

GENERIC · POWERTRAIN

P2021

OBD-II TROUBLE CODE

P2021

Intake Manifold Runner Position Sensor/Switch Circuit Low (Bank 2)

P2021 means the engine computer has detected a low-voltage signal on the intake manifold runner position sensor circuit for bank 2, which is the side of the engine that does not contain cylinder number one. The computer expects the sensor to report the runner flap position within a specific voltage range, and a sustained low reading indicates the signal wire is shorted to ground, the sensor has failed, or the runner mechanism is stuck.

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
- Reduced engine power or a limp-home mode, especially under heavy load or at higher RPM
- Rough idle or stumbling acceleration if the runner flaps are stuck in the wrong position
- Poor fuel economy or increased emissions due to incorrect airflow tuning
- A noticeable lack of low-end torque or high-end power, depending on where the flaps are stuck
- In some cases, a rattling or ticking noise from the intake manifold area as the actuator tries to move a stuck flap

Common causes, most likely first

- 1 Failed intake manifold runner position sensor on bank 2, often due to internal wear or contamination
- 2 Damaged or chafed signal wire shorting to ground between the sensor and the engine control module
- 3 Corroded or loose electrical connector at the sensor or at the engine control module
- 4 Stuck or binding intake manifold runner flap linkage, preventing the sensor from moving through its full range
- 5 Failed vacuum actuator or electric motor that moves the runner flaps, leaving them in a fixed position
- 6 Carbon buildup on the runner flaps or inside the intake manifold, restricting movement
- 7 Rarely, a fault inside the engine control module itself, such as a failed internal driver or analog-to-digital converter



How to diagnose and fix it

- 1 Use a scan tool to read the live data for the bank 2 runner position sensor and compare the commanded position to the actual position while revving the engine.
- 2 Visually inspect the sensor, connector, and wiring harness for damage, corrosion, or loose pins, and repair any obvious faults.
- 3 Check the sensor reference voltage and ground at the connector with a multimeter; if either is missing, trace the circuit back to the engine control module.
- 4 Measure the resistance or voltage output of the sensor through its full range of motion by hand, and replace the sensor if it does not change smoothly.
- 5 Disconnect the actuator linkage and verify that the runner flaps move freely; clean or replace the intake manifold if carbon buildup or mechanical binding is found.
- 6 Test the vacuum actuator or electric motor that drives the runner flaps, and replace it if it fails to move the linkage when commanded.
- 7 After repairs, clear the diagnostic trouble codes and perform a road test to confirm the sensor signal stays within the expected range under all operating conditions.

What a low runner sensor signal really means

- A low signal does not always mean the sensor is bad; a shorted signal wire or a poor ground connection can pull the voltage down and mimic a failed sensor.
- On many engines, the bank 2 runner position sensor shares a reference voltage or ground with other sensors, so a fault in a different circuit can set P2021 as a secondary code.
- Carbon buildup on the runner flaps is a common cause that technicians miss because the sensor itself tests fine on the bench; the flaps simply cannot move to the position the computer expects.
- Some vehicles use a single sensor for both banks, and a mechanical failure on bank 2 can cause the sensor to read low even though the electrical circuit is intact.
- A stuck-open or stuck-closed runner flap can cause driveability symptoms that feel like a transmission problem, leading to misdiagnosis if the live data is not checked.

Can I keep driving with P2021?

You can usually drive the vehicle with P2021, but expect reduced performance and possibly worse fuel economy; avoid heavy acceleration or towing until the fault is repaired, and have it diagnosed soon to prevent damage to the intake manifold or catalytic converter.



Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Vacuum pump or hand-held actuator tester
- Socket and wrench set
- Wiring diagram for the specific vehicle

Reading P2021

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

Often seen with

P2004 Intake Manifold Runner Control Stuck Open (Bank 1) · **P2005** Intake Manifold Runner Control Stuck Open (Bank 2) · **P2019** Intake Manifold Runner Position Sensor/Switch Circuit (Bank · **P2020** Intake Manifold Runner Position Sensor/Switch Circuit Range/ · **P2022** Intake Manifold Runner Position Sensor/Switch Circuit High (

See it working

Watch the animated explainer [How a Rotary Engine Works: Wankel in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p2021/>

