

MAZDA · POWERTRAIN

P1686

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1686 · Mazda

Metering Oil Pump Stepping Motor Cont Circuit

P1686 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, and when the feedback signal does not match the commanded position or the circuit is open or shorted, it stores this code.

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

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or engine stumble if the oil pump is not metering correctly
- Increased oil consumption or excessive smoke from the exhaust
- Reduced engine performance or power due to improper lubrication
- In rare cases, engine knocking or seizure if the pump fails completely

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 bind and overload the motor
- 6 Poor electrical ground connection for the metering oil pump circuit

How to diagnose and fix it

- 1 Inspect the wiring harness and connectors at the metering oil pump for damage, corrosion, or loose pins
- 2 Check the resistance of the stepper motor windings and compare to the manufacturer's specification
- 3 Test the control circuit for continuity and shorts between the PCM and the pump
- 4 Verify that the PCM is commanding the stepper motor correctly using a scan tool with bidirectional controls
- 5 Replace the metering oil pump stepper motor if it fails electrical or mechanical tests
- 6 Repair or replace damaged wiring or connectors as needed
- 7 Clear the code and perform a road test to confirm the repair



Stepper motor circuit faults often misdiagnosed

- A sticking metering oil pump can cause the stepper motor to draw excessive current, leading to a circuit fault code even when the motor itself is healthy.
- The PCM may set P1686 if the oil level is low or the oil is severely degraded, as the pump struggles to maintain pressure and the motor feedback falls out of range.
- Corrosion inside the connector at the metering oil pump is a common cause that is often overlooked during visual inspection.
- After replacing the stepper motor, the PCM may require a relearn procedure to calibrate the new motor's position, which is not always documented in aftermarket manuals.
- P1686 can be triggered by a weak battery or charging system issue that causes voltage spikes, so always check battery health before replacing expensive components.

Can I keep driving with P1686?

It is not advisable to continue driving with P1686 because the metering oil pump may not deliver adequate lubrication, which can lead to severe engine damage. Have the vehicle inspected by a qualified technician as soon as possible, and avoid high-speed or heavy-load driving until repaired.

Tools that help

- OBD-II scan tool with bidirectional control capability
- Digital multimeter
- Wiring diagram for the specific Mazda model
- Socket set and basic hand tools
- Oscilloscope for signal analysis

Reading P1686

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



Often seen with

P1690 MIL Malfunction · **P1690** Traction Control System STB Line Failure · **P1687** A/T FI Signal B High Input · **P1685** Metering Oil Pump Stepping Motor Cont Circuit · **P1690** Wastegate Solenoid Circuit · **P1687** Metering Oil Pump Stepping Motor Cont Circuit · **P1688** Metering Oil Pump Stepping Motor Cont Circuit · **P1689** Oil Pressure Control Solenoid Circuit · **P1687** A/T FI Signal B High Input · **P1690** Traction Control System STB Line Failure · **P1685** Driver 5 Line 5 · **P1690** PCM Loop Overrun / Wastegate Solenoid Circuit · **P1689** Delivered Torque Circuit Fault · **P1688** Internal Fuel Injection Pump Controller Failure · **P1687** Driver 5 Line 7 · **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 · **P1687** No Cluster Bus Message · **P1685** Skim Invalid Key · **P1690** Malfunction Indicator Lamp MIL Electrical

See it working

Watch the animated explainer [How ABS Works: Anti-Lock Brakes in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/mazda-p1686/>

