



P2B1E

Cylinder 8 Injection Pulse Offset Not Learned

P2B1E indicates that the powertrain control module (PCM) has not successfully learned the injection pulse offset for cylinder 8, which is the fuel injector timing correction needed for smooth and efficient combustion. The PCM monitors crankshaft speed fluctuations during fuel injection events and expects to complete a learning routine that adjusts for manufacturing tolerances and wear in the injector and cylinder; when that routine fails to complete or the learned value falls outside the acceptable range, this code is stored.

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

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- A slight rough idle or vibration that may be more pronounced when the engine is cold
- Intermittent misfire sensation or hesitation during light acceleration
- Reduced fuel economy as the PCM defaults to a less optimal injection strategy
- In rare cases, a noticeable loss of power or a stumble under load if the offset error is large

Common causes, most likely first

- 1 Faulty or dirty fuel injector on cylinder 8 that cannot deliver a consistent pulse
- 2 Wiring or connector issue at the cylinder 8 injector, such as corrosion or a loose pin
- 3 Mechanical problem in cylinder 8, such as low compression or a sticking valve, that alters combustion stability
- 4 Failed crankshaft position sensor or reluctor wheel damage that prevents accurate speed signal learning
- 5 PCM software calibration issue or internal fault in the injector driver circuit
- 6 Contaminated fuel or fuel pressure problem affecting only one cylinder's injector performance



How to diagnose and fix it

- 1 Connect a scan tool and record all stored and pending codes, then clear the code and perform a relearn drive cycle to see if it returns immediately
- 2 Inspect the cylinder 8 injector connector and wiring harness for corrosion, chafing, or loose terminals, and repair as needed
- 3 Measure the resistance of the cylinder 8 injector and compare it to the manufacturer's specification to rule out an open or shorted coil
- 4 Perform a compression test or cylinder leak-down test on cylinder 8 to check for mechanical faults that would prevent offset learning
- 5 Check fuel pressure and inspect the injector for clogging; clean or replace the injector if it is not delivering fuel evenly
- 6 Verify crankshaft position sensor signal integrity with an oscilloscope and inspect the reluctor wheel for damage or debris
- 7 If all hardware checks pass, reprogram the PCM with the latest calibration or replace it if an internal driver fault is confirmed

Why cylinder 8 offset learning fails

- A dirty injector that still flows enough fuel to avoid a misfire code can still fail the offset learning routine because the PCM requires a precise, repeatable pulse response that a partially clogged injector cannot provide.
- Technicians often replace the injector without checking the crankshaft position sensor signal, but a slightly erratic speed signal will abort the learning process on any cylinder and set this code for the last cylinder in the sequence.
- The code can be set by a weak battery or poor ground connection that causes voltage drops during the learning routine, so always check charging system health before condemning hard parts.
- On engines with active fuel management or cylinder deactivation, a fault in the lifter or oil control valve for cylinder 8 can alter combustion stability enough to prevent offset learning without setting a dedicated misfire code.
- A P2B1E that returns immediately after a successful relearn often points to a PCM calibration mismatch or a failing injector driver inside the PCM rather than a mechanical engine problem.

Can I keep driving with P2B1E?

You can generally continue driving with P2B1E because the engine will run using default injection values, but avoid heavy acceleration or towing until the fault is repaired. Prolonged driving with an uncorrected offset can lead to increased emissions, reduced fuel economy, and eventual damage to the catalytic converter if the cylinder runs too rich or too lean.



Tools that help

- OBD-II scan tool with bidirectional control and relearn capability
- Digital multimeter for injector resistance and wiring checks
- Oscilloscope for crankshaft position sensor and injector pulse analysis
- Compression tester or cylinder leak-down tester
- Fuel pressure gauge
- Factory service information for relearn procedures and wiring diagrams

Reading P2B1E

P	Powertrain: engine, transmission and emissions.
2	Generic (SAE) code: it means the same thing on every OBD-II vehicle.
B	Hybrid propulsion.
1E	The exact fault within that area.

Often seen with

P0208 Injector Circuit/Open - Cylinder 8 · **P0308** Cylinder 8 Misfire Detected · **P2146** Fuel Injector Group 'A' Supply Voltage Circuit/Open · **P2B1D** Cylinder 7 Injection Pulse Offset Exceeded Learning Limit · **P2B1F** Cylinder 8 Injection Pulse Offset Exceeded Learning Limit

See it working

Watch the animated explainer [How an Elevator Works: Traction Lift in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2b1e/>

