



P2191

System Too Lean at Higher Load (Bank 1)

P2191 means the engine computer has detected a lean condition on bank 1 that only appears when the engine is under higher load, such as during acceleration or climbing a hill. The computer compares the oxygen sensor readings against the fuel trims it has commanded and sees that the mixture is still too lean despite adding fuel, which points to a fuel delivery or unmetered air problem that worsens under demand.

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

Symptoms you may notice

- Often no symptoms besides the warning light, especially if the lean condition is mild and only occurs briefly under load.
Hesitation or a flat spot during acceleration, particularly when merging onto a highway or climbing a grade.
- Loss of power or sluggish response when the engine is working hard, with the vehicle feeling like it is down on torque.
- Occasional engine misfire or rough running under load, sometimes accompanied by a flashing check engine light if the misfire is severe.
- Poor fuel economy as the computer tries to compensate by adding fuel, though this is less noticeable in short-term driving.
- In some cases, a slight surge or stumble when the throttle is applied firmly from a steady cruise.

Common causes, most likely first

- 1 A vacuum leak that only opens or worsens under higher load, such as a cracked intake boot, a leaking intake manifold gasket, or a faulty positive crankcase ventilation (PCV) hose.
- 2 A weak or failing fuel pump that cannot maintain pressure and volume when demand increases, often due to a worn pump or a clogged fuel filter.
- 3 Dirty or clogged fuel injectors that flow less fuel than commanded, especially on bank 1, which can be caused by contaminated fuel or lack of maintenance.
- 4 A faulty mass air flow (MAF) sensor that under-reports airflow at higher load, leading the computer to calculate a lean mixture.
- 5 An exhaust leak before the upstream oxygen sensor on bank 1, which can draw in outside air and cause a false lean reading under load.
- 6 A failing upstream oxygen sensor on bank 1 that responds slowly or inaccurately under load, though this is less common than the other causes.
- 7 Low fuel pressure caused by a restricted fuel line or a faulty fuel pressure regulator, which may only show up when the engine is under demand.



How to diagnose and fix it

- 1 Check for stored and pending diagnostic trouble codes (DTCs) and freeze-frame data to confirm the conditions under which P2191 set, then inspect live data for fuel trims and oxygen sensor activity under load.
- 2 Perform a visual inspection of the intake system for cracked hoses, loose clamps, and damaged gaskets, and use a smoke machine to locate vacuum leaks that only appear under load.
- 3 Measure fuel pressure and volume at the rail, comparing against the manufacturer's specification, and check for a restricted fuel filter or a weak pump.
- 4 Clean or test the mass air flow sensor with a proper cleaner and verify its readings against expected values under load using a scan tool.
- 5 Inspect the exhaust system for leaks upstream of the bank 1 oxygen sensor, looking for cracked manifolds, broken studs, or damaged gaskets.
- 6 Test the upstream oxygen sensor on bank 1 for proper switching and response time, and replace it if it is slow or biased lean under load.
- 7 If the lean condition persists, perform a fuel injector balance test and consider professional cleaning or replacement of the injectors on bank 1.

Load-dependent lean faults that fool technicians

- A vacuum leak that only appears under load is easy to miss because idle fuel trims may look normal; a smoke test performed while the engine is revved can reveal leaks that only open when the engine moves or intake pressure changes.
- A weak fuel pump often passes a static pressure test but fails to deliver enough volume under load, so a fuel volume test or a pressure test while driving under load is more revealing than a simple key-on pressure check.
- An exhaust leak before the oxygen sensor can draw in air and create a false lean reading that only shows up at higher exhaust flow, so inspect the exhaust carefully even if fuel delivery seems adequate.
- A dirty mass air flow sensor can under-report airflow at higher load without setting a mass air flow code, causing a lean condition that the computer cannot correct, so clean it before condemning other parts.
- P2191 is sometimes set by a failing fuel pressure regulator that leaks fuel into the intake through the vacuum reference line, which can cause a rich condition at idle and a lean condition under load, so check the regulator for fuel in the vacuum hose.

Can I keep driving with P2191?

You can usually drive the vehicle to a repair shop, but avoid hard acceleration, heavy towing, and sustained high-speed driving until the fault is repaired. Continuing to drive with a lean condition under load can lead to overheating of the catalytic converter and possible engine damage, so have it diagnosed promptly.



Tools that help

- OBD-II scan tool with live data and freeze-frame capability
- Smoke machine for vacuum leak detection
- Fuel pressure gauge and fuel volume test kit
- Digital multimeter for sensor and circuit testing
- Mass air flow sensor cleaner
- Vacuum gauge for intake system testing

Reading P2191

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

Often seen with

P0171 System Too Lean (Bank 1) · **P0174** System Too Lean (Bank 2) · **P0300** Random/Multiple Cylinder Misfire Detected · **P2190** System Too Rich at Idle (Bank 2) · **P2192** System Too Rich at Higher Load (Bank 1)

See it working

Watch the animated explainer [How Drive-by-Wire Works: Electronic Throttle Body](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2191/>

