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FORD Escape 2017 Manual – Complete Service & Repair

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Engine Cooling

303-03A Engine Cooling - 2.7L EcoBoost (238kW/324PS)	***2022 F-150***
Diagnosis and Testing	***Procedure revision date: 09/20/2022***

Engine Cooling

Special Tool(s)

 E144765	Coolant/Battery Refractometer ROB75240 or equivalent
 E144766	Radiator Tester 014-R1072 or equivalent
 E145674	UView® Combustion Leak Tester UVU560000-R

Diagnostic Trouble Code (DTC) Chart

Start/Run/Move > Fluids > Coolant > Consumption	GO to Pinpoint Test A
Start/Run/Move > Fluids > Coolant > Consumption	GO to Pinpoint Test B
Start/Run/Move > Fluids > Coolant > Visible Leak	GO to Pinpoint Test A
Start/Run/Move > Fluids > Coolant > Visible Leak	GO to Pinpoint Test B

Symptom Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: Diagnostic Methods

(100-00 General Information, Description and Operation).

Condition	Possible Sources	Actions
Loss of coolant	Refer to the Pinpoint Test	GO to Pinpoint Test A
The engine overheats.	Refer to the Pinpoint Test	GO to Pinpoint Test B
The engine does not reach normal operating temperature.	Refer to the Pinpoint Test	GO to Pinpoint Test C
The electric cooling fan is inoperative in one or more speeds or does not operate correctly.	• Wiring • Relays • Fuses • Cooling fan motor	REFER to: Cooling Fan Control(303-03A Engine Cooling - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
The electric cooling fan stays on all the time.	• Wiring • Relays	REFER to: Cooling Fan Control(303-03A Engine Cooling - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

A1 CHECK COMPONENTS FOR DAMAGE OR FAILURE

- Visually inspect the possible sources for obvious signs of physical damage or failure.

Are any concerns present?

Yes	REPAIR as needed.
No	GO to A2

A2 CHECK THE ENGINE COOLANT LEVEL AND PRESSURE TEST THE ENGINE COOLING SYSTEM

NOTE

Allow the engine to cool before checking the engine coolant level.

- Ignition OFF
- Visually inspect the engine coolant level at the degas bottle and adjust as necessary. Pressure test the engine cooling system. Refer to Component Tests, Cooling System Pressure Test in this section.

Does the engine cooling system leak externally?

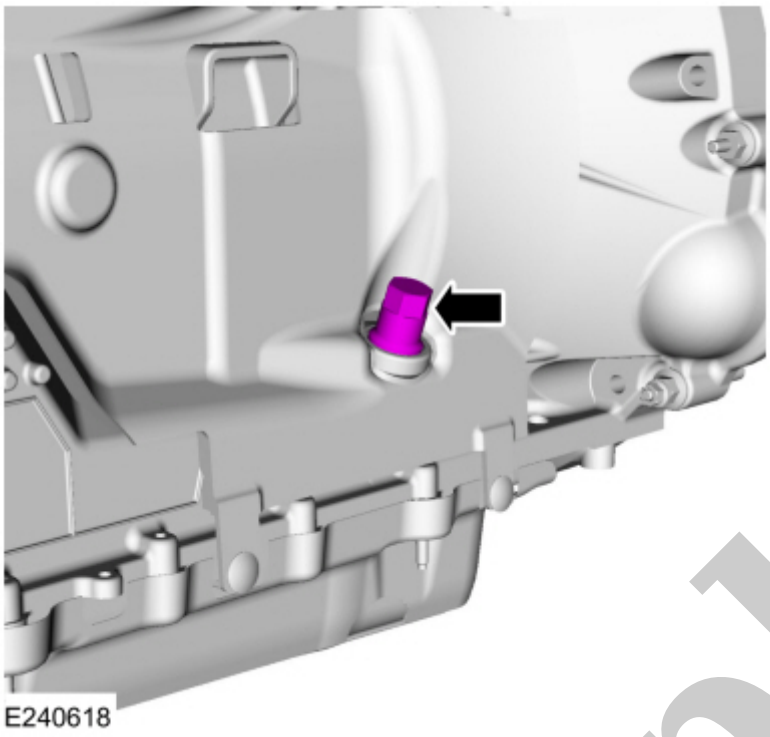
Yes	REPAIR or INSTALL new components.
No	GO to A3

A3 CHECK THE ENGINE COOLANT FOR AN INTERNAL LEAK

- Inspect the engine coolant in the degas bottle for signs of engine oil.

