

GENERIC · POWERTRAIN

P0417

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0417

Secondary Air Injection System Switching Valve 'B' Circuit Shorted

P0417 indicates that the powertrain control module has detected a short circuit on the electrical path for the secondary air injection system's switching valve 'B'. The computer monitors the valve's control circuit and sets this code when the voltage on the command wire is outside the expected range, typically indicating a short to ground or to power.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Low	Intermediate	Auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- A slight hesitation or stumble during the first minute of cold engine operation
- A brief rich exhaust smell at startup due to incomplete air injection
- In some cases, a pending code may set without turning on the light until a second trip
- Rough idle only during the cold-start phase, clearing as the engine warms
- No drivability complaints once the engine reaches operating temperature

Common causes, most likely first

- 1 A damaged or chafed wire in the switching valve 'B' control circuit shorting to ground
- 2 A short to voltage on the same control wire from a rubbed-through harness
- 3 A failed switching valve 'B' solenoid with an internally shorted coil
- 4 Corroded or loose electrical connector pins at the valve or the powertrain control module
- 5 Water intrusion into the valve connector or harness causing a conductive path
- 6 A faulty powertrain control module driver, though this is rare
- 7 Aftermarket alarm or remote start wiring tapped into the circuit incorrectly



How to diagnose and fix it

- 1 Inspect the switching valve 'B' connector and harness for visible damage, corrosion, or moisture, and clean or repair as needed
- 2 Disconnect the valve and measure resistance across its terminals to check for an internally shorted coil
- 3 With the valve disconnected and the key on, measure voltage on the control wire to ground to see if the short is present in the harness
- 4 Wiggle-test the harness while watching a multimeter or scan tool to locate an intermittent short
- 5 Check for continuity between the control wire and ground or battery voltage with the valve and module disconnected to isolate the short
- 6 Repair or replace the affected section of harness, using proper solder and heat-shrink rather than twist-and-tape
- 7 Clear the code and perform a cold-start drive cycle to confirm the repair and verify the monitor runs without resetting

What a shorted air valve really means

- A shorted switching valve coil can read normal resistance when cold but short internally once the engine heats the nearby exhaust, so test both cold and hot if the code is intermittent.
- The code names valve 'B', which on many V-engine layouts is the valve feeding one bank; technicians who replace the wrong valve waste time because the two valves often look identical.
- A short to voltage on the control wire can back-feed the driver in the powertrain control module and cause other unrelated codes, so check for a short to power before condemning the module.
- Water that collects in the valve connector after a car wash or heavy rain is a common hidden cause, and the code may only appear on damp mornings.
- The secondary air system only runs for the first minute or two after a cold start, so a scan tool live-data check of the valve command during that window is more revealing than a static key-on test.

Can I keep driving with P0417?

The vehicle remains safe to drive because the secondary air system only affects emissions during cold starts, but avoid long-term neglect since a persistent short can damage the powertrain control module driver. Have the circuit inspected soon, especially if the check engine light flashes or other codes appear.

Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Wiring diagram for the secondary air injection circuit
- Back-probe pins or breakout leads
- Heat-shrink tubing and soldering iron for harness repair



Reading P0417

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

Often seen with

P0410 Secondary Air Injection System Malfunction · **P0411** Secondary Air Injection System Incorrect Flow · **P0412** Secondary Air Injection System Switching Valve 'A' Circuit · **P0413** Secondary Air Injection System Switching Valve 'A' Circuit O · **P0414** Secondary Air Injection System Switching Valve 'A' Circuit S

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/p0417/>

