P0502: VEHICLE SPEED SENSOR A LOW INPUT

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$350**
Can I Still Drive?	:	No

What Does The P0502 Code Mean?

A stored code P0502 means that the powertrain control module (PCM) has detected a low voltage input signal from vehicle speed sensor (VSS) A. The designation A typically refers to the primary VSS in systems which utilize multiple vehicle speed sensors.

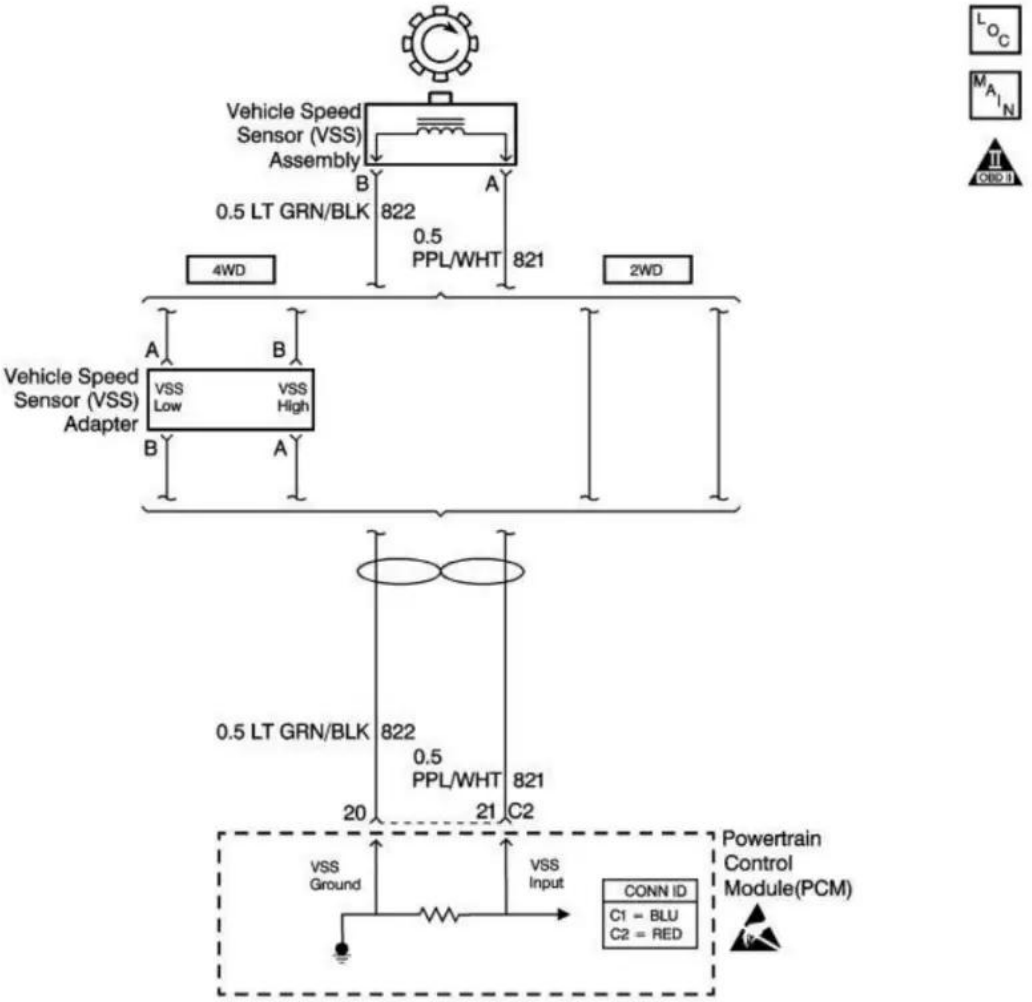
Most vehicle speed sensors are electromagnetic sensors which utilize some type of toothed reluctor ring wheel or gear that is permanently affixed to an axle, transmission/transfer case output shaft, differential gear, or driveshaft. As the shaft spins, so spins the reluctor device which completes a circuit with the stationary electromagnetic sensor.

As the reluctor passes in very close proximity to the electromagnetic tip of the sensor, the notches in the reluctor ring create interruptions in the sensor circuit. The combination of circuit completions and interruptions are received by the PCM (and other controllers) as wave form patterns representing voltage.

