

FORD · POWERTRAIN

P1533

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1533 · Ford

AAI Circuit Malfunction

P1533 on Ford vehicles indicates a malfunction in the Air Assisted Injection (AAI) circuit, which is part of the secondary air injection system that helps reduce exhaust emissions during cold starts. The powertrain control module (PCM) monitors the AAI circuit for expected voltage or current changes and sets this code when the signal is out of range or absent.

SYSTEM

Powertrain

CODE TYPE

Ford specific

SEVERITY

Medium

FIX DIFFICULTY

Intermediate

AREA

Vehicle speed, idle control and auxiliary inputs

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or stumbling during cold engine operation
- Slight hesitation or surge when accelerating from a stop while the engine is cold
- A faint hissing or rushing air sound from the engine bay during the first minute after a cold start
- Failed emissions test due to incomplete readiness monitors or increased tailpipe emissions

Common causes, most likely first

- 1 Failed AAI solenoid or vacuum-operated air control valve
- 2 Damaged, disconnected, or corroded wiring or connector at the AAI solenoid or PCM
- 3 Leaking or cracked vacuum hose supplying the AAI control valve
- 4 Clogged or carbon-fouled air injection passages in the cylinder head or exhaust manifold
- 5 Faulty secondary air injection pump (if equipped) not supplying air when commanded
- 6 PCM internal fault (rare, but possible after all other causes are ruled out)



How to diagnose and fix it

- 1 Connect a scan tool and verify P1533 is the only code; check for related codes and freeze-frame data to confirm the fault occurred during cold start.
- 2 Inspect the AAI solenoid and its electrical connector for corrosion, loose pins, or physical damage; clean and reseat as needed.
- 3 Test the AAI solenoid with a multimeter for correct resistance and verify it clicks when 12 volts are applied; replace if out of specification.
- 4 Check all vacuum hoses between the intake manifold, AAI solenoid, and air control valve for cracks, soft spots, or disconnection; repair or replace as necessary.
- 5 Command the AAI system on with a scan tool and listen for the air pump or valve to activate; if no response, trace the circuit back to the PCM for opens or shorts.
- 6 Remove and inspect the air injection passages and check valve for carbon buildup or blockage; clean or replace the check valve if restricted.
- 7 Clear the code and perform a cold-start drive cycle to confirm the repair; if the code returns, perform a pin-to-pin continuity test between the solenoid and PCM.

AAI Faults That Fool Even Seasoned Techs

- A stuck-open AAI check valve can allow exhaust gases to back up into the air pump and solenoid, corroding them and setting P1533 without any obvious driveability complaint.
- The AAI circuit is only active during the first 30 to 90 seconds after a cold start, so a faulty solenoid may test fine when the engine is warm and only fail when the PCM runs its cold-start self-test.
- Many technicians replace the AAI solenoid only to find the real problem is a brittle vacuum hose that collapses under vacuum when cold, so always inspect hoses in the cold state.
- P1533 can be set by a weak battery or low charging voltage that causes the PCM to see an implausible voltage on the AAI circuit during cranking, so check battery health before condemning parts.
- On some Ford engines, carbon buildup in the air injection passages restricts flow enough to trigger P1533 even though the solenoid and wiring are fully functional, so a flow test is essential.

Can I keep driving with P1533?

You can usually continue driving with P1533 because the fault mainly affects cold-start emissions and does not compromise engine safety, but avoid long periods of idling and schedule diagnosis soon to prevent secondary damage to the air pump or catalytic converter.



Tools that help

- OBD-II scan tool with bidirectional control and live data
- Digital multimeter
- Hand vacuum pump
- Basic socket and wrench set
- Inspection mirror and flashlight

Reading P1533

P Powertrain: engine, transmission and emissions.

1 Manufacturer-specific code (Ford): its meaning depends on the make.

5 Vehicle speed, idle control and auxiliary inputs.

33 The exact fault within that area.

Often seen with

P1532 A/C Evaporator Temperature Sensor Circuit Low Voltage · **P1532** IMCC Circuit Malfunction Bank B · **P1532** A/C Evaporator Temperature Sensor Circuit Low Voltage · **P1532** B Camshaft Position Actuator Control Open Circuit Bank 2 · **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

See it working

Watch the animated explainer [How a Radiator Fan Relay Circuit Works](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/ford-p1533/>

