

GENERIC · POWERTRAIN

P02DA

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P02DA

Cylinder 8 Fuel Injector A Offset Learning At Min Limit

P02DA indicates that the powertrain control module has learned a fuel injector offset correction for cylinder 8 that has reached its minimum allowable limit, meaning the injector is flowing more fuel than expected and the computer can no longer lean it out. The code is set when the adaptive learning value for that injector bottoms out during closed-loop fuel control.

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

Symptoms you may notice

- Illuminated 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 over time
- Occasional hesitation or stumble during acceleration
- Strong fuel odor from the exhaust in severe cases
- Elevated hydrocarbon emissions that may fail an emissions test

Common causes, most likely first

- 1 Leaking or dripping fuel injector on cylinder 8
- 2 Partially clogged or restricted fuel injector causing an uneven spray pattern
- 3 Faulty fuel injector connector or damaged wiring to the cylinder 8 injector
- 4 High fuel pressure from a failing fuel pressure regulator or restricted return line
- 5 Carbon buildup on the injector tip or intake valve affecting fuel delivery
- 6 Engine mechanical issue such as low compression on cylinder 8 that alters fuel trim learning
- 7 Outdated powertrain control module software with known injector learning calibration errors



How to diagnose and fix it

- 1 Connect a scan tool and record freeze-frame data and fuel trim values for cylinder 8 to confirm the offset learning is at the minimum limit
- 2 Inspect the cylinder 8 fuel injector connector and wiring for corrosion, chafing, or loose pins, and repair as needed
- 3 Measure fuel pressure with a gauge and compare to specification to rule out high pressure causing rich running
- 4 Perform an injector balance test or cylinder contribution test to compare cylinder 8 against the others
- 5 Remove and flow-test the cylinder 8 injector, or swap it with a known-good injector from another cylinder to see if the code follows
- 6 Clean or replace the cylinder 8 fuel injector if it is leaking or restricted, then clear adaptive learning and re-learn the offset
- 7 Check for carbon buildup on the intake valve and perform an induction cleaning if deposits are found, then verify the code does not return

What the offset learning limit really means

- A minimum offset learning limit does not automatically condemn the injector; a wiring fault or high fuel pressure can force the same learned value without any injector defect.
- Technicians often replace the injector only to find the code returns because the adaptive learning was not cleared and re-learned after the repair.
- Cylinder 8 on V8 engines is frequently the last injector in the fuel rail, so it can be more susceptible to debris and pressure fluctuations than the others.
- A mechanical issue such as a worn cam lobe or low compression on cylinder 8 can mimic an injector fault by changing how the computer trims fuel for that cylinder.
- Some manufacturers released software updates to correct injector offset learning logic, so checking for a calibration update should come before parts replacement.

Can I keep driving with P02DA?

The vehicle is generally safe to drive to a repair shop, but avoid heavy acceleration and long trips because a leaking injector can wash cylinder walls and dilute engine oil. If the check engine light begins flashing or the engine runs very rough, stop driving and have it towed.



Tools that help

- OBD-II scan tool with live data and bidirectional controls
- Fuel pressure gauge
- Digital multimeter
- Injector balance tester or cylinder contribution tester
- Basic hand tools for injector removal
- Induction cleaning kit

Reading P02DA

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).
DA	The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P02D9** Cylinder 7 Fuel Injector A Offset Learning At Max Limit · **P02DB** Cylinder 8 Fuel Injector A Offset Learning At Max Limit · **P02DC** Cylinder 9 Fuel Injector A Offset Learning At Min Limit · **P0308** Cylinder 8 Misfire Detected

See it working

Watch the animated explainer [Helicopter Simulator: Take Off, Hover and Land](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02da/>

