



P02C7

Cylinder 12 - Fuel Trim at Min Limit

P02C7 means the engine control module has detected that the long-term fuel trim for cylinder 12 has reached its minimum authority limit, so the module can no longer remove enough fuel to correct a rich condition on that cylinder. The computer is reporting that the fuel delivery to cylinder 12 is at the extreme lean end of its adjustment range, which typically indicates excess fuel is entering that cylinder or the oxygen sensor signal for that cylinder is skewed rich.

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 that is felt more at idle than at higher engine speeds
- Black sooty exhaust smoke or a strong fuel odor from the tailpipe
- Reduced fuel economy and a rich-running smell around the vehicle
- Engine hesitation or stumble during acceleration when the affected cylinder is under load
- Possible catalytic converter overheating smell or a sulfur-like odor after extended driving

Common causes, most likely first

- 1 Leaking or stuck-open fuel injector on cylinder 12 delivering too much fuel
- 2 Contaminated or failed oxygen sensor for that cylinder bank sending a false rich signal
- 3 Faulty engine coolant temperature sensor reporting a cold engine when it is warm, causing excess fuel enrichment
- 4 High fuel pressure from a failing fuel pressure regulator or restricted return line
- 5 Intake or exhaust valve sealing problems on cylinder 12 causing incomplete combustion and false rich readings
- 6 Wiring or connector corrosion between the cylinder 12 fuel injector or oxygen sensor and the engine control module
- 7 Engine control module software calibration issue or internal driver fault affecting cylinder 12 fuel control



How to diagnose and fix it

- 1 Connect a scan tool and record freeze-frame data plus all fuel trim values for both banks to confirm the rich condition is isolated to cylinder 12
- 2 Inspect the cylinder 12 fuel injector connector and wiring for corrosion, chafing, or loose pins, and perform a resistance check against the manufacturer specification
- 3 Measure fuel pressure with a gauge and compare it to the underhood specification to rule out a high-pressure condition before replacing parts
- 4 Perform a cylinder balance or injector cut test to see whether disabling cylinder 12 changes the fuel trim and confirms the affected cylinder
- 5 Check the oxygen sensor response for that bank with a scan tool or oscilloscope to verify the sensor is not skewed rich and causing false fuel trim correction
- 6 Remove and flow-test the cylinder 12 fuel injector, or swap it with a known-good injector from another cylinder to see if the fault follows the injector
- 7 After repairs, clear the adaptive fuel trim memory and road-test the vehicle through several drive cycles to confirm the code does not return

Cylinder 12 fuel trim traps to avoid

- A cylinder-specific fuel trim code like P02C7 often points to a single injector or a single-cylinder mechanical issue rather than a global fuel pressure problem, so technicians who replace all injectors waste money and may not fix the fault.
- A lazy or contaminated oxygen sensor on the affected bank can report a false rich condition and drive the fuel trim to its minimum limit even though the engine is actually running at the correct air-fuel ratio.
- Intake manifold leaks near cylinder 12 can cause a lean misfire that the oxygen sensor interprets as rich, leading to fuel trim corrections that mask the real vacuum leak.
- On engines with cylinder deactivation or variable valve timing, a mechanical fault on cylinder 12 that reduces airflow can make the fuel trim hit its limit without any injector or sensor problem at all.
- The engine control module may set P02C7 as a companion code when a misfire code for cylinder 12 is present, so always diagnose the misfire first before chasing fuel trim.

Can I keep driving with P02C7?

You can usually drive the vehicle short distances to a repair shop, but avoid heavy acceleration, towing, or long highway trips because the rich condition can overheat the catalytic converter and cause costly damage. If the check engine light begins flashing or you notice a strong fuel smell, stop driving and have the vehicle towed.



Tools that help

- OBD-II scan tool with live data and fuel trim graphing capability
- Fuel pressure gauge
- Digital multimeter for injector and sensor circuit testing
- Oscilloscope for oxygen sensor and injector waveform analysis
- Mechanic's stethoscope or noid light for injector pulse testing
- Cylinder leak-down tester or compression gauge for mechanical checks

Reading P02C7

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).
C7	The exact fault within that area.

Often seen with

P0172 System Too Rich (Bank 1) · **P02C6** Cylinder 12 - Fuel Trim at Max Limit · **P02C8** Cylinder 12 - Injector Restricted · **P0300** Random/Multiple Cylinder Misfire Detected · **P0301** Cylinder 1 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/p02c7/>

