P0512: STARTER REQUEST CIRCUIT

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$200**
Can I Still Drive?	:	**Yes**

What Does The P0512 Code Mean?

Any time that I encounter a stored code P0512, it means that the powertrain control module (PCM) has detected a malfunction in the starter request circuit. In this case, the word starter refers to the engine starter.

Although the starter is supplied with constant battery voltage from the positive cable, the starter request signal originates from the ignition switch. When the ignition key is placed into the ignition cylinder and turned to the start position, it actuates the electrical portion of the ignition switch and closes a set of heavy-duty contacts, completing the starter request circuit.

When the starter request circuit is completed, a battery voltage signal is sent to the starter solenoid (or the starter relay on some models). In the vehicle which you are attempting to diagnose, it means that a starter request signal should also be sent to the PCM. Since a code P0512 has been stored, the PCM has probably not received the starter request signal.

Once the starter request signal is received by the starter solenoid, the starter motor begins to spin and a small cog is pushed in the direction of the engine where the teeth of the cog intermesh with the teeth of the flywheel ring gear. This turns the engine crankshaft and helps to initiate startup.

Consult a reliable vehicle information source (All Data DIY is great) to see if the vehicle in question is equipped with a starter relay. If so, you'll need to locate the relay and the system wiring diagram.

Typically, the ignition switch supplies the starter relay with a starter request signal. After the relay

receives the signal, the relay then provides the starter and the PCM with a starter request signal. After that, the starter and solenoid function in exactly the same manner as the vehicle that has no starter relay.

Even if there are no symptoms exhibited, if the PCM fails to receive the starter request signal and the engine is started, a code P0512 will be stored and a malfunction indicator lamp may be illuminated. Some vehicles require multiple ignition cycles (with a failure) for the MIL to be illuminated.

What Are The Symptoms Of The P0512 Code?

Symptoms of a P0512 code may include:

- The engine may fail to start
- Delayed starter engagement (startup may require multiple key cycles)
- PCM power circuit failure or ignition system circuit failure codes may accompany this code
- There are often no symptoms at all

What Are The Potential Causes Of The P0512 Code?

Possible causes for this code include:

- Defective ignition switch
- Blown fuses or burnt fusible links
- Faulty starter relay
- Open or shorted circuits in the starter request circuit
- PCM fault or PCM programing error

How Can You Fix The P0512 Code?

A good starting point is always to check for technical service bulletins (TSB) for your particular vehicle. Your issue may be a known issue with a known fix put out by the manufacturer and can save you time and money during diagnosis.

When diagnosing a P0512, a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a vehicle information source (such as All Data DIY) will be necessary.

Begin with a visual inspection of all related wiring and connectors. This is also a good time to check all fuses, using the DVOM. Check starter system fuses while the starter is being engaged because fuses on unloaded circuits may appear operational until the circuit is loaded.

You must now determine whether or not the vehicle in question is equipped with a starter relay. If it is; a simple and easy test is to swap the starter relay with a known good relay. Since most manufacturers use identical relays for multiple functions, you may swap one relay for another for

diagnostic purposes. If the problem is rectified, after the relays are swapped, swap them back and replace the starter relay with a new one.

To test the relay without swapping relays, look in your vehicle information source and find the starter system wiring diagram. The starter relay connector view will also prove helpful. Test for a battery voltage input circuit to the starter relay.

This circuit should maintain battery voltage when the ignition switch is placed in the on position (this is called switched voltage). If there is no voltage being input to the starter relay, check system fuses, fusible links and wiring from the battery or battery junction box.

In most cases, the ignition switch will provide the relay with a secondary voltage source signal when the ignition switch is turned to the start position. At the same time, the PCM will provide a ground signal to the starter relay. The secondary voltage and ground signals will cause contacts inside the relay to close, completing the starter request circuit that should send a signal to the starter solenoid and back to the PCM.

Disconnect all related controllers before testing circuit resistance with the DVOM. Test the voltage signal to the relay (from the ignition switch) first. If it is not present, suspect a defective ignition switch or wiring malfunction. If the secondary voltage input is present, check the ground signal input from the PCM. If there is no ground being input to the starter relay from the PCM, suspect PCM failure or a PCM programming error.

There could also be a wiring malfunction between the PCM and the starter relay.

Additional diagnostic notes:

- This code will seldom be exhibited in a vehicle without a starter relay (I have never seen it)
- To avoid misdiagnosis, after repairs are performed and the code is cleared, operate the vehicle normally until the PCM either enters readiness mode or the code is reset
- Before swapping relays (for diagnostic purposes) make sure that they have matching service numbers
- Always swap relays back to their original position and replace the defective relay with a new one

Severity Description

If the engine cranks normally, a P0512 can be addressed at your convenience. Obviously, if the engine will not start, the code will need to be addressed with a certain degree of urgency.

Reference Sources

P0512 Starter Request Circuit, OBD-Codes.