

GENERIC · POWERTRAIN

P0687

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0687

ECM/PCM Power Relay Control Circuit High

P0687 indicates that the engine control module (ECM) or powertrain control module (PCM) has detected an abnormally high voltage on the control circuit for its main power relay. The computer is seeing a short to voltage or an open circuit on the wire that it uses to command the relay on, so it cannot reliably control its own power supply.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

High

FIX DIFFICULTY

Intermediate

AREA

Computer and output circuits

Symptoms you may notice

- The check engine light is illuminated, often with no other noticeable symptoms.
- The engine may stall intermittently or fail to start because the ECM/PCM loses power.
- Electrical accessories may flicker or behave erratically if the relay chatters.
- The engine may crank but not start if the ECM/PCM does not power up.
- In some cases, the vehicle may enter a fail-safe mode with reduced performance.

Common causes, most likely first

- 1 A short to voltage on the control circuit between the ECM/PCM and the power relay.
- 2 A faulty ECM/PCM power relay that has internally shorted or has high resistance.
- 3 Corroded, damaged, or loose wiring or connectors in the relay control circuit.
- 4 A defective ECM/PCM driver circuit for the relay control.
- 5 Poor ground connections for the relay or the ECM/PCM.
- 6 Aftermarket accessories improperly wired into the relay control circuit.

How to diagnose and fix it

- 1 Verify the code with a scan tool and check for any related codes in other modules.
- 2 Inspect the ECM/PCM power relay and its socket for corrosion, burning, or loose terminals.
- 3 Test the relay control circuit for a short to voltage using a digital multimeter and wiring diagram.
- 4 Check the relay ground circuit for continuity and clean any corroded grounds.
- 5 Substitute a known-good relay of the same part number and clear the code to see if it returns.
- 6 If the circuit and relay are good, test the ECM/PCM control signal with an oscilloscope or lab scope.
- 7 Repair any wiring faults found, clear the code, and road-test the vehicle to confirm the fix.



Relay Control Circuit High Voltage Traps

- A common mistake is to replace the ECM/PCM first, but the fault is more often in the wiring or the relay itself.
- The code can be set by a relay that is not the correct type or has been replaced with an incompatible part.
- Water intrusion into the relay box or ECM/PCM connectors can cause a short to voltage that only appears in damp conditions.
- A weak battery or poor charging system can cause voltage spikes that mimic a control circuit fault.
- Some vehicles use a solid-state relay integrated into the power distribution module, which requires different diagnostic steps than a conventional relay.

Can I keep driving with P0687?

If the engine is running normally, you can drive cautiously to a repair shop, but avoid long trips and be prepared for a sudden stall. If the engine stalls, will not start, or multiple electrical systems act up, stop driving and have the vehicle towed to prevent safety risks.

Tools that help

- OBD-II scan tool
- Digital multimeter
- Test light
- Wiring diagram for the specific vehicle
- Relay puller or small screwdriver
- Oscilloscope (optional for advanced diagnostics)

Reading P0687

P	Powertrain: engine, transmission and emissions.
0	Generic (SAE) code: it means the same thing on every OBD-II vehicle.
6	Computer and output circuits.
87	The exact fault within that area.

Often seen with

P0562 System Voltage Low · **P0563** System Voltage High · **P0685** ECM/PCM Power Relay Control Circuit Open · **P0686** ECM/PCM Power Relay Control Circuit Low · **P0688** ECM/PCM Power Relay Sense Circuit /Open



See it working

Watch the animated explainer [Car Relay Test Bench: Test 4-Pin and 5-Pin Relays](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0687/>