Is engine oil evident in the engine coolant?

Yes	REFER to: Engine - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline(303-00 Engine System - General Information, Diagnosis and Testing).
No	GO to A4

- 

- Check the transmission fluid for engine coolant.

Is engine coolant evident in the transmission fluid?

Yes	INSTALL a new transmission fluid cooler or transmission fluid heat exchanger. REFER to: Transmission Fluid Heat Exchanger (307-02A Transmission Cooling - 10-Speed Automatic Transmission – 10R80, Removal and Installation). REPAIR the transmission as necessary. REFER to: Diagnosis By Symptom (307-01A Automatic Transmission - 10-Speed Automatic Transmission – 10R80, Diagnosis and Testing). TEST the system for normal operation.

No	GO to A7

A7 CHECK THE COOLING SYSTEM FOR COMBUSTION GASES

NOTE

P1299:00	Information	by the CHT (cylinder head temperature) sensor.

Possible Sources

- Low coolant level
- External engine coolant leak
- Airlock in system
- Pressure relief cap installation
- Restricted airflow through A/C (air conditioning) condenser/radiator
- Internal engine coolant leak
- Coolant condition/concentration
- Turbochargers
- Non-OEM engine enhancement components
- Cooling fan or electric cooling fan
- Cooling fan clutch (if equipped)
- CHT (cylinder head temperature) sensor
- ECT (engine coolant temperature) sensor
- Radiator
- Thermostat
- Coolant pump
- Coolant flow restriction
- Active grill shutter assembly

B1 CHECK COMPONENTS FOR DAMAGE OR FAILURE

- Visually inspect the possible sources for obvious signs of physical damage or failure.

Are any concerns present?

Yes	REPAIR as needed.

No	GO to B2

B2 CHECK FOR PCM (POWERTRAIN CONTROL MODULE) DTCS

- Ignition ON.
- Using a scan tool, perform PCM (powertrain control module) self-test.

Is DTC (diagnostic trouble code) P0217 and/or P1299 present?

NOTE

Verify no vehicle front end damage is present.

- Check the radiator or A/C (air conditioning) condenser for an external obstruction such as leaves or cardboard and verify all air deflectors are present.

Is an airflow obstruction present or air deflectors missing?

Yes	REPAIR as necessary.

No	GO to B5

B5 CHECK THE ENGINE COOLANT LEVEL AND PRESSURE TEST THE COOLING SYSTEM

- Ignition OFF.
- Visually inspect the engine coolant level at the degas bottle and adjust as necessary. Pressure test the engine cooling system. Refer to Component Tests, Cooling System Pressure Test in this section.

Does the engine cooling system leak externally?

Yes	REPAIR or INSTALL new components.

No	GO to B6

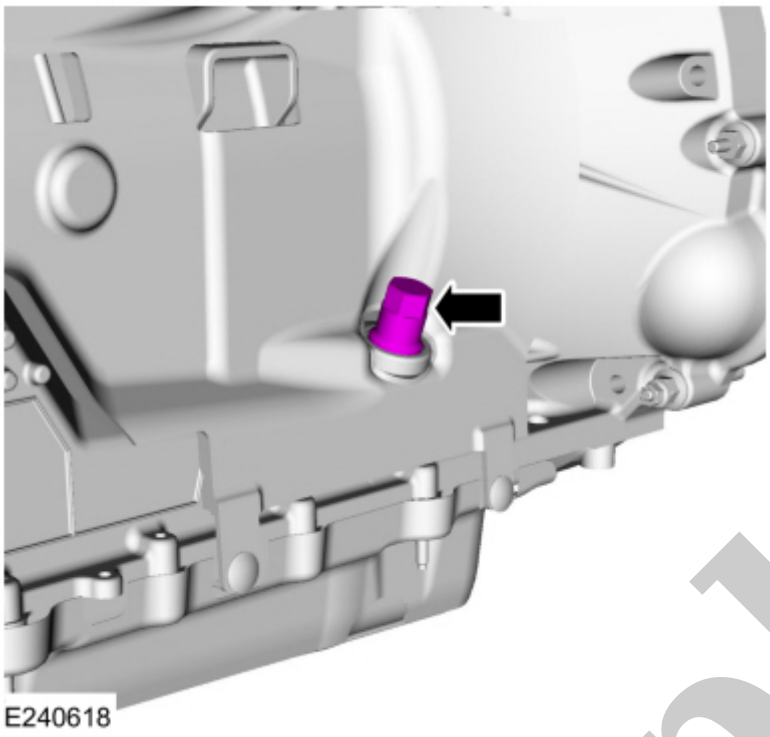
B6 CHECK THE ENGINE COOLANT FOR AN INTERNAL LEAK

