPERATION WITH INCREASED AND DECREASED VACUUM.
   a. Check the continuity from terminal 6 to terminals 1, 2, 3, and 4 while vacuum is slowly increasing. Circuits 6 to 4, 6 to 3, 6 to 2 and 6 to 1 should each close in sequence. Circuit 6 to 4 should close just after the crank arm reaches mid-position.
9. CHECK THE SWITCH FOR FUNCTIONAL (PROPER) OPERATION AT HIGH VACUUM.
   a. Check the continuity from terminal 7 to 8, 7 to 9 and 8 to 9. Continuity should exist between terminals 7 and 8, 7 and 9, and 8 and 9. No continuity should exist between these three terminals and other terminals.
10. CHECK THE SWITCH FOR FUNCTIONAL (PROPER) OPERATION WHILE GOING TO ZERO VACUUM FROM HIGH.
    a. Check the continuity from terminal 7 to 8, and 8 to 9 as vacuum is slowly decreased to zero. Continuity between 7 and 9 should open soon after the crank arm starts to move. In the approximate midway position of crank arm movement, terminal 7 to 8 should also open. From there on to zero vacuum, the arm should move and the circuit remain open.

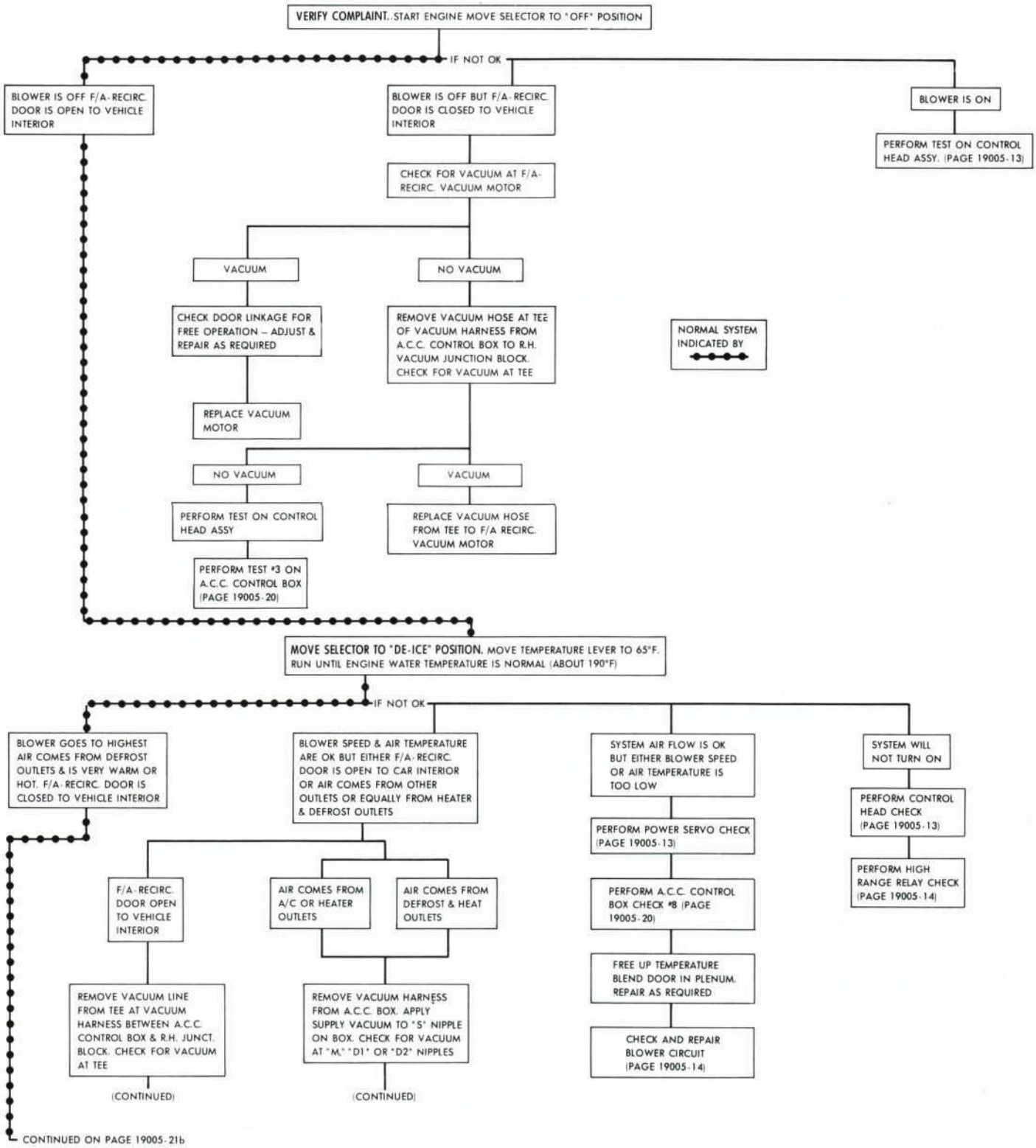


POWER SERVO CHECK OUT PROCEDURE

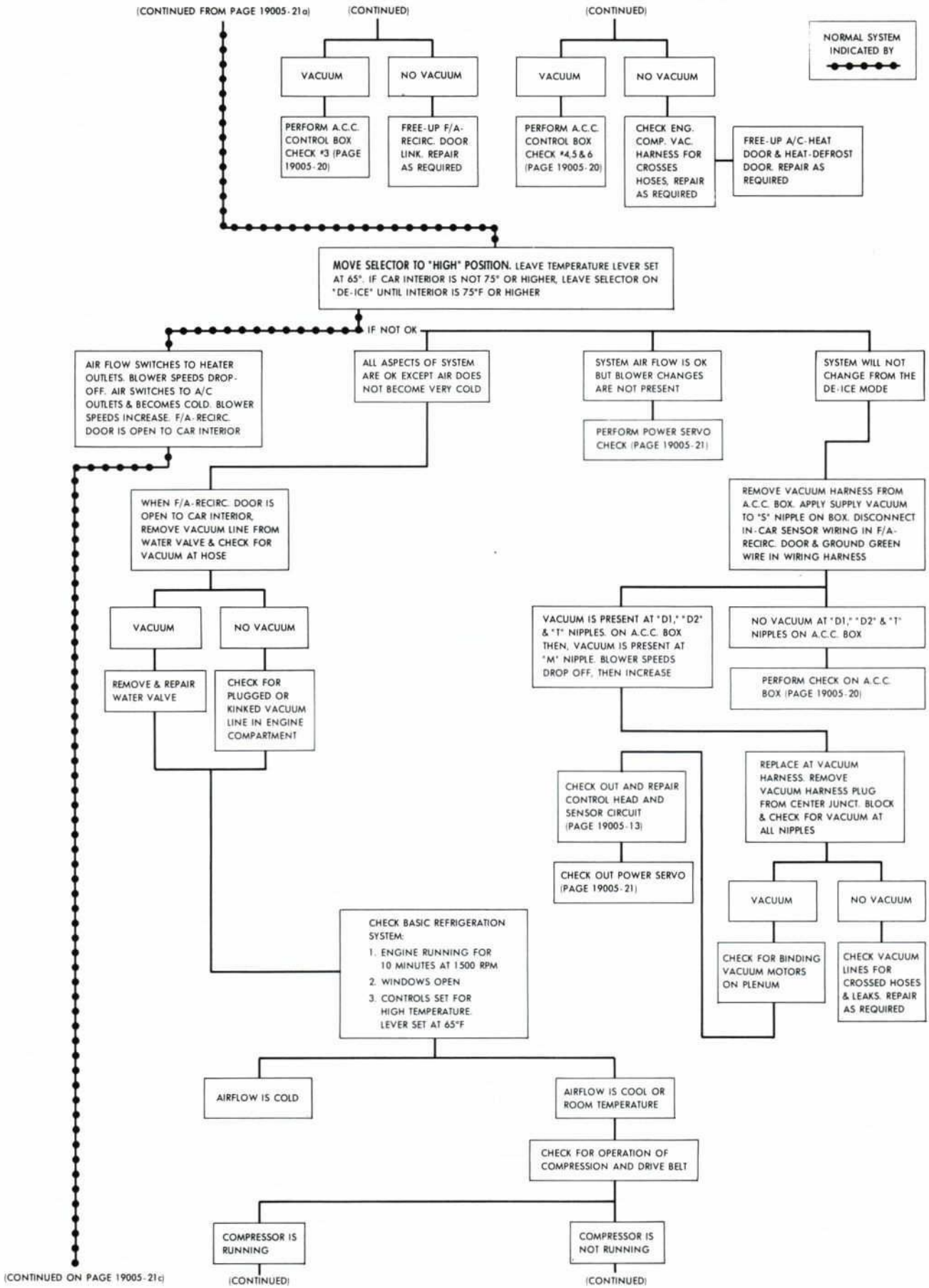
SERVICE TRAINING

19005-20

AUTOMATIC CLIMATE CONTROL SYSTEM DIAGNOSIS FUNCTIONAL CHECK



AUTOMATIC CLIMATE CONTROL SYSTEM FUNCTIONAL CHECK – Continued



AUTOMATIC CLIMATE CONTROL SYSTEM FUNCTIONAL CHECK – Continued

(CONTINUED FROM PAGE 19005-21b)

