



P029E

Cylinder 2 - Fuel Trim at Max Limit

P029E means the engine computer has reached the maximum authority it is allowed to add or subtract fuel on cylinder 2 while trying to keep that cylinder's combustion at the target air-fuel ratio. The powertrain control module (PCM) is reporting that the cylinder 2 fuel trim correction has hit its calibrated limit, so it can no longer compensate for the imbalance it is seeing.

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 symptoms besides the warning light
- Rough idle or a noticeable shake that is worse when the engine is cold
- Misfire-like shudder or hesitation under light acceleration
- Reduced fuel economy because the computer is adding maximum fuel to one cylinder
- A faint fuel or exhaust smell if the cylinder is running rich at the trim limit
- Possible slight loss of power or uneven running at steady cruise

Common causes, most likely first

- 1 Leaking or sticking fuel injector on cylinder 2, delivering too much or too little fuel
- 2 Vacuum leak at the intake runner or intake manifold gasket serving cylinder 2
- 3 Faulty ignition coil, spark plug, or plug boot causing incomplete combustion on cylinder 2
- 4 Mechanical fault such as low compression, a worn cam lobe, or a bad valve seat on cylinder 2
- 5 Contaminated or restricted fuel injector screen reducing fuel delivery to cylinder 2
- 6 Engine coolant temperature or mass airflow sensor error skewing fuel trim globally and pushing cylinder 2 to its limit
- 7 Exhaust leak before the oxygen sensor or a lazy upstream oxygen sensor causing false trim corrections



How to diagnose and fix it

- 1 Scan all modules and record freeze-frame data, then check for related misfire and fuel trim codes before touching any parts
- 2 Inspect the intake tract and vacuum lines around cylinder 2 for cracks, loose clamps, and leaking gaskets using a smoke machine
- 3 Swap the cylinder 2 ignition coil and spark plug with a neighbouring cylinder and see whether the misfire or trim fault follows
- 4 Perform a compression test and, if needed, a cylinder leak-down test on cylinder 2 to rule out mechanical causes
- 5 Check fuel injector operation with a noid light or injector balance test, and inspect the injector connector and wiring
- 6 Verify fuel pressure and inspect the mass airflow and coolant temperature sensor readings against expected values
- 7 Repair the confirmed fault, clear the codes, and road-test through several drive cycles to confirm fuel trim returns within normal range

Cylinder 2 fuel trim limit traps to avoid

- A P029E can be set by a problem that is not actually on cylinder 2, because a global vacuum leak or a skewed mass airflow sensor reading can push one cylinder's trim to its limit first.
- Technicians often replace the cylinder 2 injector immediately, but a leaking intake gasket at that runner produces the same maxed-out trim and is far cheaper to fix.
- The code does not always mean the engine is running rich; a maxed-out positive fuel trim means the computer is adding fuel because it thinks cylinder 2 is lean, which can come from a vacuum leak or low fuel pressure.
- A failing ignition coil on cylinder 2 can send unburned oxygen into the exhaust, and the oxygen sensor then reports a false lean condition that drives fuel trim to its limit.
- After the repair, fuel trim must be rechecked at idle and at cruise, because a fault that only appears under load will not show up in a stationary idle test.

Can I keep driving with P029E?

You can usually drive the vehicle to a workshop, but avoid heavy acceleration, towing, and long trips until the fault is diagnosed. Continued driving with a maxed-out fuel trim on one cylinder can overheat the catalytic converter and cause expensive damage.



Tools that help

- OBD-II scan tool with live fuel trim and misfire data
- Smoke machine for intake and vacuum leak testing
- Compression tester and cylinder leak-down tester
- Noid light or injector balance tester
- Fuel pressure gauge
- Basic hand tools and a spark tester

Reading P029E

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).
9E	The exact fault within that area.

Often seen with

P0171 System Too Lean (Bank 1) · **P0172** System Too Rich (Bank 1) · **P0202** Injector Circuit Malfunction - Cylinder 2 · **P0261** Cylinder 1 Injector Circuit Low · **P0302** Cylinder 2 Misfire Detected

See it working

Watch the animated explainer [How ABS Works: Anti-Lock Brakes in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p029e/>

