



P1641 · Ford

Fuel Pump Primary Circuit Failure

P1641 on Ford vehicles indicates that the powertrain control module (PCM) has detected a fault in the primary electrical circuit that powers the fuel pump, typically an open circuit, short to ground, or excessive current draw. The PCM monitors this circuit for expected voltage and current, and when the readings fall outside the programmed range, it sets this code and may disable the fuel pump to prevent damage.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Ford specific	High	Intermediate	Computer and output circuits

Symptoms you may notice

- The engine cranks but does not start because the fuel pump is not running.
- The engine may start briefly and then stall immediately after the initial prime pulse.
- Intermittent no-start condition, especially after the vehicle sits for a while or in damp weather.
- The check engine light is illuminated, often accompanied by a fuel pump-related code in the powertrain control module.
- A noticeable lack of power or hesitation under load if the pump is running weakly due to high resistance in the circuit.
- Often no symptoms besides the warning light if the fault is intermittent and the pump still receives adequate power.

Common causes, most likely first

- 1 A failed fuel pump relay or a relay that is not receiving the proper control signal from the PCM.
- 2 Corroded, loose, or damaged wiring and connectors in the fuel pump primary circuit, especially at the inertia switch or fuel tank connector.
- 3 A faulty inertia switch (fuel cut-off switch) that has tripped or has high resistance internally.
- 4 An open or shorted fuel pump motor winding, causing excessive current draw or no current flow.
- 5 A blown fuse or a fuse that has degraded and is not passing full current to the fuel pump circuit.
- 6 A poor ground connection for the fuel pump at the chassis or fuel tank mounting point.
- 7 A PCM driver circuit failure inside the powertrain control module, though this is less common than wiring or pump issues.



How to diagnose and fix it

- 1 Check the fuel pump fuse and relay first; swap the relay with a known-good identical relay and inspect the fuse for corrosion or a loose fit.
- 2 Verify battery voltage and ground at the fuel pump connector while cranking; if voltage is low or absent, trace the circuit back toward the relay and inertia switch.
- 3 Inspect the inertia switch for continuity and proper reset; a tripped or corroded switch is a frequent culprit on older Ford models.
- 4 Perform a voltage drop test on the ground circuit and power feed to the fuel pump to identify excessive resistance without loading the circuit.
- 5 Command the fuel pump on with a scan tool and listen for pump operation; if the pump runs but the code persists, check the feedback circuit to the PCM.
- 6 If the circuit tests good but the pump does not run, remove the fuel pump assembly and bench-test the motor for open windings or excessive current draw.
- 7 After repairs, clear the code and verify the fuel pump prime and engine start, then monitor live data for fuel pump circuit status to confirm the fix.

Don't overlook the inertia switch and grounds

- A tripped inertia switch is a common cause of P1641 on Ford vehicles after a minor bump or rough road, and many people replace the fuel pump unnecessarily before checking it.
- The fuel pump primary circuit includes the relay, fuse, inertia switch, wiring, and pump motor; a fault anywhere in that chain can set this code, so testing at each connection point saves time and money.
- Corrosion inside the fuel pump connector at the tank is a frequent hidden cause, especially in salt-belt states, and it can create enough resistance to set the code without a complete failure.
- A weak fuel pump that still runs can set P1641 due to excessive current draw, so a pump that sounds normal is not proof that the circuit is healthy.
- The PCM may set P1641 as a result of a low battery or charging system issue that causes voltage spikes, so always check battery health and grounds before condemning the fuel pump.

Can I keep driving with P1641?

Do not drive the vehicle if it is running poorly or has stalled, because a failed fuel pump can cause a sudden loss of power and create a safety hazard. If the engine starts and runs normally but the light is on, limit driving to a short distance to a repair shop and avoid high speeds or heavy loads.



Tools that help

- Digital multimeter with voltage and resistance measurement
- Scan tool capable of commanding the fuel pump and reading live data
- Test light or noid light for circuit testing
- Fuel pressure gauge
- Basic hand tools including socket set and wire crimpers

Reading P1641

- P** Powertrain: engine, transmission and emissions.
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- 1** Manufacturer-specific code (Ford): its meaning depends on the make.
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- 6** Computer and output circuits.
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- 41** The exact fault within that area.

Often seen with

P1235 Fuel Pump Control Circuit · **P1235** VSV 1/2/3 Circuit Range Performance · **P1233** Fuel Pump Driver Module Off-Line · **P1235** Fuel Pump Control Out of Range · **P0230** Fuel Pump Primary Circuit Malfunction · **P0231** Fuel Pump Secondary Circuit Low · **P0232** Fuel Pump Secondary Circuit High

See it working

Watch the animated explainer [How a Refrigerator Works: The Cooling Cycle](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/ford-p1641/>

