



P052D

Cold Start A Camshaft Position Timing Over-Retarded Bank 2

P052D means the engine computer detected that the bank 2 camshaft is retarded further than expected during a cold start, based on the camshaft position sensor signal compared with the crankshaft position sensor. The powertrain control module sets this code when the measured cam timing error exceeds a calibrated threshold while the engine is warming up from a cold soak.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Vehicle speed, idle control and auxiliary inputs

Symptoms you may notice

- Illumination of the check engine light, often with no other symptoms besides the warning light
- Rough idle or slight misfire during the first few minutes after a cold start
- Reduced engine power or sluggish acceleration while the engine is cold
- A brief rattle or ticking noise from the timing chain area on cold start
- Slightly higher fuel consumption or altered exhaust smell during warm-up
- In some cases, the engine may enter limp mode after repeated cold starts

Common causes, most likely first

- 1 Sludge or varnish buildup in the oil control valve (OCV) or variable valve timing (VVT) solenoid for bank 2, restricting oil flow
- 2 A sticking or worn camshaft phaser (VVT actuator) on bank 2 that cannot return to the correct cold-start position
- 3 Low engine oil level or degraded oil that cannot build the required oil pressure for the phaser at cold start
- 4 A faulty bank 2 camshaft position sensor or damaged wiring/connector causing an erratic signal
- 5 Restricted oil passage or clogged oil gallery feeding the bank 2 phaser or OCV
- 6 A stretched timing chain or worn chain tensioner that alters cam timing on cold start
- 7 A rare PCM calibration issue or software fault that misinterprets the cold-start cam timing



How to diagnose and fix it

- 1 Check the engine oil level and condition; top up or change the oil and filter if the oil is low or degraded
- 2 Use a scan tool to read live camshaft and crankshaft position data during a cold start and compare bank 2 timing error with bank 1
- 3 Remove and inspect the bank 2 oil control valve (OCV) for sludge or debris; clean or replace it if restricted
- 4 Test the bank 2 camshaft position sensor and its wiring for continuity, resistance, and signal integrity
- 5 Perform an oil pressure test at cold start to confirm the lubrication system is delivering adequate pressure to the phaser
- 6 Inspect the timing chain, tensioner, and guides for wear or slack that could cause retarded cam timing on cold start
- 7 If all mechanical and electrical checks pass, check for PCM software updates or reflash the module as a last step

Cold-start VVT faults that fool technicians

- A dirty oil control valve often causes this code without any driveability complaint once the engine is warm, so many owners ignore it until the phaser wears out.
- The code can be set by a momentary low oil pressure condition at cold start even when the oil level is correct, especially if the oil filter anti-drainback valve is failing.
- Technicians sometimes replace the camshaft phaser first, but a restricted oil passage or sludged OCV is the more common root cause and costs far less to fix.
- Bank 2 cam timing on V engines is frequently affected by oil sludge that accumulates in the valve cover or oil gallery on that side, so a visual inspection of the bank 2 valvetrain is worthwhile.
- A stretched timing chain can mimic a failed phaser by retarding cam timing on cold start, so always verify chain condition before condemning the VVT components.

Can I keep driving with P052D?

You can usually drive the vehicle short distances to a repair shop, but avoid hard acceleration and prolonged idling until the fault is diagnosed. If the check engine light starts 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 graphing capability
- Oil pressure test gauge kit
- Digital multimeter for sensor and wiring tests
- Basic hand tools (socket set, wrenches, screwdrivers)
- Torque wrench for reassembly
- Flashlight or inspection mirror for visual checks



Reading P052D

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 5** Vehicle speed, idle control and auxiliary inputs.
- 2D** The exact fault within that area.

Often seen with

P0011 'A' Camshaft Position - Timing Over-Advanced or System Perfo · **P0021** 'A' Camshaft Position - Timing Over-Advanced or System Perfo · **P052A** Cold Start A Camshaft Position Timing Over-Advanced Bank 1 · **P052B** Cold Start A Camshaft Position Timing Over-Retarded Bank 1 · **P052C** Cold Start A Camshaft Position Timing Over-Advanced 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/p052d/>

