

GENERIC · POWERTRAIN

P2401

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P2401

Evaporative Emission System Leak Detection Pump Control Circuit Low

P2401 indicates that the powertrain control module (PCM) has detected a low-voltage condition on the control circuit for the evaporative emission (EVAP) leak detection pump. The PCM commands the pump on and off during EVAP system tests, and when the circuit voltage stays below the expected threshold, it sets this code. This is a circuit fault, not a direct indication that the pump itself has failed.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Low	Intermediate	Auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms.
- A slight fuel odor may be present if the EVAP system cannot complete its self-test.
- The PCM may inhibit EVAP monitor readiness, preventing completion of an emissions inspection.
- In rare cases, the engine may run slightly rough or have a minor hesitation if the pump circuit shares a ground with other sensors.
- No driveability issues are typical because the leak detection pump only operates during off-cycle tests.

Common causes, most likely first

- 1 A damaged, corroded, or disconnected electrical connector at the leak detection pump.
- 2 A chafed or broken wire in the pump control circuit, often near the pump or along the harness routing.
- 3 A short to ground in the control circuit wiring, which pulls the voltage low.
- 4 A failed leak detection pump solenoid or internal pump motor that draws excessive current.
- 5 A faulty PCM driver for the pump control circuit, though this is less common.
- 6 Poor ground connection for the pump or PCM, causing reference voltage to drop under load.
- 7 Water intrusion into the pump connector or harness, leading to corrosion and low voltage.



How to diagnose and fix it

- 1 Inspect the leak detection pump connector and harness for corrosion, moisture, or loose pins, and clean or repair as needed.
- 2 Disconnect the pump and check for battery voltage on the control circuit with the key on and the pump commanded off; repair any open or shorted wiring.
- 3 Measure resistance of the pump solenoid or motor and compare to the manufacturer's specification; replace the pump if resistance is out of range.
- 4 Check the ground circuit for the pump and PCM using a voltage drop test; clean or repair grounds if resistance is excessive.
- 5 Use a scan tool to command the leak detection pump on and off while monitoring the control circuit voltage; look for a drop that indicates a wiring or pump fault.
- 6 If all wiring and the pump test good, suspect the PCM and perform a pin-fit and voltage check at the PCM connector before replacement.
- 7 After repairs, clear the code and run the EVAP monitor to confirm the fix and ensure the code does not return.

Don't replace the pump before checking this

- A low-voltage code on the pump control circuit is more often caused by a bad ground or corroded connector than by a failed pump, so always perform a voltage drop test on the ground side first.
- Some vehicles share the leak detection pump ground with the fuel level sensor or EVAP canister vent valve, so a fault in those circuits can set P2401 even though the pump itself is fine.
- The PCM may set P2401 only after a failed EVAP monitor, so the code can appear long after the actual wiring damage occurred, making visual inspection of the entire harness path essential.
- A weak battery or charging system that drops voltage during cranking can cause a false P2401 if the PCM sees low voltage on the control circuit during its self-test.
- Replacing the leak detection pump without checking the control circuit voltage under load can lead to a repeat failure if the underlying wiring or ground issue is not corrected.

Can I keep driving with P2401?

The vehicle is safe to drive under normal conditions because the leak detection pump does not affect engine performance or safety systems. Avoid ignoring the check engine light for an extended period, as the EVAP system will not self-test and you may not be able to pass an emissions inspection.

Tools that help

- OBD-II scan tool with bidirectional control capability
- Digital multimeter
- Wire repair kit with crimpers and heat shrink
- Electrical contact cleaner
- Vehicle-specific wiring diagram



Reading P2401

- P** Powertrain: engine, transmission and emissions.
- 2** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 4** Auxiliary emission controls.
- 01** The exact fault within that area.

Often seen with

P0455 EVAP System Leak Detected (Large) · **P0456** Evaporative Emission System Leak Detected (very small leak) · **P2402** Evaporative Emission System Leak Detection Pump Control Circ · **P2403** Evaporative Emission System Leak Detection Pump Sense Circui · **P2404** Evaporative Emission System Leak Detection Pump Sense Circui

See it working

Watch the animated explainer [How a Catalytic Converter Works: 3D Cutaway](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2401/>

