



P02D1

Cylinder 3 Fuel Injector A Offset Learning At Max Limit

P02D1 means the engine control module has learned that the fuel injector for cylinder 3 needs the maximum allowed correction to its opening time, so the injector is flowing less fuel than expected or the cylinder is not producing the expected power. The computer stores this code when the injector offset learning value hits its upper limit and can no longer compensate.

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 symptoms besides the warning light
- A noticeable misfire or rough idle, especially when the engine is cold
- Reduced engine power or sluggish acceleration under load
- Slightly higher fuel consumption as the computer tries to compensate
- Occasional hesitation or stumble during light-throttle cruising

Common causes, most likely first

- 1 Clogged or restricted fuel injector nozzle on cylinder 3
- 2 Internal injector wear or electrical fault in the injector solenoid
- 3 Low fuel pressure or a weak fuel pump affecting all injectors but most noticeable on cylinder 3
- 4 Vacuum leak or intake air leak near cylinder 3 intake port
- 5 Mechanical issue such as low compression or a faulty spark plug on cylinder 3
- 6 Contaminated fuel or fuel system deposits
- 7 Wiring or connector problem at the cylinder 3 injector



How to diagnose and fix it

- 1 Scan all modules and record freeze-frame data to confirm the code and check for related misfire or fuel trim codes
- 2 Inspect the cylinder 3 injector connector and wiring for corrosion, looseness, or damage
- 3 Measure fuel pressure and compare with specification to rule out a weak pump or restricted filter
- 4 Perform a cylinder contribution test or injector balance test to compare cylinder 3 with the others
- 5 Check ignition components and compression on cylinder 3 to rule out mechanical or spark issues
- 6 Remove and flow-test or replace the cylinder 3 fuel injector if it is restricted or electrically faulty
- 7 Clear the code and perform an injector offset learning reset or adaptation drive cycle to verify the repair

What the offset learning limit really means

- The offset learning value is the computer's long-term correction for injector opening delay, so hitting the maximum limit means the injector is at the end of its adjustment range, not necessarily failed outright.
- A dirty injector that still clicks and ohms out correctly can set this code, so flow testing is more reliable than a simple resistance check.
- Fuel pressure that is slightly low across the whole rail often shows up first as an offset learning limit on one cylinder because that injector was already marginal.
- This code can be set by a mechanical fault such as low compression on cylinder 3, so always rule out spark and compression before condemning the injector.
- After replacing an injector, the offset learning must be reset and a drive cycle completed, or the code may return even with a good injector.

Can I keep driving with P02D1?

You can usually drive the vehicle short distances to a repair shop, but avoid heavy acceleration or towing because the misfire can worsen and may damage the catalytic converter over time. If the check engine light starts flashing, stop driving and have the vehicle towed.

Tools that help

- OBD-II scan tool with live data and freeze-frame capability
- Fuel pressure gauge
- Digital multimeter
- Noid light or injector pulse tester
- Compression tester
- Basic hand tools for injector removal



Reading P02D1

- 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).
- D1** The exact fault within that area.

Often seen with

P0171 System Too Lean (Bank 1) · **P0172** System Too Rich (Bank 1) · **P02D0** Cylinder 3 Fuel Injector A Offset Learning At Min Limit · **P02D2** Cylinder 4 Fuel Injector A Offset Learning At Min Limit · **P0303** Cylinder 3 Misfire Detected

See it working

Watch the animated explainer [How Variable Valve Timing Works: Cam Phaser and VVT Solenoid](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02d1/>

