

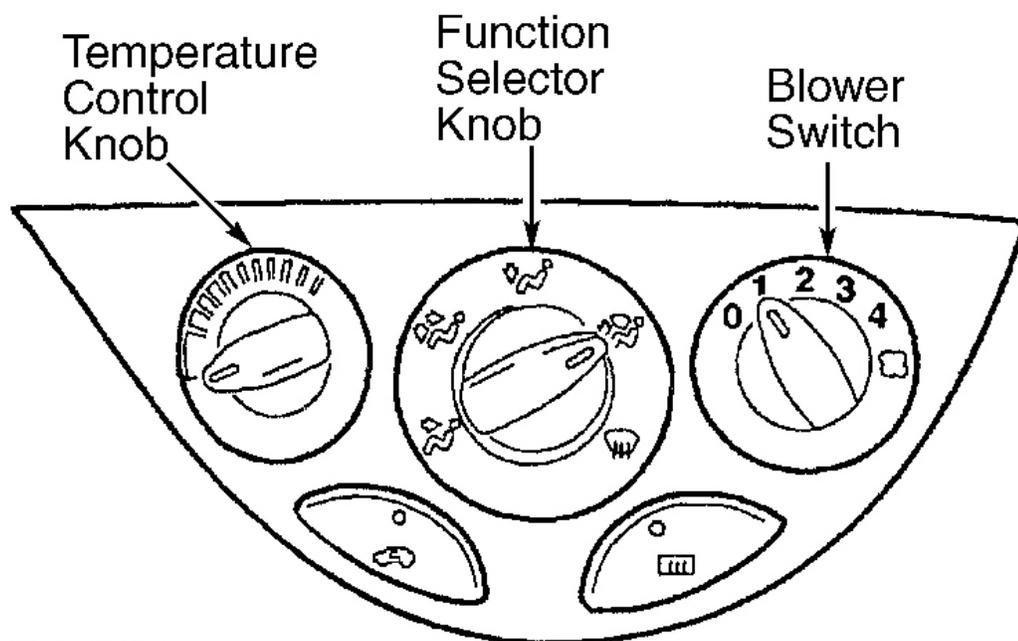
2002 HEATER SYSTEMS**Focus****DESCRIPTION**

WARNING: Vehicle is equipped with Supplemental Inflatable Restraint (SIR) system. When servicing vehicle, use care to avoid accidental air bag deployment. SIR system-related components are located in various locations throughout interior and exterior of vehicle, depending on application. Do not use electrical test equipment on or near these circuits. If necessary, deactivate SIR system before servicing components. See appropriate AIR BAG RESTRAINT SYSTEMS article in RESTRAINTS.

AIR DISTRIBUTION & FILTERING

Vehicle has a conventional heater control panel with 3 rotary switches. See **Fig. 1** . Engine coolant constantly flows through heater core. Heater function is controlled by a mechanical air temperature valve. Temperature control and air distribution flaps are mechanically operated by 2 Bowden cables. Recirculation air function is operated by a switch which operates a servo motor. Air distribution valves are operated by means of a simple rotary switch with 5 positions; footwell, footwell/demist, footwell/headroom, headroom and demist.

Air is supplied to windscreen and side windows regardless of air distribution setting. Passenger compartment air filter is fitted as standard in most countries. This cleans incoming fresh air of pollen and dirt particles. It must be renewed after every 25,000 miles (40,000 km) under normal operation conditions, or after 12,000 miles (20,000 km) under difficult conditions. If no passenger compartment air filter is installed, a plastic grille is fitted over air intake. This can easily be replaced with a passenger compartment air filter.



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Fig. 1: Identifying Heater Control Panel Rotary Switch Locations
 Courtesy of FORD MOTOR CO.

OPERATION

CONTROL PANEL ASSEMBLY

Temperature Control Knob

The temperature knob mechanically operates a cable through a cam mechanism to adjust position of temperature blend door. Temperature blend door is in plenum assembly. When temperature knob is in cool position (turned fully counterclockwise), temperature blend door stops airflow to heater core. See **Fig. 1**. When knob is in warm position (turned fully clockwise), air is directed through heater core. When knob is in intermediate positions, heated air is blended with cooler incoming air to achieve desired temperature.

