

MAZDA · POWERTRAIN

P1687

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1687 · Mazda

Metering Oil Pump Stepping Motor Cont Circuit

P1687 on Mazda vehicles indicates that the powertrain control module (PCM) has detected an open or short circuit in the control circuit for the metering oil pump stepping motor. The PCM monitors the electrical current through the motor's control circuit and sets this code when the expected current is out of range, which prevents the pump from delivering the precise oil quantity required for engine lubrication.

SYSTEM

Powertrain

CODE TYPE

Mazda specific

SEVERITY

High

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 hesitation due to improper oil metering affecting combustion.
- Increased oil consumption or blue smoke from the exhaust if the pump fails to deliver oil.
- Reduced engine performance or power loss under load.
- In severe cases, engine knocking or seizure from inadequate lubrication.
- The vehicle may enter limp mode, limiting engine speed to protect the engine.

Common causes, most likely first

- 1 Damaged or corroded wiring in the metering oil pump control circuit.
- 2 Failed metering oil pump stepping motor.
- 3 Poor electrical connection at the pump motor connector.
- 4 Faulty powertrain control module (PCM) driver circuit.
- 5 Open or shorted control wire between the PCM and the pump motor.
- 6 Contamination or debris causing the stepping motor to bind mechanically.



How to diagnose and fix it

- 1 Inspect the metering oil pump motor connector and wiring for corrosion, damage, or loose pins; clean or repair as needed.
- 2 Measure the resistance of the stepping motor windings and compare to the manufacturer's specification; replace the motor if out of spec.
- 3 Check for continuity and short-to-ground or short-to-power on the control circuit between the PCM and the pump motor; repair the harness if faulty.
- 4 Test the PCM output signal to the pump motor with an oscilloscope or a bidirectional scan tool; replace the PCM if the driver circuit is defective.
- 5 Verify oil supply lines and pump mechanism for blockages or mechanical binding; clean or replace components as required.
- 6 Clear the diagnostic trouble codes (DTCs) and perform a road test to confirm the repair; monitor live data for proper pump operation.

Metering Oil Pump Circuit Checks

- A common oversight is assuming the pump motor itself is at fault when the real issue is a chafed wire in the harness near the engine mount or exhaust manifold.
- The code can be set intermittently by a poor ground connection at the pump motor mounting bolt, which is often overlooked during diagnosis.
- On some Mazda models, the metering oil pump is integrated into the oil pump assembly, so a circuit fault may require replacing the entire assembly rather than just the motor.
- A failing PCM driver can mimic a faulty pump motor; always test the control signal at the PCM before condemning the motor.
- This code does not always mean the pump has failed completely; it can indicate a marginal circuit resistance that only triggers the code under specific temperature or vibration conditions.

Can I keep driving with P1687?

Driving with P1687 is not recommended because the engine may not receive adequate lubrication, leading to catastrophic damage. If you must drive, keep the engine at low speed and load, and have the vehicle towed to a repair facility as soon as possible.

Tools that help

- OBD-II scan tool with bidirectional control and live data capabilities
- Digital multimeter (DMM)
- Oscilloscope
- Wiring diagram for the specific Mazda model
- Socket and ratchet set
- Electrical contact cleaner and dielectric grease



Reading P1687

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

Often seen with

P1690 MIL Malfunction · **P1686** Control Unit Error Programming · **P1686** A/T FI Signal B Low Input · **P1690** Traction Control System STB Line Failure · **P1686** Metering Oil Pump Stepping Motor Cont Circuit · **P1688** Metering Oil Pump Stepping Motor Cont Circuit · **P1690** Wastegate Solenoid Circuit · **P1689** Oil Pressure Control Solenoid Circuit · **P1686** A/T FI Signal B Low Input · **P1690** Traction Control System STB Line Failure · **P1686** Driver 5 Line 6 · **P1688** Internal Fuel Injection Pump Controller 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 · **P1688** Internal Fuel Injection Pump Controller Failure · **P1686** No SKIM Bus Message Received · **P1690** Malfunction Indicator Lamp MIL Electrical · **P0300** Random/Multiple Cylinder Misfire Detected

See it working

Watch the animated explainer [How Push-Button Start Works: Keyless Ignition](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/mazda-p1687/>

