

GENERIC · POWERTRAIN

# P2B12

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

## P2B12

# Cylinder 2 Injection Pulse Offset Not Learned

P2B12 indicates that the engine control module (ECM) has not successfully learned the injection pulse offset for cylinder 2, which is the small fuel-delivery correction needed to balance that cylinder against the others. The ECM stores this code when the learning routine cannot complete, typically because the cylinder's fuel injector response falls outside the expected range during the calibration window.

| 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
- Slight rough idle or vibration that may be more noticeable when the engine is cold
- Intermittent misfire sensation or hesitation during light acceleration
- Slightly elevated or uneven fuel trims that may not trigger a separate code
- Reduced fuel economy over time if the offset remains unlearned

## Common causes, most likely first

- 1 Faulty or clogged fuel injector on cylinder 2 that cannot deliver the expected pulse response
- 2 Carbon buildup or mechanical issue in cylinder 2 affecting combustion consistency
- 3 Wiring or connector problem at the cylinder 2 injector, including chafed harness or corroded pins
- 4 Low fuel pressure or a weak fuel pump that prevents stable injector learning conditions
- 5 ECM software calibration issue or incomplete relearn procedure after battery or module service
- 6 Intake or vacuum leak near cylinder 2 that skews the learned offset
- 7 Failed or contaminated engine oil affecting variable valve timing or injector performance



## How to diagnose and fix it

- 1 Verify battery voltage and clear the code, then perform the manufacturer's injection pulse offset relearn procedure under the specified idle and temperature conditions
- 2 Inspect the cylinder 2 injector connector and harness for corrosion, chafing, or loose pins, and repair as needed
- 3 Measure fuel pressure and compare to specification, checking for a weak pump or restricted filter
- 4 Perform a cylinder contribution or injector balance test to compare cylinder 2 against the others
- 5 Remove and flow-test or replace the cylinder 2 injector if it fails the balance test
- 6 Check for intake leaks near cylinder 2 using a smoke test or propane enrichment
- 7 If all mechanical and electrical checks pass, update the ECM calibration or replace the module only after confirming the learning routine still fails

## Why cylinder 2 offset learning fails

- A perfectly running engine can still set P2B12 if the relearn procedure is interrupted by low battery voltage or a cold engine, so always confirm the learn conditions before condemning parts.
- Technicians often replace the cylinder 2 injector only to find a corroded connector pin or a chafed harness section causing the same failure.
- This code does not always mean the injector is bad; a vacuum leak or carbon buildup on the intake valve can skew the pulse response enough to prevent learning.
- After any ECM replacement or reprogramming, the injection pulse offset must be relearned, and skipping that step will immediately set P2B12.
- Fuel quality and pressure stability matter more than most people realize, so check for a weak pump or restricted filter before assuming an internal engine fault.

## Can I keep driving with P2B12?

The vehicle is generally safe to drive with P2B12 because the ECM continues to use default offset values, but avoid heavy load or towing until the fault is repaired. Prolonged driving with an unlearned offset can lead to rough running and increased emissions, so schedule diagnosis soon.

## Tools that help

- OBD-II scan tool with bidirectional control and relearn capability
- Digital multimeter for harness and injector resistance checks
- Fuel pressure gauge
- Smoke machine or propane enrichment kit for intake leak testing
- Injector balance tester or cylinder contribution tester



### Reading P2B12

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

### Often seen with

**P0171** System Too Lean (Bank 1) · **P0202** Injector Circuit Malfunction - Cylinder 2 · **P0302** Cylinder 2 Misfire Detected · **P2B11** Cylinder 1 Injection Pulse Offset Exceeded Learning Limit · **P2B13** Cylinder 2 Injection Pulse Offset Exceeded Learning Limit

### See it working

Watch the animated explainer [How a Knock Sensor Works: Spark Timing and Octane](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2b12/>

