

GENERIC · POWERTRAIN

P02BE

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P02BE

Cylinder 10 - Fuel Trim at Max Limit

P02BE means the engine computer has reached the maximum authority it is allowed to apply to the fuel mixture for cylinder 10, yet the exhaust gas sensor still reports that cylinder running outside the acceptable fuel trim window. In practical terms, the powertrain control module has been adding or subtracting fuel for that one cylinder until the long-term trim hit its calibration limit, and the correction is no longer bringing the air/fuel ratio back where it belongs.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Professional	Fuel and air metering (injector circuits)

Symptoms you may notice

- Illuminated check engine light, often with no other noticeable symptom at first
- Rough idle or a noticeable shake that feels like a single-cylinder miss
- Reduced power or sluggish acceleration under load
- Poor fuel economy compared with the vehicle's normal consumption
- Occasional hesitation, stumble, or surge during light-throttle cruising
- A faint fuel or exhaust smell if the cylinder is running excessively rich

Common causes, most likely first

- 1 Faulty or contaminated fuel injector for cylinder 10, delivering too much or too little fuel
- 2 Vacuum or intake manifold leak affecting the airflow to that cylinder
- 3 Worn or fouled spark plug or ignition coil causing incomplete combustion on cylinder 10
- 4 Leaking intake or exhaust valve, or low compression on cylinder 10
- 5 Contaminated or failing oxygen sensor or air/fuel ratio sensor feeding bad feedback to the computer
- 6 Restricted fuel supply such as a weak pump or clogged filter affecting one bank more than the other
- 7 Engine mechanical wear such as a worn camshaft lobe or lifter on cylinder 10



How to diagnose and fix it

- 1 Scan all stored and pending codes and record freeze-frame data to confirm the fault is isolated to cylinder 10
- 2 Inspect the spark plug, ignition coil, and injector connector for cylinder 10 for damage, fouling, or looseness
- 3 Perform a cylinder balance or compression test to rule out mechanical faults on cylinder 10
- 4 Check for vacuum leaks at the intake manifold and around the cylinder 10 runner using a smoke machine
- 5 Measure fuel pressure and compare injector pulse width and fuel trim values across cylinders with a scan tool
- 6 Swap the cylinder 10 injector and ignition coil with a neighbouring cylinder to see whether the misfire or trim fault follows
- 7 Repair or replace the confirmed faulty component, clear the codes, and verify fuel trims return to normal during a road test

What a maxed fuel trim on one cylinder really tells you

- A fuel trim at its maximum limit does not automatically mean the injector is bad; a vacuum leak or low compression on that cylinder can force the same correction and is often missed.
Cylinder-specific fuel trim codes frequently appear after a recent repair where an injector connector was left loose or an intake gasket was pinched, so always review recent work first.
- On engines with individual cylinder trim monitoring, a failing ignition coil can push fuel trim to its limit before a misfire code ever sets, which makes P02BE the first warning.
- A dirty mass airflow sensor or a skewed upstream oxygen sensor can bias the whole bank and make one cylinder appear to be at its trim limit when the real fault is shared.
Clearing the code without repairing the cause will usually bring P02BE back within a few drive cycles, and repeated clearing can mask a worsening mechanical problem.

Can I keep driving with P02BE?

You can usually drive the vehicle to a workshop, but avoid heavy acceleration, towing, or long trips until the fault is diagnosed because continued operation with a maxed-out fuel trim can damage the catalytic converter and worsen the underlying problem. If the check engine light begins flashing or the engine runs very rough, stop driving and arrange a tow.

Tools that help

- OBD-II scan tool with live fuel trim and misfire data
- Compression gauge or cylinder leak-down tester
- Smoke machine for intake leak detection
- Fuel pressure gauge
- Infrared thermometer or oscilloscope for injector and ignition testing
- Basic hand tools and a spark plug socket



Reading P02BE

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 2** Fuel and air metering (injector circuits).
- BE** The exact fault within that area.

Often seen with

P0171 System Too Lean (Bank 1) · **P0172** System Too Rich (Bank 1) · **P0200** Injector Circuit Malfunction · **P0300** Random/Multiple Cylinder Misfire Detected · **P0301** Cylinder 1 Misfire Detected

See it working

Watch the animated explainer [How a Helicopter Flies: Rotor and Tail in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p02be/>

