

MAZDA · POWERTRAIN

P1138

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1138 · Mazda

HO2S Bank 1 Sensor 2 Signal Above 0.45v AF Ratio Too Rich

P1138 on Mazda vehicles means the downstream heated oxygen sensor (HO2S) in Bank 1 is reporting a steady voltage above 0.45 volts, which the powertrain control module interprets as an air/fuel mixture that is too rich. The computer is not measuring fuel directly; it is watching the rear sensor's signal and flagging that it stays high instead of switching normally after the catalytic converter.

SYSTEM

Powertrain

CODE TYPE

Mazda specific

SEVERITY

Medium

FIX DIFFICULTY

Intermediate

AREA

**Fuel and air
metering**

Symptoms you may notice

- Check engine light illuminated, often with no other noticeable symptoms
- A slight decrease in fuel economy over time
- A faint sulfur or rotten-egg smell from the exhaust in some cases
- Black or sooty exhaust tailpipe residue
- Occasional rough idle or hesitation when the mixture is genuinely rich
- Failed emissions test due to high carbon monoxide or hydrocarbon readings

Common causes, most likely first

- 1 Failed downstream heated oxygen sensor (Bank 1 Sensor 2) reading high or biased rich
- 2 Wiring or connector damage between the rear HO2S and the PCM, including corrosion or chafed harness
- 3 Exhaust leak ahead of the rear sensor letting in air that skews the reading
- 4 Leaking fuel injector or high fuel pressure causing a genuinely rich mixture
- 5 Contaminated sensor from oil or coolant consumption, or from silicone sealant use
- 6 Aging or partially clogged catalytic converter affecting the rear sensor's switching behavior
- 7 Engine coolant temperature sensor or mass airflow sensor drift that enriches the mixture



How to diagnose and fix it

- 1 Scan all stored and pending codes and record freeze-frame data to confirm P1138 is the primary fault
- 2 Inspect the Bank 1 Sensor 2 harness and connector for corrosion, chafing, or loose pins, and repair as needed
- 3 Check for exhaust leaks between the manifold and the rear sensor using a smoke test or listening for ticking
- 4 Graph the rear HO2S voltage on a scan tool; a steady high reading above 0.45V confirms the fault direction
- 5 Measure fuel pressure and check for leaking injectors if the mixture is genuinely rich
- 6 Swap the rear HO2S with a known-good sensor or perform a bench resistance check before condemning it
- 7 Replace the downstream HO2S only after wiring, exhaust, and fuel delivery checks pass, then clear codes and verify the monitor completes

Why the rear sensor reads rich on Mazdas

- A rear HO2S that stays above 0.45V is often a lazy or contaminated sensor rather than a true rich mixture, so graphing the signal before replacing parts saves money.
- Exhaust leaks upstream of the rear sensor pull in outside air and can make the sensor read lean at idle and rich under load, mimicking a fuel problem.
- Mazda's PCM strategy uses the rear sensor mainly to judge catalytic converter efficiency, so a P1138 can appear even when driveability feels normal.
- Silicone-based sealants or coolant burning in the exhaust can coat the sensor element and bias its output high without any fuel system fault.
- A stuck-open thermostat or a coolant temperature sensor reading cold keeps the PCM in enrichment, which drives the rear sensor high and sets this code.

Can I keep driving with P1138?

You can usually drive short distances to a repair shop, but avoid heavy throttle and long trips because a genuinely rich mixture can overheat and damage the catalytic converter. If the check engine light begins flashing or you notice misfiring, stop driving and have the vehicle towed.

Tools that help

- OBD-II scan tool with live data and graphing capability
- Digital multimeter for sensor and wiring checks
- Exhaust smoke machine or stethoscope for leak detection
- Fuel pressure gauge
- Socket set and oxygen sensor wrench



Reading P1138

- P** Powertrain: engine, transmission and emissions.
- 1** Manufacturer-specific code (Mazda): its meaning depends on the make.
- 1** Fuel and air metering.
- 38** The exact fault within that area.

Often seen with

P0136 O2 Sensor Circuit Malfunction (Bank 1 Sensor 2) · **P0137** O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2) · **P0138** O2 Sensor Circuit High Voltage (Bank 1 Sensor 2) · **P0172** System Too Rich (Bank 1) · **P0420** Catalyst System Efficiency Below Threshold (Bank 1)

See it working

Watch the animated explainer [How a Wideband Air-Fuel Sensor Works](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/mazda-p1138/>