The PCM monitors vehicle speed using input data from one or more vehicle speed sensors and compares it to inputs from the antilock brake control module (ABCM) or electronic brake control module (EBCM). In some cases, secondary VSS input may be monitored using one or more wheel speed sensors but the primary VSS input (A) will likely be initiated by the VSS in the transmission.

If the PCM detects a low input voltage signal from the primary VSS, a code P0502 will be stored and a malfunction indicator lamp may be illuminated. A low voltage input condition may be caused by

either an electrical or mechanical problem.



P0502 wiring diagram

Related vehicle speed sensor trouble codes:

- P0500 Vehicle Speed Sensor “A” Malfunction
- P0501 Vehicle Speed Sensor “A” Range/Performance
- P0503 Vehicle Speed Sensor “A” Intermittent/Erratic/High

What Are The Symptoms Of The P0502 Code?

Symptoms of a P0502 code may include:

- Erratic speedometer/odometer operation
- Irregular transmission shift patterns
- Illumination of the service engine soon lamp, traction control lamp, or antilock brake lamp

- Unexpected activation/deactivation of the traction control system (if equipped)
- Other transmission and ABS codes may be stored
- The ABS system may be rendered inoperable in some cases

What Are The Potential Causes Of The P0502 Code?

Possible causes for this code include:

- Excessive metal debris buildup on speed sensor/s
- A defective wheel speed or vehicle speed sensor
- Cut or otherwise damaged wiring harnesses or connectors (especially near speed sensors)
- Damaged or worn teeth on a reluctor ring
- A faulty PCM, ABCM, or EBCM

How Can You Fix The P0502 Code?

A diagnostic scanner, a digital volt/ohmmeter (DVOM), possibly an oscilloscope, and a reliable vehicle information source will be required when diagnosing a code P0502.

Visually Inspect The Connectors, Wiring Speed Sensors

I normally like to begin my diagnosis of a P0502 with a visual inspection of system wiring, speed sensors, and connectors. Repair open or shorted circuits as required and clean excessive metallic debris from effected sensors. Check reluctor ring integrity when inspecting the sensor.

Retrieve All Stored Trouble Codes

Connect the scanner to the vehicle diagnostic port and retrieve all stored trouble codes and available freeze-frame data. Before clearing the codes, write this information down as it may prove helpful as your diagnosis progresses.

Using your vehicle information source, search applicable technical service bulletins (TSB). If you locate a TSB that matches the symptoms and stored codes of the vehicle in question, the diagnostic information contained therein will likely aid in diagnosing the P0502 from here.

Utilize the scanner data stream to observe wheel speed and vehicle speed while test driving the vehicle. You may narrow the data stream to display only pertinent fields to increase the speed and accuracy at which the desired data is delivered. Inconsistent or erratic readings from VSS or wheel speed sensors may lead you to wiring, electrical connector, or sensor problems by narrowing the general area of the system malfunction.

Use The DVOM To Perform A Resistance Test On The Sensor

After you have located the VSS circuit from which the low voltage input is being initiated, use the DVOM to perform a resistance test on the sensor in question. Consult your vehicle information source for the manufacturer's recommendation for testing the VSS and replace sensors that do not comply with specifications.

Use the oscilloscope to retrieve live data from each individual VSS by probing the sensor signal wire and the sensor ground wire. Jacking or hoisting the vehicle will almost always be necessary to perform this type of testing properly. After the drive axle/s are safely secured off the ground, run up the drivetrain while observing the waveform pattern on the oscilloscope. Focus on glitches or inconsistencies in the pattern and proceed with the diagnosis accordingly.

Vehicle speed sensors may be damaged as a result of regular maintenance while wheel speed sensors and sensor wiring harnesses are frequently damaged when brake repairs are performed. If this code is presented immediately following a repair, suspect a damaged sensor harness, connector, or sensor.

Additional diagnostic notes:

- When performing circuit resistance and continuity testing with a DVOM, always disconnect electrical connectors from related controllers – failure to do so could result in a damaged controller
- Use caution when removing sensors from transmission cases because hot transmission fluid may be inadvertently released

Severity Description

Since the conditions which may cause a P0502 code to be stored could create drivability and ABS issues, it should be classified as severe and addressed as quickly as possible.

Reference Sources

Diagnostic Trouble Code (DTC) Guide for P0502 - Ominitek Advanced Technologies, pages 108-109.