

GENERIC · POWERTRAIN

P2050

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P2050

Reductant Injector Circuit/Open (Bank 2 Unit 1)

P2050 indicates that the powertrain control module (PCM) has detected an open circuit or excessive resistance in the reductant injector circuit for bank 2 unit 1, which is part of the diesel exhaust fluid (DEF) injection system on vehicles with selective catalytic reduction (SCR). The PCM monitors the injector command and feedback circuit and sets this code when the expected current or voltage is not present, meaning the injector is not being properly energized.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Medium

FIX DIFFICULTY

Intermediate

AREA

Fuel and air metering and auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Reduced engine power or limp mode, depending on the vehicle's strategy
- A message on the dash indicating DEF system fault or service required
- Increased DEF consumption or failure to inject DEF, leading to poor NOx reduction
- Rough running or misfire in extreme cases if the injector is stuck open or shorted
- Possible induction of a countdown to engine derate or no-start condition

Common causes, most likely first

- 1 Failed reductant injector (open coil or internal short)
- 2 Damaged or corroded wiring harness or connector at the injector
- 3 Open circuit in the power or ground circuit to the injector
- 4 Faulty PCM driver for the injector circuit
- 5 Poor electrical connection at the PCM connector
- 6 Aftermarket or damaged DEF injector installation causing pinched wires



How to diagnose and fix it

- 1 Verify the code with a scan tool and check for any related codes in the reductant system
- 2 Inspect the reductant injector connector and wiring for damage, corrosion, or loose pins
- 3 Measure the resistance of the reductant injector with a multimeter and compare to specification
- 4 Check for power and ground at the injector connector with the key on and during cranking
- 5 Perform a wiggle test on the harness while monitoring injector data to detect intermittent opens
- 6 If the circuit tests good, suspect the PCM and perform pinpoint tests for the driver circuit
- 7 Replace the faulty reductant injector or repair the wiring as needed, then clear codes and verify

Reductant injector circuit pitfalls and hidden causes

- A common oversight is assuming the injector itself is faulty when the real problem is a chafed wire in the harness near the exhaust or transmission, which can short only when the engine is hot or vibrating.
- The PCM may set P2050 even if the injector coil is good, because the driver circuit inside the PCM can fail due to heat or age, so always test the circuit at the PCM before condemning the injector.
- On some vehicles, a weak battery or poor ground can cause a false open circuit code because the injector driver needs stable voltage to operate correctly.
- After replacing the injector, some vehicles require a learned value reset or adaptation procedure; skipping this can lead to a repeat code or poor DEF dosing.
- P2050 is often accompanied by other reductant codes like P20B9 or P208E, and diagnosing only the injector without checking the DEF pump and pressure can lead to a comeback.

Can I keep driving with P2050?

You can usually drive with P2050, but the vehicle may enter limp mode or eventually derate power if the fault persists. Avoid long trips and heavy loads until the circuit is repaired, because continued driving with a disabled reductant injector can lead to increased emissions and potential aftertreatment damage.

Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Test light
- Wire repair kit with crimpers and heat shrink
- Factory service information for pinpoint tests



Reading P2050

- P** Powertrain: engine, transmission and emissions.
- 2** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 0** Fuel and air metering and auxiliary emission controls.
- 50** The exact fault within that area.

Often seen with

P204F Reductant System Performance · **P205C** Reductant Tank Temperature Sensor A Circuit Low · **P208E** Reductant Injection Valve Stuck Closed (Bank 1 Unit 1) · **P20B9** Reductant Heater A Control Circuit/Open · **P20BE** Reductant Heater B Control Circuit Performance

See it working

Watch the animated explainer [Helicopter Simulator: Take Off, Hover and Land](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2050/>

