

GENERIC · POWERTRAIN

P2BF1

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P2BF1

Fuel Control System B Too Rich Bank 1

P2BF1 indicates that the powertrain control module has detected an excessively rich air-fuel mixture on bank 1 of fuel control system B, meaning the engine is receiving more fuel or less air than the computer commanded. The module monitors short- and long-term fuel trim corrections and sets this code when the trim values exceed a calibrated rich threshold for a sustained period.

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
- A strong gasoline odor from the exhaust or engine bay
- Noticeably reduced fuel economy compared with normal driving
- Rough idle, misfire, or engine stumble, especially when cold
- Black sooty smoke from the tailpipe under acceleration
- Failed or marginal emissions test results

Common causes, most likely first

- 1 Leaking or sticking fuel injector on bank 1
- 2 Excessive fuel pressure from a faulty pressure regulator or restricted return line
- 3 Contaminated mass airflow sensor reporting less air than actually enters the engine
- 4 Faulty engine coolant temperature sensor biased cold, causing extra fuel enrichment
- 5 Leaking or saturated evaporative emissions purge valve allowing fuel vapor into the intake
- 6 Restricted air intake or dirty air filter reducing measured airflow
- 7 Worn spark plugs or ignition components causing incomplete combustion and false rich readings



How to diagnose and fix it

- 1 Connect a scan tool and record freeze-frame data plus short- and long-term fuel trims on bank 1 to confirm the rich condition
- 2 Inspect the air intake tract and air filter for restrictions or unmetered air leaks downstream of the mass airflow sensor
- 3 Check fuel pressure with a gauge and compare against the manufacturer specification, looking for excessive pressure
- 4 Test the evaporative emissions purge valve for sticking open or leaking when commanded closed
- 5 Perform an injector balance or leak-down test to identify a leaking or sticking injector on bank 1
- 6 Verify engine coolant temperature sensor readings against actual engine temperature with a scan tool
- 7 Clean or replace the mass airflow sensor only after confirming its reported airflow is inconsistent with actual engine demand

Rich codes often start with a small vacuum leak

- A rich code on bank 1 can be triggered by a vacuum leak that causes the mass airflow sensor to under-report airflow, so smoke testing the intake is a smart early step.
- A sticking purge valve is one of the most commonly overlooked causes because it introduces fuel vapor when the engine is not expecting it, skewing fuel trims rich.
- Fuel trim readings that are rich at idle but normal at cruise often point to an injector or purge valve issue rather than a sensor calibration problem.
- Replacing the upstream oxygen sensor because of a rich code is a frequent misdiagnosis; the sensor is usually reporting the rich condition correctly.
- A dirty mass airflow sensor can read low without setting its own code, so cleaning it is a low-cost check before condemning injectors or the computer.

Can I keep driving with P2BF1?

You can usually drive a short distance to a repair shop, but avoid heavy acceleration, towing, or long trips because a rich mixture can overheat and damage the catalytic converter. If the engine runs rough, misfires, or the check engine light flashes, stop driving and arrange a tow.

Tools that help

- OBD-II scan tool with live data and fuel trim capability
- Fuel pressure gauge
- Smoke machine for intake leak testing
- Digital multimeter
- Injector balance tester or leak-down kit
- Basic hand tools for intake and sensor access



Reading P2BF1

- P** Powertrain: engine, transmission and emissions.
- 2** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- B** Hybrid propulsion.
- F1** The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P0175** System Too Rich (Bank 2) · **P0300** Random/Multiple Cylinder Misfire Detected · **P2BF0** Fuel Control System B Too Lean Bank 1 · **P2BF2** Fuel Control System B Too Lean Bank 2

See it working

Watch the animated explainer [How a Rotary Engine Works: Wankel in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2bf1/>

