

GENERIC · POWERTRAIN

P2B11

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P2B11

Cylinder 1 Injection Pulse Offset Exceeded Learning Limit

P2B11 indicates that the engine control module (ECM) has learned a fuel injector correction for cylinder 1 that has hit its maximum allowed limit, meaning the injector is flowing outside the range the computer can compensate for. The ECM monitors crankshaft speed fluctuations and adjusts the injection pulse width to keep each cylinder contributing equally, and this code sets when that learned offset can no longer be increased or decreased.

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

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
- Slight hesitation or stumble during acceleration
- Decreased fuel economy compared to normal
- In rare cases, a faint fuel smell or black smoke from the exhaust if the injector is over-fueling

Common causes, most likely first

- 1 Clogged, restricted, or dirty fuel injector on cylinder 1
- 2 Internal injector failure causing incorrect flow rate or poor spray pattern
- 3 Carbon buildup on the intake valve or port for cylinder 1
- 4 Vacuum leak or intake manifold gasket leak affecting cylinder 1
- 5 Wiring or connector issue at the cylinder 1 injector, such as corrosion or a chafed wire
- 6 Low fuel pressure or a failing fuel pump that affects all cylinders but is first detected on cylinder 1
- 7 Mechanical issue such as low compression or a worn camshaft lobe on cylinder 1



How to diagnose and fix it

- 1 Perform a visual inspection of the cylinder 1 injector connector and wiring for damage or corrosion
- 2 Check fuel pressure and verify it meets the manufacturer's specification
- 3 Use a scan tool to view injector pulse width and fuel trim data for cylinder 1 compared to other cylinders
- 4 Run a compression test and cylinder leak-down test to rule out mechanical faults
- 5 Perform an injector balance test or remove and flow-test the cylinder 1 injector
- 6 Clean or replace the cylinder 1 fuel injector if it is restricted or faulty
- 7 Clear the adaptive learning memory and re-learn the injection pulse offset, then verify the code does not return

What the learned offset really tells you

- A dirty injector is the most common cause, but a vacuum leak at the intake port for cylinder 1 can mimic the same offset error and is often overlooked.
- The code does not always mean the injector itself is bad; wiring resistance or a poor connection can alter the effective pulse and trigger the same learning limit.
- Replacing the injector without clearing and relearning the adaptive memory may leave the code stored even after the repair.
- Low fuel pressure from a weak pump can cause all cylinders to run lean, but the ECM may hit the learning limit on cylinder 1 first due to its firing order or sensor placement.

Can I keep driving with P2B11?

You can usually drive the vehicle short distances to a repair shop, but avoid heavy acceleration or towing because a lean or rich cylinder can lead to overheating or catalytic converter damage. 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 controls
- Fuel pressure gauge
- Compression tester
- Digital multimeter
- Injector balance tester or oscilloscope
- Basic hand tools for injector removal



Reading P2B11

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

Often seen with

P0171 System Too Lean (Bank 1) · **P0172** System Too Rich (Bank 1) · **P0301** Cylinder 1 Misfire Detected · **P2B12** Cylinder 2 Injection Pulse Offset Not Learned · **P2B13** Cylinder 2 Injection Pulse Offset Exceeded Learning Limit

See it working

Watch the animated explainer [How a Gyroscope Works: Gimbals and Precession](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2b11/>