Continued

CHECK SIGHT GLASS

FOAM

CHECK SYSTEM FOR LEAKS, REPAIR AS NECESSARY, & CHARGE SYSTEM TO 2-1/4 LB. OF REFRIGERANT 12

NO FOAM

CYCLE CLUTCH OFF AND ON. OBSERVE SIGHT GLASS CLOSELY FOR BUBBLES OR FOAM TO APPEAR

NO FOAM BUBBLES APPEAR AT ANY TIME DURING THE CLUTCH CYCLING TEST

CHECK SYSTEM FOR LEAKS, REPAIR AS NECESSARY. CHARGE SYSTEM TO TOTAL OF 2-1/4 LB. REFRIGERANT 12

FOAM OR BUBBLES APPEAR DURING "OFF," CYCLE AND DISAPPEAR DURING "ON" CYCLE. DURING EXTREMELY HOT WEATHER BUBBLES MAY APPEAR OCCASIONALLY IN THE GLASS

CHECK FOR PROPER OPERATION OF COMPRESSOR, DE-ICE SWITCH AND EXPANSION VALVE. REPAIR AS REQUIRED

CHECK FOR IMPROPER DE-ICE SWITCH CAPILLARY TUBE INSTALLATION. CORRECT IF REQUIRED

Continued

ADJUST OR REPLACE DRIVE BELT, IF REQUIRED. DISCONNECT CLUTCH HOT FEED WIRE AT COMPRESSOR & CHECK FOR HOT SPEED AT CONNECTOR

NO FEED

TRACE WIRING BACK TO CONTROL ASSY. CHECK DE-ICE SWITCH, MICRO-SWITCH ON CONTROL ASSY. & BLOWER SWITCH FEED. REPAIR AS REQUIRED

FEED

CHECK CLUTCH BRUSHES FOR PROPER OPERATION. REPLACE IF NECESSARY

REPLACE CLUTCH

NORMAL SYSTEM INDICATED BY

MOVE SELECTOR TO "LOW" POSITION. MAINTAIN TEMPERATURE LEVER ST 65°F. IF CAR INTERIOR IS BELOW 75°F., HEAT INTERIOR WITH UNIT UNTIL TEMPERATURE IS 75°F., OR HIGHER

IF OK

AIR FLOW IN QUANTITY. F/A-RECIRC. DOOR IS CLOSED TO CAR INTERIOR

IF NOT OK

SYSTEM AIR FLOW IS OK. BUT AIR QUANTITY DOES NOT DECREASE

CHECK HIGH RANGE RELAY FOR PROPER OPERATION. (PAGE 19005-14)

SYSTEM DOES NOT CHANGE FROM "HIGH" POSITION

PERFORM CONTROL HEAD AND SENSOR CIRCUIT CHECK. (PAGE 19005-13)

MOVE SELECTOR TO "DE-FOG" POSITION

IF OK

BLOWER SPEED INCREASES AND AIRFLOW SPLITS – APPROX. 40% OUT DEFROSTER AND 60% OUT HEATER. AIR TEMPERATURE DOES NOT CHANGE

END TEST

IF NOT OK

AIRFLOW IS OK BUT BLOWER SPEED DOESN'T INCREASE

CHECK HIGH RANGE RELAY FOR PROPER OPERATION (PAGE 19005-14)

AIR COMES FROM A/C OUTLETS OR FROM EITHER HEATER OR DEFROSTER OUTLETS ONLY

REMOVE HARNESS PLUG FROM CENTER JUNCTION BLOCK. CHECK FOR VACUUM AT ALL NIPPLES ON BLOCK

VACUUM AT TAN OR YELLOW

PERFORM A.C.C. BOX CHECK (PAGE 19005-20)

CHECK CONTROL HEAD SENSOR CIRCUIT (PAGE 19005-13)

VACUUM AT RED NIPPLE ONLY

CHECK FOR BINDING VACUUM MOTOR LINKAGE ON DEFROST DOOR

REPLACE DEFROST VACUUM MOTOR