

MAZDA · POWERTRAIN

P1690

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1690 · Mazda

Wastegate Solenoid Circuit

P1690 on Mazda vehicles indicates that the powertrain control module (PCM) has detected an electrical fault in the wastegate solenoid circuit, which controls boost pressure on turbocharged engines. The PCM monitors the solenoid's command and feedback circuits and sets this code when the measured current or voltage falls outside the expected range for the commanded state.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Mazda specific	Medium	Intermediate	Computer and output circuits

Symptoms you may notice

- Check engine light illuminated, often with no other noticeable symptoms
- Reduced engine power or limp mode, especially under acceleration
- Overboost or underboost conditions leading to sluggish performance
- Poor fuel economy or increased turbo lag
- In rare cases, the engine may enter a fail-safe mode limiting boost

Common causes, most likely first

- Failed wastegate solenoid (sticking, open, or shorted coil)
- Damaged or disconnected wiring harness to the solenoid
- Corroded or loose electrical connector at the solenoid
- Vacuum or boost hose leak between the solenoid and wastegate actuator
- Faulty PCM driver circuit (less common)
- Restricted solenoid filter or debris blocking the valve

How to diagnose and fix it

- Inspect the wastegate solenoid connector and wiring for corrosion, damage, or looseness
- Check vacuum/boost hoses for cracks, leaks, or disconnections
- Measure solenoid resistance and compare to factory specification
- Test solenoid operation with a scan tool bidirectional control or apply 12V to verify clicking
- Check for power and ground signals at the solenoid connector with a multimeter
- If wiring and solenoid test good, diagnose PCM driver circuit or replace PCM as last resort
- Clear codes and perform a road test to verify repair



Wastegate Solenoid Diagnostics Beyond the Code

- A stuck-open wastegate solenoid often causes overboost and a P0234 code, but P1690 can set first due to electrical monitoring.
- Mazda's wastegate solenoid is duty-cycle controlled; a solenoid that tests good statically may fail under heat or vibration.
- Vacuum leaks at the wastegate actuator or solenoid can mimic solenoid failure, so always pressure-test the circuit.
- Some technicians replace the turbocharger unnecessarily when the fault is a \$5 hose or corroded connector.
- P1690 can be intermittent; a wiggle test of the harness while monitoring solenoid command often reveals the issue.

Can I keep driving with P1690?

You can drive the vehicle with P1690, but avoid heavy acceleration and sustained boost to prevent potential engine damage from overboost or limp mode. Have the fault diagnosed promptly to restore proper turbo operation.

Tools that help

- OBD-II scan tool with bidirectional control
- Digital multimeter
- Vacuum pump and gauge
- Hand tools for connector and hose inspection
- Factory service information for resistance specifications

Reading P1690

- P** Powertrain: engine, transmission and emissions.
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- 1** Manufacturer-specific code (Mazda): its meaning depends on the make.
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- 6** Computer and output circuits.
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- 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



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/mazda-p1690/>

