

GM · POWERTRAIN

P1690

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1690 · GM

PCM Loop Overrun / Wastegate Solenoid Circuit

This code indicates that the powertrain control module (PCM) has detected an overrun condition in its internal control loop, often linked to the wastegate solenoid circuit on turbocharged GM vehicles. The PCM monitors the wastegate solenoid command and feedback; when the actual boost pressure or solenoid response deviates from the commanded value beyond a calibrated threshold, it sets P1690. In plain terms, the engine computer sees that the turbocharger's boost control is not following orders, which can affect performance and emissions.

SYSTEM

Powertrain

CODE TYPE

GM specific

SEVERITY

Medium

FIX DIFFICULTY

Intermediate

AREA

Computer and output circuits

Symptoms you may notice

- Illuminated check engine light, often with no other noticeable symptoms
- Reduced engine power or limp mode, especially during acceleration
- Poor fuel economy or rough running under load
- Turbocharger not building boost or overboosting, leading to sluggish performance
- Possible hesitation or stumble when accelerating from a stop
- In some cases, the engine may enter a fail-safe mode limiting RPM

Common causes, most likely first

- 1 Faulty wastegate solenoid (boost control solenoid) due to internal failure or contamination
- 2 Damaged or disconnected vacuum lines to the wastegate actuator or solenoid
- 3 Wiring issues such as open circuit, short to ground, or corroded connectors at the solenoid
- 4 Sticking or misadjusted wastegate actuator linkage
- 5 PCM software calibration issue requiring reflash (less common)
- 6 Boost pressure sensor fault providing erroneous feedback to the PCM



How to diagnose and fix it

- 1 Inspect all vacuum hoses and connections at the wastegate solenoid and actuator for cracks, leaks, or disconnections; replace as needed
- 2 Check the wastegate solenoid resistance and compare to specification; replace if out of range
- 3 Test the solenoid circuit with a multimeter for power, ground, and continuity; repair wiring faults
- 4 Verify wastegate actuator operation by applying vacuum and observing movement; replace actuator if stuck
- 5 Check boost pressure sensor readings with a scan tool and compare to actual boost; replace sensor if faulty
- 6 Reprogram the PCM with the latest calibration if all hardware checks pass
- 7 Clear codes and perform a road test to confirm the repair

What GM techs check before replacing the solenoid

- A common oversight is a partially disconnected vacuum line at the wastegate actuator that only leaks under boost, so a visual inspection at idle may miss it.
- The wastegate solenoid often fails due to oil contamination from the turbo, so replacing it without addressing the root cause can lead to repeat failure.
- P1690 can be set by a faulty boost pressure sensor even when the solenoid and wiring are perfect, so always compare sensor data to a mechanical gauge.
- On some GM platforms, this code may be accompanied by reduced power mode, but the vehicle may still drive normally; do not assume the turbo is failing without proper diagnosis.
- After repairs, a bidirectional scan tool is needed to reset the learned wastegate adaptations; simply clearing the code may not restore proper boost control.

Can I keep driving with P1690?

You can usually drive the vehicle with this code, but avoid heavy acceleration or towing until repaired, as the engine may enter limp mode and boost control is compromised. Prolonged driving with an overboost condition can damage the turbocharger or engine, so schedule diagnosis soon.

Tools that help

- OBD-II scan tool with bidirectional controls
- Digital multimeter
- Hand vacuum pump
- Wrench set and screwdrivers
- Service information for wiring diagrams and specifications



Reading P1690

- P** Powertrain: engine, transmission and emissions.
- 1** Manufacturer-specific code (GM): its meaning depends on the make.
- 6** Computer and output circuits.
- 90** The exact fault within that area.

Often seen with

P0234 Engine Overboost Condition · **P0235** Turbocharger Boost Sensor A Circuit Malfunction · **P0243** Turbocharger Wastegate Solenoid A Malfunction · **P0299** Turbo/Supercharger Underboost · **P2563** Turbocharger Boost Control Position Sensor Circuit Range/Per

See it working

Watch the animated explainer [Turbocharger Trainer: Boost, Wastegate and Intercooler](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/gm-p1690/>