- Inspect the engine coolant in the coolant expansion tank for signs of engine oil.

Is engine oil evident in the coolant?

Yes	REFER to: Engine - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline(303-00 Engine System - General Information, Diagnosis and Testing).

No	GO to B7

- 

- Check the transmission fluid for engine coolant.

Is engine coolant evident in the transmission fluid?

Yes	INSTALL a new transmission fluid cooler or transmission fluid heat exchanger. REFER to: Transmission Fluid Heat Exchanger (307-02A Transmission Cooling - 10-Speed Automatic Transmission – 10R80, Removal and Installation). REPAIR the transmission as necessary. REFER to: Diagnosis By Symptom (307-01A Automatic Transmission - 10-Speed Automatic Transmission – 10R80, Diagnosis and Testing). TEST the system for normal operation.

No	GO to B10

B10 CHECK THE COOLING SYSTEM FOR COMBUSTION GASES

NOTE

- Start the engine.
- Place the climate control function selector in the MAX A/C position and the blower motor switch in the HI position.

Did the electric cooling fan operate?

Yes	GO to B13

No	DIAGNOSE the electric cooling fan operation. REFER to: Cooling Fan Control (303-03A Engine Cooling - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

B13 CHECK THE COOLANT PUMP OPERATION

- Start the engine.
- Allow the engine to run for 30 minutes. Place the climate control function selector in the MAX HEAT position. Feel the heater outlet hose.

Is the heater outlet hose hot?

Yes	GO to B14

No	INSTALL a new coolant pump. REFER to: Coolant Pump (303-03A Engine Cooling - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

B14 CHECK THE THERMOSTAT OPERATION

NOTE

This cooling system uses a cold side thermostat. The coolant in the radiator must reach full operating temperature for the thermostat to remain in an open state.

- Start the engine.
- Allow the engine to run for 30 minutes. Place the climate control function selector in the MAX HEAT position. Feel the lower radiator hose.

Is the lower radiator hose hot?

Concerns of engine inability to reach normal operating temperature typically occur when the rate of coolant flow through some coolant circuits (radiator, heater core) is more than expected given the conditions. Heat is not allowed to build in the engine because a heat exchanger is removing too much heat, including the radiator, heater core and oil cooler. In addition, perceived concerns that the engine does not reach normal operating temperature can be related to a low coolant level or trapped air which does not allow for hot coolant to be available at the heater core, an inoperative climate control system, or for concerns perceived or related to an incorrect engine temperature gauge indication.

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
PCM (powertrain control module) P0125:00	Insufficient Coolant Temp For Closed Loop Fuel Control: No Sub Type Information	Sets in the PCM (powertrain control module) when the CHT (cylinder head temperature) sensor has not achieved the required temperature level to enter closed loop operating conditions within a specified amount of time after starting the engine.
PCM (powertrain control module) P0128:00	Coolant Thermostat (Coolant Temp Below Thermostat Regulating Temperature): No Sub Type Information	Sets in the PCM (powertrain control module) when the thermostat monitor has not achieved the required engine operating temperature within a specified amount of time after starting the engine.

Possible Sources

- Low coolant level
- Thermostat
- Temperature gauge
- CHT (cylinder head temperature)
- ECT (engine coolant temperature) sensor

WARNING

Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.

C1 CHECK COMPONENTS FOR DAMAGE OR FAILURE