P0414: SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE A CIRCUIT SHORTED

OVERVIEW

Severity	:	Medium
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$300-$500**
Can I Still Drive?	:	**Yes**

What Does The P0414 Code Mean?

A stored code P0414, simply means that the powertrain control module (PCM) has detected a short in a secondary air injection (SAI) system switching valve circuit. This particular switching valve has been given the designation A and refers to a particular switching valve in a system that uses multiple switching valves, or the only valve if there is a single valve system. A shorted circuit could mean that the effected circuit has come into contact with an unexpected voltage signal or a ground. A shorted circuit will usually result in a blown fuse.

The SAI system pumps ambient air into the engine exhaust system as a method of reducing harmful exhaust emissions. Automotive SAI systems use either a belt driven pump or an electric pump to draw-in ambient air, compress it slightly, and inject the pressurized air into the engine exhaust manifolds. One-way valves, switching valves, anti-backfire valves, and bypass valves (controlled by the PCM) are used to regulate and distribute air pressure and protect the SAI air pump.

The PCM receives voltage input signals from pressure sensors to monitor fluctuations in SAI system pressure. When appropriate conditions are met, the PCM electronically opens the necessary valves and allows secondary air to be pumped into the exhaust system. The PCM monitors SAI pressure sensors and activates the pump when required in vehicles that are equipped with electric pumps.

If the PCM detects a voltage input signal from the SAI switching valve (designated as A) circuit that is

indicative of a short (to voltage or ground), a code P0414 will be stored and a malfunction indicator lamp may be illuminated.

Other secondary air injection system trouble codes include P0410, P0411, P0412, P0413, P0415, P0416, P0417, P0418, P0419, P041F, P044F, P0491, and P0492.

What Are The Symptoms Of The P0414 Code?

Symptoms of this code may include:

- Constant SAI pump activation (short to voltage)
- No SAI pump activation (short to ground with a blown fuse)
- Loud whining from SAI pump

What Are The Potential Causes Of The P0414 Code?

Potential causes for this code to set are:

- Shorted wiring, components, and/or connectors in the SAI system
- Shorted SAI pump

How Can You Fix The P0414 Code?

A diagnostic scanner, a digital volt/ohmmeter (DVOM), and a reliable vehicle information source (like All Data DIY) will be necessary to correctly diagnose a code P0414.

Inspecting system wiring, connectors, and the serpentine belt which drives the pump (if applicable) is a good place to begin your diagnosis. Repair or replace shorted circuits as required and retest the system. If the belt is missing or otherwise defective (belt-driven pump) replace it before proceeding. Make sure that the pump turns freely by hand before replacing the belt. I like to check system fuses and relays at this time if the SAI pump is driven by an electric motor.

Continue by connecting the scanner to the vehicle diagnostic port and retrieving all stored codes and freeze frame data, if your visual inspection leads to no obvious malfunctions. I like to write this information down because it may come in handy later in my diagnosis.

Next, I clear the codes and test-drive the vehicle to see if the P0414 is reset.

Search technical service bulletins (TSB) using your vehicle information source to find entries that match the code/s and symptom/s exhibited by the vehicle in question. TSBs are comprised of hundreds-of-thousands of repairs and the information contained therein can be very helpful in reaching a successful diagnosis. Belt driven SAI pumps are prone to lockup (due to frozen condensation) in extreme cold weather conditions.

A one-way check valve is normally integrated into the air inlet hose to prevent condensation from reaching the SAI pump. One-way check valves may fail and permit condensation from the exhaust to enter the SAI pump. The condensation freezes and the ice may either cause the SAI pump to seize (belt driven) or causes it to bind and blow a fuse (electric pump).

Proceed by using the scanner to actuate the electric SAI pump. After the pump has been activated, you can use the DVOM to test voltage and ground at the SAI pump. Suspect a blown fuse or a bad power supply relay if no voltage is detected. Use the DVOM to check for an open circuit between the power supply source and the pump if all fuses and relays are good. Before using the DVOM to check circuit resistance, disconnect all related controllers.

Test individual system circuits for shorts to ground or voltage using the DVOM and a wiring diagram from your vehicle information source. Repair or replace circuits that are found to have unexpected ground or voltage signals.

Additional diagnostic notes:

- Blown fuses are usually a reaction to a shorted circuit and not the source of the malfunction
- Frozen pumps may be allowed to thaw before use to avoid catastrophic pump damage

Severity Description

A stored code P0414 should not be considered severe. The SAI system is related only to exhaust emission reduction and is not vital to engine operation. However, if the SAI circuit is shorted to voltage, constant motor activation could result in a discharged battery.

Reference Sources

P0414 Secondary Air Injection System A Shorted, OBD-Codes.