

GENERIC · POWERTRAIN

P2B1C

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P2B1C

Cylinder 7 Injection Pulse Offset Not Learned

P2B1C means the engine control module (ECM) has not been able to learn the injection pulse offset for cylinder 7, which is the small fuel-delivery correction the ECM applies to that cylinder's injector to keep all cylinders balanced. The ECM commands a learn routine during specific operating conditions and stores this code when the expected correction value cannot be stored or verified.

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 is more noticeable when the engine is cold
- Intermittent misfire sensation or hesitation under light acceleration
- Slightly elevated fuel consumption if the ECM defaults to a rich correction
- Poorer throttle response or a subtle loss of power on some vehicles
- No drivability change at all in many cases, with the code found only during a scan

Common causes, most likely first

- 1 A faulty or contaminated fuel injector on cylinder 7 that cannot deliver the expected pulse response
- 2 Carbon buildup or mechanical wear on the cylinder 7 injector tip altering its flow characteristics
- 3 A weak or failing ignition coil or spark plug on cylinder 7 causing an unstable combustion signal during the learn routine
- 4 Low fuel pressure or a restricted fuel supply that prevents the ECM from completing the offset learn
- 5 A wiring fault or poor connection at the cylinder 7 injector connector or the ECM harness
- 6 An internal ECM fault or corrupted adaptive memory that prevents the learned offset from being stored
- 7 A vacuum leak or intake leak near cylinder 7 that skews the air-fuel mixture during the learn cycle



How to diagnose and fix it

- 1 Connect a scan tool and record all stored and pending codes, then check freeze-frame data for the conditions when P2B1C set
- 2 Inspect the cylinder 7 injector connector and harness for corrosion, chafing, or loose pins, and verify injector resistance if specifications are available
- 3 Check fuel pressure and fuel trim values to rule out a supply or mixture problem before condemning the injector
- 4 Perform a cylinder contribution or power balance test to compare cylinder 7 against the others
- 5 Swap the cylinder 7 ignition coil and spark plug with a neighbouring cylinder to see if the fault follows the component
- 6 Run the manufacturer's injector offset learn or adaptation reset procedure with a capable scan tool after any repair
- 7 If the learn still fails, replace the cylinder 7 injector and repeat the learn procedure, then clear codes and verify the repair

What the offset learn routine really needs

- The ECM only runs the cylinder 7 offset learn under a narrow set of conditions, so a code can set simply because the engine never reached the required temperature or load during short trips.
- A perfectly healthy injector can fail the learn if fuel pressure is marginally low or if a small vacuum leak exists near that cylinder, so always verify those basics before replacing parts.
- Some vehicles store P2B1C after a battery replacement or ECM reprogramming because the adaptive memory was cleared and the learn cycle has not yet completed.
- A misfire code for cylinder 7 may not be stored alongside P2B1C, which leads some technicians to overlook an ignition or compression problem that is disturbing the learn routine.
- Clearing the code without completing the offset learn procedure often results in the code returning within a few drive cycles, so the learn must be run after every repair.

Can I keep driving with P2B1C?

The vehicle is generally safe to drive with P2B1C because the ECM falls back to a default injection offset, but avoid heavy towing or sustained high-load driving until the fault is repaired. If a noticeable misfire or rough running develops, have it diagnosed promptly to prevent damage to the catalytic converter.

Tools that help

- OBD-II scan tool with bidirectional control and injector offset learn capability
- Fuel pressure gauge
- Digital multimeter for injector resistance and wiring checks
- Cylinder contribution or power balance tester
- Mechanic's stethoscope or noid light for injector pulse verification



Reading P2B1C

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

Often seen with

P0171 System Too Lean (Bank 1) · **P0207** Injector Circuit/Open - Cylinder 7 · **P0307** Cylinder 7 Misfire Detected · **P2B1A** Cylinder 6 Injection Pulse Offset Not Learned · **P2B1B** Cylinder 6 Injection Pulse Offset Exceeded Learning Limit

See it working

Watch the animated explainer [How Misfire Detection Works: Crankshaft Speed](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2b1c/>