Function Selector Knob

Function selector knob can be placed in panel, panel/floor, floor, floor/defrost or defrost position. See **Fig. 1**. Function selector knob operates a cable connected to recirculation air actuator (next to blower motor). Which operate floor/defrost and panel doors.

At face level, main flow of air enters passenger compartment at face level.

At face level/floor level, main flow of air enters passenger compartment in equal parts at face level and floor level, and a small amount flows to demister nozzles of side windows.

At floor level, main flow of air enters passenger compartment at floor level, and a smaller amount flows to demister nozzles of side windows.

At demist/floor level, main flow of air enters passenger compartment in equal parts at windscreen and at floor level, and a smaller amount flows to demister nozzles of side windows.

At demist, main flow of air enters passenger compartment at windscreen and a smaller amount flows to demister nozzles of side windows.

Blower Switch

Blower motor is controlled by a 5-position blower switch. See **Fig. 1** . Blower switch starts with off (zero) and progresses to position No. 4 for high speed. Blower switch is turned off by rotating switch fully counterclockwise to off (zero) position. 3 lower operating speeds are obtained with a blower motor resistor, connected in series with blower motor switch, operating on negative side of A/C blower motor. High speed operation by-passes blower motor resistor.

HEATING & VENTILATION

Coolant flows through heater core constantly. Heating capacity is controlled by means of a mechanical air temperature valve.

All vehicles have a recirculated air function, with flap controlled by a servo motor. If recirculated air function is selected, it remains active even when ignition is switched on or off.

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Component	Location
Blower Motor	Under Dash, Behind Glove box
Control Panel Assembly	Center of Instrument Panel
Heater Core	In Heater Core Housing, Right-Center Of Dash
Recirculation Air Actuator	Behind Glove Box

TROUBLESHOOTING

POOR VENTILATION

Poor ventilation of vehicle interior and misting of windshield, side windows and rear window may be caused by insufficient forced air extraction in area of rear bumper. This should be rectified by installing a modified cover to forced air extraction vents.

In some markets, poor ventilation of vehicle interior and misting of windshield, side windows and rear window.

or icing-up could be caused by certain weather conditions. Snow slush could be swirling up and lodging between rear panel blocking force air extension vents. This should be resolved by cleaning blockage and installing mudflaps.

HEATER CORE HOUSING WHISTLING NOISES

Whistling noise may occur when blower fan is set to level 3 or 4. This is probably do to manufacturing tolerances causing a gap between components of heater core housing. This should be rectified by applying additional sealing tape to heater core housing to seal off components.

SYMPTOM TESTS

SYMPTOM TESTS DIRECTORY

Symptom	Test
Blower Motor Does Not Operate	<u>D</u>
Blower Motor Is Inoperative At Low Speeds	<u>E</u>
Blower Motor Operates Continuously At High Speed	<u>F</u>
Blower Motor Does Not Operate At High Speed But Does At Low Speeds	(1)
No Operation In All Temperature Settings	(2)
(1) Blower motor switch is at fault. Install new blower motor switch.	
(2) Visually inspect temperature control cable, blend door or temperature control switch. Repair as necessary.	

TEST D: BLOWER MOTOR DOES NOT OPERATE

NOTE: For circuit reference, see **WIRING DIAGRAMS** .

Possible Causes

- Blower Motor
- Fuse(s)
- Circuits
- Blower Motor Switch

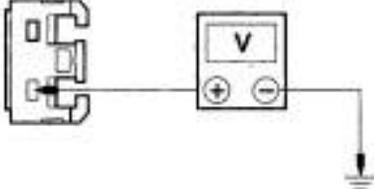
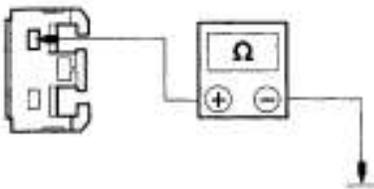
Diagnostic Procedure

For testing procedure, see **Fig. 2 -Fig. 4** .

CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK FUSE FUSE 64 (30A)	<ol style="list-style-type: none"> 1 CHECK Fuse 64 (30A). <ul style="list-style-type: none"> • Are the fuses OK? → Yes GO to D2 → No INSTALL new fuses as required. TEST the system for normal operation. If the fuse fails again, CHECK for a short to ground. REPAIR as necessary.
D2: CHECK VOLTAGE TO BLOWER MOTOR	<ol style="list-style-type: none"> 1 Key in OFF position. 2 Disconnect Blower Motor 3 Key in ON position.

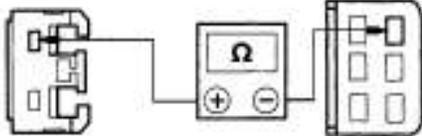
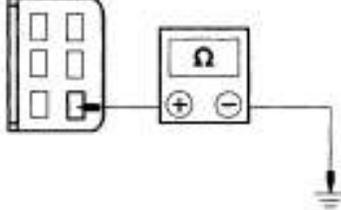
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Fig. 2: Test D (1 Of 3 - Steps D1-D2)
 Courtesy of FORD MOTOR CO.

CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Measure the voltage between blower motor pin 1, circuit 15-FA18 (GN/OG), harness side and ground.</p> <p>• Is the voltage greater than 10 volts? → Yes GO to D3 → No REPAIR circuit 15-FA18 (GN/OG). TEST the system for normal operation.</p>
<p>D3: CHECK THE GROUND TO THE HEATER BLOWER MOTOR</p>	
<p>NOTE: Ensure that the heater blower switch is in MAX position (position 4).</p>	
	<p>1 Key in OFF position.</p> <p>2 Measure the resistance between heater blower motor, connector, pin 2, circuit 31S-FA18 (BK/RD), harness side and ground.</p> <p>• Is the resistance less than 5 ohms? → Yes INSTALL a new heater blower motor. TEST the system for normal operation. → No GO to D4</p>
<p>D4: CHECK CIRCUIT 31S - FA18 (BK/RD) FOR OPEN</p>	
<p>1 Disconnect Heater blower switch.</p>	

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Fig. 3: Test D (2 Of 3 - Steps D3-D4)
 Courtesy of FORD MOTOR CO.

CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the resistance between heater blower, connector pin 2, circuit 31S-FA18 (BK/RD), and heater blower switch, connector, pin 4, circuit 31S-FA33 (BK/OG).</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to D5 → No REPAIR circuit 31S-FA18 (BK/RD), or circuit 31S-FA33 (BK/OG). TEST the system for normal operation.
<p>D5: CHECK CIRCUIT 31-FA25 (BK) FOR GROUND</p>	
	<p>1 Measure the resistance between heater blower switch connector, pin 6 circuit 31-FA25(BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new heater blower switch. TEST the system for normal operation. → No REPAIR ground circuit 31-FA25(BK). TEST the system for normal operation.

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Fig. 4: Test D (3 Of 3 - Steps D4 Cont.-D5)
 Courtesy of FORD MOTOR CO.

TEST E: BLOWER MOTOR IS INOPERATIVE AT LOW SPEEDS

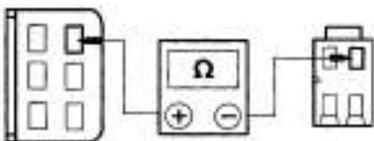
NOTE: For circuit reference, see WIRING DIAGRAMS .

Possible Causes

- Circuits
- Blower Motor Switch
- Blower Motor Series Resistor

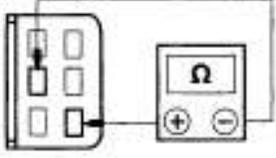
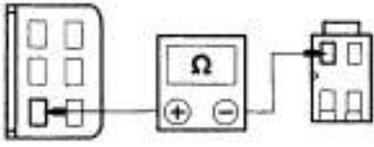
Diagnostic Procedure

For testing procedure, see **Fig. 5 -Fig. 9** .

CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK WHICH SPEED(S) ARE INOPERATIVE	
	<ol style="list-style-type: none"> 1 Key in ON position. <ul style="list-style-type: none"> • Are all the lower speeds inoperative? <p>→ Yes GO to E2</p> <p>→ No Blower motor speed 1 inoperative then GO to E4 Blower motor speed 2 inoperative then GO to E6 Blower motor speed 2 inoperative then GO to E8</p>
E2: CHECK CIRCUIT 31S - FA1 (BK/BU) FOR OPEN	
	<ol style="list-style-type: none"> 1 Key in OFF position. 2 Disconnect Heater blower switch. 3 Disconnect Heater blower resistor. 4 Measure the resistance between heater blower switch connector, pin 4, circuit 31S-FA1 (BK/BU), and heater blower resistor, connector, pin 1. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to E3</p> <p>→ No REPAIR circuit 31S-FA1 (BK/BU). TEST the system for normal operation.</p>
E3: CHECK OPERATION OF HEATER BLOWER SWITCH	
	<ol style="list-style-type: none"> 1 Ensure that the heater blower switch is in speed 2 position.

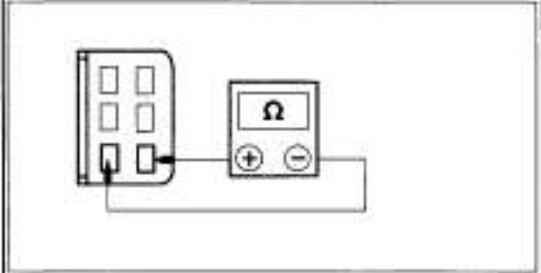
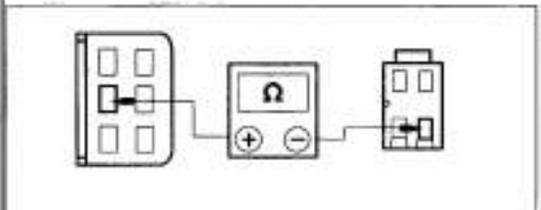
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Fig. 5: Test E (1 Of 5 - Steps E1-E3)
Courtesy of FORD MOTOR CO.

CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the resistance between connector, pin 6 component side and connector, pin 2 component side.</p> <p>• Is the resistance less than 5 ohms? → Yes INSTALL a new heater blower series resistor. TEST the system for normal operation. → No INSTALL a new heater blower switch. TEST the system for normal operation.</p>
<p>E4: CHECK CIRCUIT 31S - FA30 (BK/WH) FOR OPEN</p>	
	<p>1 Key in OFF position. 2 Disconnect Heater blower switch. 3 Disconnect Heater blower resistor. 4 Measure the resistance between heater blower switch, connector, pin 3, circuit 31S-FA30 (BK/WH), and heater blower resistor, connector, pin 3.</p> <p>• Is the resistance less than 5 ohms? → Yes GO to E5 → No REPAIR circuit 31S-FA30 (BK/WH). TEST the system for normal operation.</p>

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Fig. 6: Test E (2 Of 5 - Steps E3 Cont.-E4)
 Courtesy of FORD MOTOR CO.

CONDITIONS	DETAILS/RESULTS/ACTIONS
E5: CHECK OPERATION OF HEATER BLOWER SWITCH	
	<ol style="list-style-type: none"> 1 Ensure that the heater blower switch is in speed 1 position. 2 Measure the resistance between heater blower switch connector, pin 6, component side and heater blower switch connector, pin 3, component side. <p>• Is the resistance less than 5 ohms?</p> <p>→ Yes INSTALL a new heater blower series resistor. TEST the system for normal operation.</p> <p>→ No INSTALL a new heater blower switch. TEST the system for normal operation.</p>
E6: CHECK CIRCUIT 31S - FA31 (BK/YE) FOR OPEN	
	<ol style="list-style-type: none"> 1 Key in OFF position. 2 Disconnect Heater blower switch. 3 Disconnect Heater blower resistor. 4 Measure the resistance between heater blower switch, connector, pin 2, circuit 31S-FA31 (BK/YE), and heater blower resistor, connector, pin 2. <p>• Is the resistance less than 5 ohms?</p> <p>→ Yes GO to E7</p> <p>→ No</p>

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Fig. 7: Test E (3 Of 5 - Steps E5-E6)
Courtesy of FORD MOTOR CO.