



P02D0

Cylinder 3 Fuel Injector A Offset Learning At Min Limit

P02D0 indicates that the engine control module (ECM) has learned a fuel injector offset correction for cylinder 3 that has reached its minimum allowable limit, meaning the injector is flowing more fuel than expected and the ECM can no longer lean it out. The ECM stores this code when the adaptive learning value for that injector's offset hits the bottom of its programmed range during closed-loop fuel control.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Fuel and air metering (injector circuits)

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or misfire sensation, especially when the engine is cold
- Slight decrease in fuel economy as the ECM struggles to correct the rich condition
- Occasional hesitation or stumble during acceleration
- Black soot on the exhaust tip or spark plug fouling in severe cases
- Elevated hydrocarbon emissions that may fail an emissions inspection

Common causes, most likely first

- 1 Leaking or dripping fuel injector on cylinder 3, allowing excess fuel into the cylinder
- 2 Sticking or partially open injector pintle due to carbon deposits or wear
- 3 High fuel pressure from a faulty fuel pressure regulator or restricted return line
- 4 Contaminated fuel or fuel additive that has degraded the injector's internal seals
- 5 Wiring harness chafe or poor connection at the cylinder 3 injector causing erratic pulse width
- 6 ECM software calibration issue or adaptive learning memory corruption (less common)



How to diagnose and fix it

- 1 Connect a scan tool and verify the fuel trim and injector offset learning values for cylinder 3 to confirm the code is active and not historical
- 2 Perform a visual inspection of the cylinder 3 injector connector and wiring for corrosion, chafing, or loose pins
- 3 Check fuel pressure with a gauge to rule out a high-pressure condition that would affect all injectors
- 4 Run a cylinder balance test or injector flow test to compare cylinder 3 against the others
- 5 Remove and inspect the cylinder 3 spark plug for signs of rich running, then replace if fouled
- 6 Clean or replace the cylinder 3 fuel injector, using a known-good unit and confirming the offset learning resets
- 7 Clear the adaptive memory with the scan tool and perform a relearn drive cycle to verify the code does not return

What the offset learning limit really tells you

- A min-limit offset code often means the injector is flowing too much fuel, but a restricted intake or low compression on that cylinder can also force the ECM to the same limit, so always check mechanical health before condemning the injector.
- Technicians frequently replace the injector only to find the code returns because a leaking fuel pressure regulator is over-pressurizing the rail and affecting all cylinders, with cylinder 3 simply being the first to hit its learning limit.
- The ECM may set P02D0 intermittently if the battery was recently disconnected and the adaptive memory was cleared, so a relearn drive cycle is required before assuming a hard fault.
- Fuel injector offset learning is sensitive to fuel quality, and a tank of contaminated or ethanol-heavy fuel can push a marginal injector to its limit without any mechanical failure.
- This code can be stored alongside misfire codes for cylinder 3, but the misfire may be a symptom of the rich condition rather than a separate ignition fault, so diagnose the fuel delivery first.

Can I keep driving with P02D0?

You can usually continue driving short distances to a repair shop, but avoid heavy acceleration or towing because the rich condition can foul the spark plug and damage the catalytic converter over time. Have the fault diagnosed promptly to prevent secondary emissions damage.

Tools that help

- OBD-II scan tool with live data and bidirectional control capability
- Fuel pressure gauge
- Digital multimeter for injector circuit testing
- Noid light or injector pulse tester
- Basic hand tools for injector removal
- Spark plug socket and wrench



Reading P02D0

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 2** Fuel and air metering (injector circuits).
- D0** The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P0175** System Too Rich (Bank 2) · **P02CF** Cylinder 2 Fuel Injector A Offset Learning At Max Limit · **P02D1** Cylinder 3 Fuel Injector A Offset Learning At Max Limit · **P0303** Cylinder 3 Misfire Detected

See it working

Watch the animated explainer [How a Helicopter Flies: Rotor and Tail in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02d0/>

