

GENERIC · POWERTRAIN

P0021

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0021

'A' Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)

P0021 means the engine computer has detected that the camshaft on bank 2 is more advanced than the commanded timing, or that the variable valve timing system on that bank is not performing as expected. The powertrain control module compares the actual camshaft position signal against the desired position and sets this code when the deviation exceeds a calibrated threshold for a set time.

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
- Rough idle or engine misfire, especially when cold or at low RPM
- Reduced engine power or sluggish acceleration due to retarded timing strategy
- Poor fuel economy as the computer struggles to correct timing
- Occasional stalling or hard starting when the camshaft is stuck advanced
- Unusual engine noise such as ticking or rattling from the timing chain area

Common causes, most likely first

- 1 Dirty or contaminated engine oil causing the variable valve timing solenoid to stick
- 2 Faulty bank 2 variable valve timing solenoid (oil control valve) or its wiring
- 3 Clogged or restricted oil passages feeding the camshaft phaser
- 4 Worn or failing timing chain tensioner allowing chain slack and timing drift
- 5 Failed camshaft phaser (phaser gear) not holding commanded position
- 6 Faulty camshaft position sensor on bank 2 or damaged reluctor wheel
- 7 Low oil pressure or sludge buildup preventing proper phaser operation



How to diagnose and fix it

- 1 Check engine oil level and condition; change oil and filter if overdue or contaminated
- 2 Inspect the bank 2 VVT solenoid for debris and test its resistance and operation
- 3 Verify oil pressure at the phaser feed port with a mechanical gauge
- 4 Remove and clean the bank 2 VVT solenoid screen and oil passages if accessible
- 5 Compare commanded and actual camshaft timing with a scan tool to confirm the fault
- 6 Inspect the timing chain, tensioner, and phaser for wear or slack, replacing as needed
- 7 Replace the bank 2 camshaft position sensor if signal is erratic or missing

Oil quality and VVT solenoid traps

- A sticking VVT solenoid caused by dirty oil is the most common root cause, so a fresh oil change often clears the code temporarily but the underlying sludge must be addressed.
- The code can set from a mechanical timing chain issue even when the solenoid and sensor test good, so always verify actual cam timing against commanded timing before replacing parts.
- Bank 2 refers to the cylinder bank opposite bank 1, which on V6 and V8 engines is often the harder side to access, leading to misdiagnosis from swapped sensor readings.
- A failing camshaft position sensor can mimic a phaser problem by sending a noisy signal, so scope the sensor output before condemning the phaser.
- Some engines use oil pressure to advance the phaser, so low oil pressure from a worn pump or clogged pickup can set P0021 without any solenoid fault.

Can I keep driving with P0021?

You can usually drive the vehicle with P0021, but avoid hard acceleration and high RPM until repaired because advanced cam timing can cause poor performance and potential engine damage over time. If the engine runs rough, misfires, or stalls, limit driving to reach a repair shop safely.

Tools that help

- OBD-II scan tool with live data and bidirectional controls
- Digital multimeter for testing solenoid and sensor circuits
- Mechanical oil pressure gauge
- Basic hand tools including socket set and torque wrench
- Feeler gauges or timing chain inspection tools



Reading P0021

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

Often seen with

P0010 'A' Camshaft Position Actuator Circuit (Bank 1) · **P0011** 'A' Camshaft Position - Timing Over-Advanced or System Perfo · **P0016** Crankshaft/Camshaft Position Correlation (Bank 1 Sensor A) · **P0022** 'A' Camshaft Position - Timing Over-Retarded (Bank 2) · **P0300** Random/Multiple Cylinder Misfire Detected

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/p0021/>

