



P02DC

Cylinder 9 Fuel Injector A Offset Learning At Min Limit

P02DC indicates that the engine control module (ECM) has learned a fuel injector offset correction for cylinder 9 that has reached its minimum allowable limit, meaning the ECM can no longer lean out that injector's fuel delivery enough to maintain proper air-fuel ratio. The ECM monitors injector performance during closed-loop operation and stores this code when the learned offset value stays at the bottom of its adjustment range.

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

Symptoms you may notice

- Malfunction indicator lamp (MIL) illuminated on the dashboard
- Rough idle or noticeable vibration, especially when the engine is cold
- Slight misfire or hesitation under light acceleration
- Often no symptoms besides the warning light, with the engine running normally
- Decreased fuel economy over time
- Elevated hydrocarbon (HC) emissions detectable during an emissions test

Common causes, most likely first

- 1 Clogged or restricted fuel injector on cylinder 9, causing a lean condition that the ECM tries to correct
- 2 Internal fuel injector wear or failure, leading to incorrect fuel delivery
- 3 Faulty fuel injector connector or damaged wiring to cylinder 9 injector
- 4 Low fuel pressure or volume from a weak fuel pump or restricted fuel filter
- 5 Vacuum leak at the intake manifold near cylinder 9, skewing the learned offset
- 6 Contaminated engine oil or fuel, affecting injector performance
- 7 ECM software calibration issue or internal fault in the injector driver circuit



How to diagnose and fix it

- 1 Connect a scan tool and verify P02DC is current, then check for related misfire or fuel trim codes
- 2 Inspect the cylinder 9 fuel injector connector and wiring for corrosion, looseness, or damage
- 3 Measure fuel pressure and volume to rule out a weak pump or restricted filter
- 4 Perform a cylinder contribution test or injector balance test to compare cylinder 9 with others
- 5 Check for vacuum leaks at the intake manifold and around cylinder 9 using a smoke machine
- 6 Remove and flow-test the cylinder 9 injector, or swap it with a known-good injector to see if the code follows
- 7 If the injector tests good, reprogram the ECM with the latest calibration or replace it if internal driver failure is confirmed

Before you replace the cylinder 9 injector

- A clogged injector is the most common cause, but a weak fuel pump or restricted filter can produce the same offset learning limit and is often overlooked.
- The code can be set by a vacuum leak near cylinder 9 that leans out that cylinder, so always smoke-test the intake before condemning the injector.
- Injector offset learning can be affected by contaminated oil from a failing head gasket or fuel dilution, so check oil condition and level as part of diagnosis.
- On some vehicles, this code appears after a battery replacement or ECM reset because the learned values are cleared and must be relearned during a drive cycle.
- Do not assume the injector is defective solely based on this code; wiring faults and ECM driver issues can mimic injector failure and require voltage-drop testing.

Can I keep driving with P02DC?

You can usually continue driving with P02DC, but avoid heavy acceleration or towing until the fault is repaired, as prolonged driving with a rich or lean offset can damage the catalytic converter and increase emissions.

Tools that help

- OBD-II scan tool with live data and injector balance capability
- Fuel pressure gauge
- Digital multimeter for wiring and voltage-drop tests
- Smoke machine for vacuum leak detection
- Noid light or injector pulse tester
- Basic hand tools for injector removal and replacement



Reading P02DC

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).
DC	The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P0175** System Too Rich (Bank 2) · **P02DD** Cylinder 9 Fuel Injector A Offset Learning At Max Limit · **P02DE** Cylinder 10 Fuel Injector A Offset Learning At Min Limit · **P0309** Cylinder 9 Misfire Detected

See it working

Watch the animated explainer [How a Refrigerator Works: The Cooling Cycle](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02dc/>

