

GENERIC · POWERTRAIN

P029F

OBD-II TROUBLE CODE

P029F

Cylinder 2 - Fuel Trim at Min Limit

P029F means the engine computer has detected that the fuel trim for cylinder 2 has reached its minimum limit, meaning the powertrain control module can no longer remove enough fuel to correct a rich condition on that specific cylinder. The computer monitors crankshaft speed fluctuations and adjusts individual cylinder fuel delivery, and when the correction hits the bottom of its allowed range, this code is stored.

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 symptoms
- Rough idle or misfire-like shudder that may be intermittent
- Slightly reduced fuel economy over time
- Black soot on the tailpipe or spark plug for cylinder 2
- Engine may stumble or hesitate under light acceleration
- Strong fuel odor from the exhaust in severe cases

Common causes, most likely first

- 1 Leaking or stuck-open fuel injector for cylinder 2
- 2 Faulty spark plug or ignition coil causing incomplete combustion on cylinder 2
- 3 Contaminated or restricted engine oil affecting variable valve timing on that cylinder
- 4 Intake or exhaust valve sealing problem on cylinder 2
- 5 Wiring or connector issue to the cylinder 2 injector or ignition coil
- 6 Mechanical fault such as low compression on cylinder 2
- 7 Engine computer software calibration issue or faulty powertrain control module



How to diagnose and fix it

- 1 Scan all stored and pending codes, then record freeze-frame data to see when the fault occurs
- 2 Inspect the spark plug and ignition coil for cylinder 2 for fouling, wear, or damage
- 3 Check the fuel injector for cylinder 2 for leaks or incorrect spray pattern, swapping it with a known-good injector if possible
- 4 Perform a compression test and cylinder leak-down test on cylinder 2 to rule out mechanical problems
- 5 Check the wiring harness and connectors at the cylinder 2 injector and coil for corrosion or damage
- 6 Verify fuel pressure and check for a leaking fuel pressure regulator or evap purge valve sticking open
- 7 If all mechanical and electrical checks pass, reflash or replace the powertrain control module as a last resort

Why cylinder 2 fuel trim bottoms out

- A rich condition on only one cylinder is almost never caused by a bad oxygen sensor, so avoid replacing sensors before checking injectors and ignition components.
- A misfire on cylinder 2 can cause unburned fuel to enter the exhaust, which the oxygen sensor reads as rich and drives fuel trim to its minimum limit, so always diagnose misfires first.
- Leaking injectors often test fine on a basic resistance check but still drip fuel; a professional injector flow test or swap is needed to confirm.
- Carbon buildup on intake valves can absorb fuel and cause uneven running that mimics a rich trim on one cylinder, especially on direct-injection engines.
- The code can set intermittently due to a poor electrical connection at the injector that only acts up when hot or vibrating.

Can I keep driving with P029F?

You can usually drive the vehicle short distances to a repair shop, but avoid heavy acceleration or towing because continued rich operation can damage the catalytic converter and waste fuel. If the check engine light flashes or the engine runs very rough, stop driving and have it towed.

Tools that help

- OBD-II scan tool with live data and freeze-frame capability
- Digital multimeter for testing injector and coil circuits
- Compression tester and cylinder leak-down tester
- Fuel pressure gauge
- Mechanic's stethoscope or noid light for injector testing
- Spark plug socket and torque wrench



Reading P029F

- 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).
- 9F** The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P0175** System Too Rich (Bank 2) · **P029E** Cylinder 2 - Fuel Trim at Max Limit · **P0302** Cylinder 2 Misfire Detected · **P2196** O2 Sensor Signal Stuck Rich (Bank 1 Sensor 1)

See it working

Watch the animated explainer [Engine Cooling System Trainer: How Engines Stay Cool](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p029f/>

