

GENERIC · POWERTRAIN

P02D8

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P02D8

Cylinder 7 Fuel Injector A Offset Learning At Min Limit

P02D8 means the engine control module has learned that the fuel injector for cylinder 7 needs its maximum allowed correction offset to deliver the right amount of fuel, and it has hit the upper or lower limit of that adaptive range. The computer stores this code when the injector's offset learning value can no longer be adjusted further, indicating a fuel delivery imbalance on that cylinder.

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

Symptoms you may notice

- Illuminated check engine light, often with no other noticeable symptoms
- Rough idle or a noticeable vibration that feels like a misfire on one cylinder
- Slight loss of power or hesitation during acceleration
- Increased fuel consumption as the engine tries to compensate
- In some cases, a faint fuel odor or black smoke from the exhaust if the injector is over-fueling

Common causes, most likely first

- 1 Clogged or partially restricted fuel injector on cylinder 7
- 2 Internal injector wear causing incorrect spray pattern or flow rate
- 3 Fuel contamination, such as water or debris, affecting injector performance
- 4 Low fuel pressure or volume from a weak pump or restricted filter
- 5 Electrical issue in the injector circuit, such as corroded connectors or damaged wiring
- 6 Mechanical fault in cylinder 7, such as low compression or a faulty spark plug, that mimics an injector imbalance



How to diagnose and fix it

- 1 Connect a scan tool and verify the code is current, then check freeze-frame data and injector offset values for cylinder 7
- 2 Inspect the injector electrical connector and wiring for corrosion, looseness, or damage, and repair as needed
- 3 Test fuel pressure and volume at the rail to rule out a supply problem before condemning the injector
- 4 Perform a cylinder contribution test or injector balance test to confirm the injector is the source of the imbalance
- 5 Remove and flow-test the cylinder 7 injector, or replace it with a known-good unit and clear the adaptive learning
- 6 After repair, clear the code and perform a relearn drive cycle so the ECM can reset the offset learning values
- 7 If the code returns, check cylinder compression and ignition components to rule out a mechanical fault

What the offset learning limit really means

- The offset learning value is not a fixed specification; it is a adaptive correction the ECM applies to compensate for injector wear or deposits, so hitting the limit means the correction has maxed out, not necessarily that the injector has failed completely.
- A dirty injector can often be cleaned and restored rather than replaced, but only if the flow test shows it is recoverable and the internal coil is healthy.
- This code can be set by a fuel pressure problem that affects all cylinders, but cylinder 7 may be the first to show the imbalance due to its position in the fuel rail or firing order.
- Replacing the injector without clearing and relearning the offset values will leave the ECM with old adaptive data, and the code may return immediately even with a new part.
- A misfire code for cylinder 7 is commonly stored alongside P02D8, but the absence of a misfire code does not rule out a failing injector because the ECM may still be able to compensate within its limits.

Can I keep driving with P02D8?

You can usually continue driving to a repair shop, but avoid heavy acceleration or towing until the fault is repaired because prolonged driving with a rich or lean cylinder can damage the catalytic converter and spark plugs. If the check engine light begins flashing, stop driving and have the vehicle towed.

Tools that help

- OBD-II scan tool with live data and bidirectional control
- Fuel pressure gauge
- Injector balance tester or cylinder contribution tester
- Multimeter for circuit testing
- Basic hand tools for injector removal



Reading P02D8

- 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).
- D8** The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P0207** Injector Circuit/Open - Cylinder 7 · **P02D7** Cylinder 6 Fuel Injector A Offset Learning At Max Limit · **P02D9** Cylinder 7 Fuel Injector A Offset Learning At Max Limit · **P0307** Cylinder 7 Misfire Detected

See it working

Watch the animated explainer [How a Turbocharger Works, Step by Step](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02d8/>

