

GENERIC · POWERTRAIN

P2091

OBD-II TROUBLE CODE

P2091

'B' Camshaft Position Actuator Control Circuit High (Bank 1)

P2091 indicates that the powertrain control module (PCM) has detected an abnormally high voltage on the control circuit for the bank 1 'B' camshaft position actuator, which is typically the exhaust camshaft phaser on engines with variable valve timing. The PCM commands a duty cycle to move the actuator, but the circuit voltage remains higher than expected, signaling an open circuit, short to power, or a faulty actuator.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Fuel and air metering and auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms.
- Rough idle or engine misfire, especially when the variable valve timing system is active.
- Reduced engine performance and poor fuel economy due to incorrect camshaft timing.
- A noticeable rattle or ticking noise from the front of the engine if the actuator is stuck.
- In some cases, the engine may enter limp mode or have difficulty starting.

Common causes, most likely first

- 1 Faulty camshaft position actuator solenoid (the 'B' actuator on bank 1) with an internal open or high resistance.
- 2 Damaged or corroded wiring harness connector at the actuator, causing high resistance or an open circuit.
- 3 Open circuit in the control wire between the PCM and the actuator, often due to a broken wire or poor terminal tension.
- 4 Short to voltage on the control circuit, which can be caused by chafed wires contacting a power source.
- 5 Failed PCM driver for the actuator control circuit, though this is less common.
- 6 Engine oil sludge or debris clogging the actuator's oil passages, leading to mechanical binding that affects circuit feedback.



How to diagnose and fix it

- 1 Use a scan tool to verify the code and check for any related camshaft or crankshaft correlation codes.
- 2 Perform a visual inspection of the actuator connector and wiring for damage, corrosion, or loose pins.
- 3 Measure the resistance of the actuator solenoid with a multimeter and compare to the manufacturer's specification.
- 4 Check for battery voltage and ground at the actuator connector with the key on, engine off, to confirm power and ground integrity.
- 5 Backprobe the control circuit at the PCM and actuator to check for an open or short to voltage while wiggling the harness.
- 6 If the circuit tests good, command the actuator with a scan tool and observe voltage or duty cycle to see if it responds correctly.
- 7 Replace the faulty actuator solenoid or repair the wiring as needed, then clear codes and verify the repair with a test drive.

Don't overlook oil condition and circuit testing

- A common oversight is replacing the camshaft actuator without first checking the engine oil condition and level, because dirty or low oil can cause the actuator to stick and set a high voltage code.
- The code can be set by a simple loose or corroded connector pin that intermittently loses contact, so a thorough wiggle test of the harness while monitoring live data is essential.
- A short to voltage on the control circuit can be caused by a wire rubbing against a hot exhaust component or a sharp bracket, which is often missed during a quick visual inspection.
- Some technicians misdiagnose P2091 as a failed PCM, but the PCM driver is rarely the root cause; always rule out the actuator and wiring first.
- After repairs, a camshaft position relearn procedure may be required on some vehicles to restore proper variable valve timing operation and prevent the code from returning.

Can I keep driving with P2091?

You can generally drive the vehicle with P2091, but avoid aggressive acceleration and heavy loads because the variable valve timing may not function correctly, which can affect performance and emissions. Have the fault diagnosed soon to prevent potential engine damage from prolonged incorrect camshaft timing.

Tools that help

- OBD-II scan tool with live data and bidirectional control capabilities
- Digital multimeter
- Wire piercing probes or backprobe pins
- Socket set and ratchet
- Electrical contact cleaner
- Manufacturer's service information for circuit specifications



Reading P2091

- 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.
- 91** The exact fault within that area.

Often seen with

P0011 'A' Camshaft Position - Timing Over-Advanced or System Perfo · **P0012** 'A' Camshaft Position - Timing Over-Retarded (Bank 1) · **P2092** 'A' Camshaft Position Actuator Control Circuit Low (Bank 2) · **P2093** 'A' Camshaft Position Actuator Control Circuit High (Bank 2) · **P2094** 'B' Camshaft Position Actuator Control Circuit Low (Bank 2)

See it working

Watch the animated explainer [Four-Stroke Engine Cutaway: Intake to Exhaust](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2091/>

