

P0046: TURBOCHARGER/SUPERCHARGER BOOST CONTROL "A" CIRCUIT RANGE PERFORMANCE

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Advanced
Repair Cost	:	\$100-\$400
Can I Still Drive?	:	No

What Does The P0046 Code Mean?

Turbochargers and superchargers are air pumps that force air into the engine to increase power. Superchargers are driven off the engine crankshaft by a belt, whereas turbochargers are driven by the engine's exhaust.

Many modern turbocharged vehicles use what's referred to as a variable geometry turbocharger (VGT). This type of turbo has adjustable vanes located around the outside of the turbine that can be opened and closed to vary the amount of boost pressure. This allows the turbo to be controlled independent of engine speed.

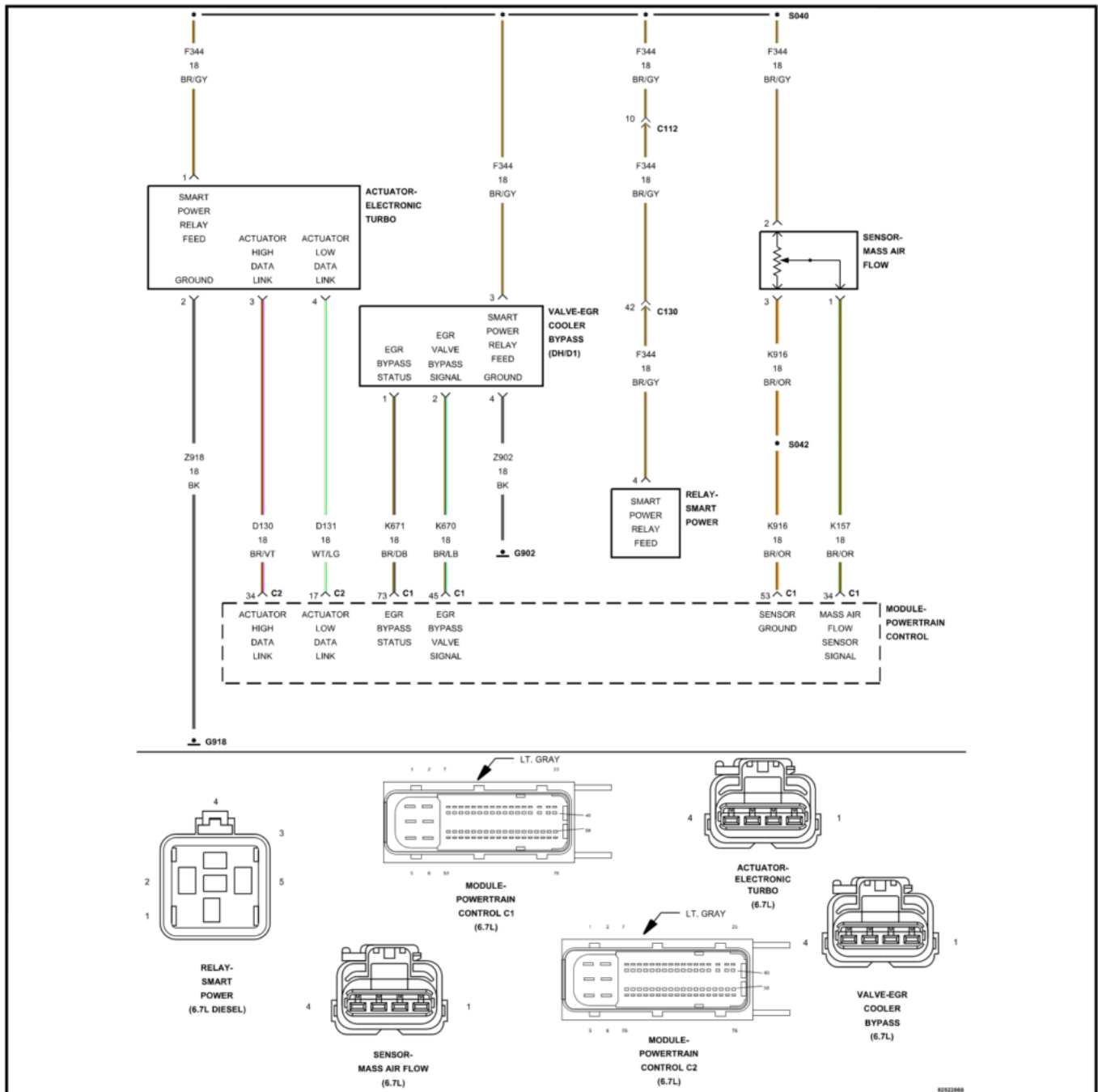
Generally, the vanes are open when the engine is under light load and open as load increases.

