



P02CC

Cylinder 1 Fuel Injector A Offset Learning At Min Limit

P02CC indicates that the engine control module has learned a fuel injector offset correction for cylinder 1 that has reached its minimum allowable limit. The computer commands a specific fuel delivery and monitors the resulting crankshaft speed or air-fuel ratio feedback, and the learned correction needed to keep cylinder 1 balanced has hit the bottom of its adjustment window.

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 slight shake that is more pronounced when the engine is cold
- Intermittent misfire sensation or hesitation during light acceleration
- Slightly elevated fuel consumption as the engine compensates for the imbalance
- A faint fuel odor from the exhaust if the injector is delivering too much fuel

Common causes, most likely first

- 1 Clogged, restricted, or leaking cylinder 1 fuel injector
- 2 Carbon buildup on the cylinder 1 intake valve or port causing uneven airflow
- 3 Failed or contaminated engine oil leading to a sticking injector pintle
- 4 Wiring harness damage or poor electrical connection at the cylinder 1 injector
- 5 Low fuel pressure or a restricted fuel filter affecting all injectors but most noticeable on cylinder 1
- 6 Worn spark plug or ignition coil on cylinder 1 creating a false fuel trim correction
- 7 Engine control module software calibration issue requiring a reflash



How to diagnose and fix it

- 1 Connect a scan tool and record all freeze-frame data and fuel trim values for cylinder 1
- 2 Perform a visual inspection of the cylinder 1 injector connector and wiring for chafing or corrosion
- 3 Check fuel pressure and volume against the manufacturer's specification
- 4 Run a cylinder contribution or power balance test to confirm the injector is the weak cylinder
- 5 Remove and inspect the cylinder 1 spark plug for fouling or incorrect gap
- 6 Swap the cylinder 1 injector with another cylinder and see if the offset limit code follows the injector
- 7 Replace the faulty injector and clear the adaptive learning, then road-test to verify the correction returns to the normal range

Why cylinder 1 offset codes mislead

- A min-limit offset does not always mean the injector is bad; a vacuum leak or exhaust restriction can skew the learned correction on one cylinder.
- Technicians often replace the injector without checking the intake valve for carbon, which can mimic a rich injector by restricting airflow.
- The adaptive offset can hit its limit from a dirty mass airflow sensor that biases the entire fuel trim before individual cylinder learning occurs.
- After injector replacement, the engine control module must relearn the offset; clearing codes alone without a drive cycle may leave the code pending.
- A weak ignition coil on cylinder 1 can cause unburned fuel that the oxygen sensor reads as rich, driving the offset to its minimum limit.

Can I keep driving with P02CC?

You can usually drive the vehicle short distances to a repair shop, but avoid heavy acceleration and prolonged idling because a rich cylinder can wash oil from the cylinder wall and overheat the catalytic converter. 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
- Digital multimeter
- Mechanic's stethoscope or injector pulse tester
- Torque wrench and basic hand tools



Reading P02CC

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

Often seen with

P0172 System Too Rich (Bank 1) · **P0201** Injector Circuit Malfunction - Cylinder 1 · **P02CD** Cylinder 1 Fuel Injector A Offset Learning At Max Limit · **P02CE** Cylinder 2 Fuel Injector A Offset Learning At Min Limit · **P0301** Cylinder 1 Misfire Detected

See it working

Watch the animated explainer [Car Won't Start? Step-by-Step No-Start Diagnosis](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02cc/>

