

MAZDA · POWERTRAIN

P1688

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1688 · Mazda

Metering Oil Pump Stepping Motor Cont Circuit

P1688 on Mazda vehicles indicates that the powertrain control module (PCM) has detected a circuit fault in the stepper motor control for the metering oil pump. The PCM monitors the electrical circuit that drives the stepper motor, which precisely regulates oil delivery to the engine, and sets this code when the circuit is open, shorted, or the motor fails to respond as commanded.

SYSTEM

Powertrain

CODE TYPE

Mazda specific

SEVERITY

Medium

FIX DIFFICULTY

Professional

AREA

Computer and output circuits

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or engine misfire due to improper oil metering
- Reduced engine performance or power output
- Increased oil consumption or blue smoke from the exhaust
- Difficulty starting or stalling, especially when cold
- In rare cases, the engine may enter limp mode to protect internal components

Common causes, most likely first

- 1 Faulty metering oil pump stepper motor
- 2 Damaged or corroded wiring harness or connector at the metering oil pump
- 3 Open or short circuit in the control circuit between the PCM and the stepper motor
- 4 Failed PCM driver for the stepper motor circuit
- 5 Contaminated or degraded oil causing the pump to seize and overload the motor
- 6 Loose or damaged ground connection for the metering oil pump circuit



How to diagnose and fix it

- 1 Inspect the wiring harness and connector at the metering oil pump for signs of damage, corrosion, or loose pins; repair or replace as needed.
- 2 Measure resistance across the stepper motor coils and compare to the manufacturer's specification; replace the motor if out of range.
- 3 Check for continuity and short-to-ground or short-to-power on each control wire between the PCM and the stepper motor; repair any faulty wiring.
- 4 Verify that the metering oil pump is not mechanically seized by attempting to rotate it by hand (if accessible); replace the pump if seized.
- 5 Test the PCM output signals to the stepper motor with an oscilloscope or a bidirectional scan tool to confirm proper command; replace the PCM if the driver circuit is faulty.
- 6 Clear the diagnostic trouble codes and perform a road test to verify that the code does not return and that the metering oil pump operates correctly.

Metering oil pump stepper motor pitfalls

- A seized metering oil pump can mimic a faulty stepper motor, so always check for mechanical binding before condemning the motor or PCM.
- Corroded connectors at the pump are a frequent cause, especially on vehicles driven in humid or salty environments, and are often overlooked during diagnosis.
- The PCM may set P1688 even when the stepper motor is functional if the feedback circuit is interrupted, so do not replace the motor without testing the entire circuit.
- After repairs, the PCM may require a relearn procedure for the metering oil pump; consult the factory service information for the specific Mazda model.
- Related codes such as P1689 or P1690 may also be present, indicating additional faults in the metering oil pump control system, so address all codes together.

Can I keep driving with P1688?

It is not advisable to continue driving with this code because improper oil metering can lead to engine damage over time. If you must drive, keep the trip short and avoid heavy loads or high speeds until the fault is repaired.

Tools that help

- OBD-II scan tool with bidirectional control capability
- Digital multimeter
- Oscilloscope
- Factory service information for wiring diagrams and specifications
- Socket and wrench set for component access



Reading P1688

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

Often seen with

P1690 MIL Malfunction · **P1690** Traction Control System STB Line Failure · **P1689** Oil Pressure Control Solenoid Circuit · **P1690** Wastegate Solenoid Circuit · **P1690** Traction Control System STB Line Failure · **P1689** Delivered Torque Circuit Fault · **P1690** PCM Loop Overrun / Wastegate Solenoid Circuit · **P1690** Wastegate Solenoid Circuit Malfunction · **P1689** No Communication Between ECM & Injection Pump Module · **P1690** Fuel Injection Pump CKP Sensor Does Not Agree With ECM CKP S · **P1690** Malfunction Indicator Lamp MIL Electrical · **P0171** System Too Lean (Bank 1) · **P0300** Random/Multiple Cylinder Misfire Detected · **P0420** Catalyst System Efficiency Below Threshold (Bank 1)

See it working

Watch the animated explainer [How a Knock Sensor Works: Spark Timing and Octane](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/mazda-p1688/>