Vane position is controlled by the powertrain control module (PCM), typically using an electronic control solenoid or motor. Turbo vane position is determined using a dedicated position sensor.

On vehicles that use a traditional, fixed displacement turbo charger or supercharger, boost is controlled via a wastegate or bypass valve. This valve opens to relieve boost pressure. The PCM monitors this system using a boost pressure sensor.

In reference to this trouble code, the "A" indicates the problem is with a portion of the system circuit, instead of a particular symptom or component.

Code P0046 is set when the PCM detects a performance problem with the boost control solenoid, no matter if the engine uses a VGT turbo or traditional turbocharger/supercharger.



P0046 wiring diagram

Related turbo / supercharger engine trouble codes:

- [P0045 Turbocharger/Supercharger Boost Control "A" Circuit/Open](#)
- [P0047 Turbocharger/Supercharger Boost Control "A" Circuit Low](#)
- [P0048 Turbocharger/Supercharger Boost Control "A" Circuit High](#)

- [P0049 Turbocharger/Supercharger Turbine Overspeed](#)
- [P004A Turbocharger/Supercharger Boost Control "A" Circuit Intermittent/Erratic](#)

What Are The Symptoms Of The P0046 Code?

Symptoms of a P0046 code may include:

- Insufficient boost resulting in lack of engine performance
- Overboost resulting in detonation and possible engine damage
- Illuminated check engine light

What Are The Potential Causes Of The P0046 Code?

Potential causes for this code to set are:

- Faulty boost pressure/ turbocharger position sensor
- Failed turbocharger/super charger
- Defective control solenoid
- Wiring problems
- Faulty PCM
- Vacuum leaks if the valve is vacuum controlled

How Can You Fix The P0046 Code?

Begin by visually inspecting the turbo and turbo control system. Look for loose connections, damaged wiring, vacuum leaks etc. Next, check for technical service bulletins (TSBs) regarding the issue. If nothing is found, you will need to move forward to step by step diagnosis of the system.

The following is a generalized procedure, as testing for this code varies between vehicles. To accurately test the system, you'll want referred to the manufacturer's diagnostic flow chart.

Check system function by commanding the control solenoid to change position using a bidirectional scan tool. Raise the engine RPMS to about 1,200 RPMs and toggle the solenoid between on and off. While doing this, engine RPMs should change and the sensor position PID on the scan tool should change as well.

If the RPMs fluctuates but the position/pressure PID does not change, suspect a problem with the sensor or its circuit. If RPMS do not change at all, suspect a problem with the control solenoid, turbo/supercharger or wiring.

- To check the circuit: test for power and ground at the solenoid. Note: the solenoid should be commanded on with a scan tool while making these checks. If either power or ground are lacking, you'll need to trace the factory wiring diagram to determine why.
- Check the turbocharger/supercharger: remove the intake to check the turbo/supercharger for

damage or debris. If damage is found, replace the unit.

- Test the position/pressure sensor and circuit: in most cases, the position sensor should have three wires going to it: power, ground and signal. Test that all three are present.
- Test the control solenoid: in some cases, you may be able to test the solenoid by checking its' internal resistance with an ohmmeter. Consult the factory repair information for details. You may also be able to jump the solenoid to power and ground to see if it is operational.

Severity Description

The severity of these codes is moderate to severe. In some cases, problems with the turbocharger/supercharger can lead to severe engine damage. It's a good idea to address this code as soon as possible.

Reference Sources

[Technical Service Bulletin P0046](#) - GM