



P2C5A

Cylinder 5 Fuel Injector B Offset Learning At Min Limit

P2C5A indicates that the engine control module (ECM) has learned a fuel injector offset correction for cylinder 5 that has reached its minimum allowable limit, meaning the injector is flowing more fuel than expected or the circuit is commanding a shorter pulse width than the ECM can compensate for. The ECM monitors injector performance during closed-loop operation and stores this code when the adaptive learning value for the 'B' injector offset cannot be reduced any further.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Hybrid propulsion

Symptoms you may notice

- Illumination of the 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 due to incorrect injector delivery
- Occasional hesitation or stumble during acceleration
- Elevated hydrocarbon (HC) emissions that may be detected during an emissions test

Common causes, most likely first

- 1 Clogged or restricted fuel injector nozzle causing abnormal spray pattern and flow
- 2 Internal injector wear or damage leading to excessive fuel delivery
- 3 Faulty injector driver circuit in the ECM or wiring harness
- 4 Low fuel pressure or volume from a weak fuel pump or clogged filter
- 5 Contaminated fuel or fuel system deposits affecting injector performance
- 6 Vacuum leaks or intake air leaks that alter the air-fuel ratio and force the ECM to adjust injector offset
- 7 Exhaust leaks upstream of the oxygen sensor causing false lean or rich readings



How to diagnose and fix it

- 1 Connect a scan tool and verify the code is current, then check freeze-frame data and fuel trim values to confirm the condition.
- 2 Inspect the wiring harness and connector at cylinder 5 injector for corrosion, chafing, or loose pins, and repair as needed.
- 3 Perform a fuel pressure and volume test to rule out a weak pump or restricted filter before condemning the injector.
- 4 Use a noid light or oscilloscope to verify the injector pulse signal from the ECM is present and correct.
- 5 Remove and flow-test the cylinder 5 injector, or swap it with a known-good injector from another cylinder to see if the code follows.
- 6 If the injector is faulty, replace it and clear the adaptive learning values with a scan tool, then perform a relearn drive cycle.
- 7 After repairs, verify fuel trims are within specification and confirm the code does not return after a complete drive cycle.

What the offset learning limit really means

- A P2C5A does not always mean the injector itself is bad; a dirty injector with a poor spray pattern can cause the ECM to hit its learning limit without any circuit fault.
- Many technicians replace the injector only to find the code returns because a vacuum leak or exhaust leak upstream of the oxygen sensor skewed the fuel trim learning.
- The 'B' offset learning refers to a secondary calibration table for injector dead time, and a weak battery or charging system can cause voltage-related injector offset errors that mimic a failed injector.
- Always check for technical service bulletins (TSBs) for the specific vehicle, as some manufacturers have updated ECM software to address false setting of this code.
- Fuel system contamination from a failing fuel pump can damage multiple injectors, so if one injector is restricted, inspect the entire fuel system for debris.

Can I keep driving with P2C5A?

You can usually continue driving with this code, but avoid heavy acceleration or towing until it is diagnosed, as prolonged driving with a rich or lean condition can damage the catalytic converter. Have the vehicle inspected promptly to prevent worsening fuel economy and emissions.



Tools that help

- OBD-II scan tool with live data and bidirectional control
- Fuel pressure gauge
- Noid light or oscilloscope
- Digital multimeter
- Injector flow tester or cleaning kit
- Basic hand tools for injector removal

Reading P2C5A

P	Powertrain: engine, transmission and emissions.
2	Generic (SAE) code: it means the same thing on every OBD-II vehicle.
C	Hybrid propulsion.
5A	The exact fault within that area.

Often seen with

P0171 System Too Lean (Bank 1) · **P0172** System Too Rich (Bank 1) · **P0205** Injector Circuit/Open - Cylinder 5 · **P0305** Cylinder 5 Misfire Detected · **P2C5B** Cylinder 5 Fuel Injector B Offset Learning At Max Limit

See it working

Watch the animated explainer [How the EVAP System Works: Fuel Vapour and Leak Test](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2c5a/>

