

GENERIC · POWERTRAIN

P2C1A

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P2C1A

B Camshaft Profile Actuator Position Sensor C Circuit Bank 1

P2C1A means the engine computer has detected a problem with the electrical circuit for the Bank 1 C camshaft profile actuator position sensor, which reports how far the variable valve timing mechanism has moved the camshaft. The computer monitors the sensor signal and sets this code when the voltage or signal behavior falls outside the expected range for the current operating conditions.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Hybrid propulsion

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or unstable engine speed when the camshaft profile system is commanded to change
- Reduced engine power or a limp-home mode as the computer limits actuator operation
- Poor fuel economy or increased emissions due to incorrect valve timing
- Occasional hesitation or stumble during acceleration when the profile change is requested
- In rare cases, a no-start condition if the sensor signal is completely lost

Common causes, most likely first

- 1 Faulty camshaft profile actuator position sensor (Bank 1 C) internally open or shorted
- 2 Damaged, chafed, or corroded wiring in the sensor circuit, including the connector
- 3 Poor electrical connection at the sensor or at the engine computer harness
- 4 Failed camshaft profile actuator solenoid or mechanical binding in the actuator mechanism
- 5 Contaminated engine oil or sludge obstructing the actuator oil passages
- 6 Engine computer internal fault on the sensor input circuit (less common)



How to diagnose and fix it

- 1 Perform a visual inspection of the sensor, connector, and wiring for damage or corrosion, and repair as needed
- 2 Check the sensor circuit with a digital multimeter for opens, shorts to ground, or shorts to voltage, and compare with manufacturer specifications
- 3 Verify the sensor signal with a scan tool or oscilloscope while commanding the camshaft profile actuator through its range
- 4 Inspect the camshaft profile actuator solenoid for debris or binding, and clean or replace if faulty
- 5 Check engine oil condition and level, and perform an oil and filter change if contaminated
- 6 If the sensor and wiring test good, substitute a known-good sensor to confirm the fault
- 7 Clear the code and perform a road test to verify the repair, and reprogram the engine computer if a software update is available

What most technicians overlook on P2C1A

- A dirty or sludged engine oil system frequently causes this code because the camshaft profile actuator relies on clean oil pressure to move, and the sensor then reports an implausible position.
- The code can be set by a momentary glitch in the sensor signal that does not repeat, so always check for stored freeze-frame data and review the sensor signal on a test drive before replacing parts.
- Wiring harness damage near hot exhaust components or at sharp bends is a common hidden cause that a simple continuity check may miss if the harness is not flexed during testing.
- A failed camshaft profile actuator solenoid can mechanically stick and cause the sensor to read out of range, yet the solenoid itself may not set a separate code, leading to misdiagnosis of the sensor.
- After repairs, some vehicles require a camshaft profile actuator learn or adaptation reset with a scan tool, otherwise the code may return even though the hardware is fixed.

Can I keep driving with P2C1A?

You can usually drive the vehicle short distances to a repair shop, but avoid aggressive acceleration or heavy loads because the engine may enter limp mode or suffer poor performance. If the check engine light is flashing or the engine runs very rough, stop driving and have it towed to prevent catalytic converter damage.

Tools that help

- OBD-II scan tool with live data and actuator command capability
- Digital multimeter
- Oscilloscope for signal waveform analysis
- Basic hand tools and socket set
- Wiring repair kit with crimpers and heat shrink



Reading P2C1A

- P** Powertrain: engine, transmission and emissions.
- 2** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- C** Hybrid propulsion.
- 1A** The exact fault within that area.

Often seen with

P0011 'A' Camshaft Position - Timing Over-Advanced or System Perfo · **P0014** Exhaust Camshaft Position - Over-Advanced (Bank 1) · **P0016** Crankshaft/Camshaft Position Correlation (Bank 1 Sensor A) · **P2C19** B Camshaft Profile Actuator Position Sensor B Circuit High B · **P2C1B** B Camshaft Profile Actuator Position Sensor C Range/Performa

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/p2c1a/>

