

Diagnosis and Testing

General Equipment

Digital Multimeter (compatible with K-type thermocouple)
Ford diagnostic equipment
Refrigerant center
Thermometer - Fluke 80 PK-8 (FSE number 260 4102 001 07)

Refer to Wiring Diagram Section 054-1 for schematic and connector information.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

VISUAL INSPECTION

Mechanical	Electrical
• Coolant level • Pollen filter • Refrigerant lines • Drive belt • Thermostatic expansion valve • Receiver drier • Condenser • Air conditioning (A/C) compressor	• Fuse(s) • Relay(s) • Wiring harness • Electrical connector(s) • Front blower motor • Front blower motor switch • Front blower motor resistor • Rear blower motor (if fitted) • Rear blower motor switch (if fitted) • Rear blower motor resistor (if fitted) • Rear blower controller (if fitted) • Air inlet door actuator • Defrost vent/register door actuator • Temperature door actuator • Recirculation door actuator • Ambient air temperature sensor • Front evaporator temperature sensor • Rear evaporator temperature sensor (if fitted) • Refrigerant valve (if fitted) • Auxiliary blower switch (if fitted) • Air conditioning (A/C) clutch and air conditioning (A/C) clutch field coil • Air conditioning (A/C) clutch relay • Air conditioning (A/C) pressure transducer • Fuel-fired heater control module (if fitted) • Fuel-fired heater coolant pump motor (if fitted) • Fuel-fired heater fuel pump motor (if fitted) • PTC heater control module (if fitted) • Auxiliary heater control module (AHCM) • Auxiliary junction box (AJB) • Battery Junction Box (BJB) • Body control module (BCM) • Powertrain control module (PCM)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Diagnostic tab within the [Ford diagnostic equipment](#).

Refrigerant Circuit - Quick Check



WARNING: The air conditioning system is filled with refrigerant R134a. Observe "Health and Safety Precautions". For further information

REFER to: [Health and Safety Precautions](#) (100-00 General Information, Description and Operation).

Refrigerant circuit check



WARNING: Under certain circumstances, refrigerant lines and A/C components may be extremely hot or cold. Exercising care, touch the refrigerant lines or A/C components in order to check this. Failure to observe this instruction can lead to injury.

- The refrigerant line from the refrigerant compressor to the condenser must be hot.
- The refrigerant line from the A/C condenser to the fixed orifice tube must be warm, but not so hot as the refrigerant line mentioned above.
- Determine the difference in temperature upstream and downstream of the A/C condenser by measuring the temperatures at the refrigerant lines. The temperature difference should be more than 20° C, depending on the ambient temperature. If the temperature difference is less, check the condenser for contamination or damage to the fins as well as operation of the radiator fan.
- The refrigerant line between the fixed orifice tube and the evaporator must be cold from the point where the fixed orifice tube is installed. Depending on the weather, the line may also be iced up on the outside.
- The refrigerant line between the evaporator and the A/C compressor including the accumulator must be cold.

Evaporator outlet temperature test

To test the power of the A/C system, the temperature of the evaporator outlet line must be measured. To do this, the following preconditions must be met:

- Open all windows.
- Set the air distribution to the defrost/dashboard position and open all the ventilation nozzles.
- Deactivate recirculated air function.
- Select lowest blower switch setting.
- Select lowest temperature setting.

NOTE: The temperature measurement cannot be done with a thermometer which makes no contact. Incorrect readings could be made because of reflections from surfaces.

Connect temperature sensor (Fluke 80 PK-8) to the refrigerant line from the evaporator to the accumulator in the area of the accumulator (metal line). Connect the temperature sensor to the multimeter.

Start the engine and allow it to run at idle speed for several minutes.

Switch on the air-conditioning system.

After three minutes, measure the surface temperature of the evaporator outlet line.

If the temperature measured is 2° C or lower (vehicles with automatic transmission: 5° C or lower) the A/C system is OK. If the temperature is higher, the A/C system may be under-filled.

Frequent faults and their causes

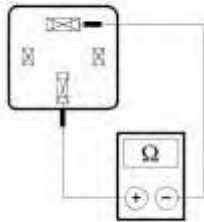
Should a customer express concern about poor cooling performance of the A/C system it must be ensured that the temperature control valve actuation is OK.

- No or poor cooling performance:
 - Blockage or narrowing in a refrigerant line or in the accumulator: The location of the blockage or narrowing can easily be found by comparing temperatures at the refrigerant lines and at the accumulator. The blockage or restriction is located at the point where the temperature difference is identified. **Note: A temperature difference in the area of the fixed orifice tube is normal.** Once the location of the blockage or restriction has been detected, check the relevant component and renew if necessary.
- Cooling power suddenly deteriorates (returns to normal after the compressor has been switched off for about 5 minutes):
 - The cause is an iced-up fixed orifice tube because of moisture in the refrigerant circuit. In order to ensure that moisture is completely removed from the refrigerant circuit, evacuation time must be extended to 2-3 hours and the dehydrator must be renewed. For further information
REFER to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).

Component Tests

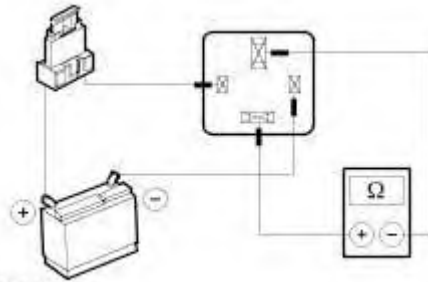
Air conditioning (A/C) clutch relay

1. Check the normally open contact in the unswitched state:
 - Measure the resistance at the air conditioning clutch relay, between pin 3 and pin 5, component side.
 - Is a resistance of more than 10,000 Ohm measured?
 1. If yes, go to 2.
 2. If no, RENEW the air conditioning clutch relay.



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2. Check the normally open contact in the switched state:
 - Use a fused test cable (1 A) to connect pin 1 of the air conditioning clutch relay, component side, to the battery positive terminal.
 - Use a test cable to connect pin 2 of the air conditioning clutch relay, component side, to the battery negative terminal.
 - Measure the resistance at the air conditioning clutch relay, between pin 3 and pin 5, component side.
 - Is a resistance of less than 2 Ohm registered?
 1. If yes, then the air conditioning clutch relay is OK.
 2. If no, RENEW the air conditioning clutch relay.



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