# P077A: OUTPUT SPEED SENSOR CIRCUIT - LOSS OF DIRECTION SIGNAL

OVERVIEW

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

## What Does The P077A Code Mean?

When your vehicle has stored a code P077A, it means that the powertrain control module (PCM) has detected a loss of directional signal from the output speed sensor.

Output speed sensors are typically of the electromagnetic variety. They utilize some type of toothed reluctor ring or gear that is permanently affixed to the transmission output shaft. As the output shaft spins, so spins the reluctor ring. The raised teeth of the reluctor ring complete the output speed sensor circuit when they pass in close proximity to the stationary electromagnetic sensor.

As the reluctor passes by the electromagnetic tip of the sensor, the notches between the reluctor ring teeth create interruptions in the sensor circuit. This combination of circuit completions and interruptions are received by the PCM (and other controllers) as wave form patterns which represent transmission output speed.

The sensor either threads directly into the transmission housing or is held in place with a bolt. An O-ring seal is used to prevent fluid leaking from the sensor opening.

The PCM compares transmission input speed and output speed to determine if the transmission is shifting correctly and operating efficiently.

If a code P077A is stored, the PCM has detected an input voltage signal from the output speed

sensor indicating that the reluctor ring is not moving. When the output speed sensor voltage signal fails to fluctuate, the PCM assumes that the reluctor ring has unexpectedly stopped moving.

The PCM receives vehicle speed input data and wheel speed input data in addition to the output speed sensor data. By comparing these signals, the PCM can determine if the reluctor ring is moving sufficiently (according to the output speed sensor signal). An immobile output speed sensor signal may be caused by either an electrical malfunction or a mechanical problem.

## What Are The Symptoms Of The P077A Code?

Symptoms of a P077A engine code may include:

- Intermittent speedometer/odometer operation
- Abnormal transmission shift patterns
- Transmission slippage or delayed engagement
- Activation/deactivation of the traction control system (if applicable)
- Other transmission and/or ABS codes may be stored

## What Are The Potential Causes Of The P077A Code?

Causes for this code may include:

- Defective output speed sensor
- Metal debris on the output speed sensor
- Open or shorted circuits or connectors (especially near the output speed sensor)
- Damaged or worn reluctor ring
- Mechanical transmission failure

## How Can You Fix The P077A Code?

### Step 1

I typically like to begin my diagnosis of a P077A with a visual inspection of system wiring and connectors. I would remove the output speed sensor and clean excessive metallic debris from the magnetic tip. Use caution when removing the sensor because hot transmission fluid may leak from the sensor opening. Repair open or shorted circuits and connectors as required.

### Step 2

Check the reluctor ring when the sensor is removed for inspection. If the reluctor ring is damaged, cracked, or if any teeth are missing (or worn), you have most likely found your problem.

## Step 3

Check automatic transmission fluid if other transmission related symptoms are exhibited. Fluid should appear relatively clean and not smell burnt. If transmission fluid is more than one-quart low, refill it with the correct fluid and check for leaks. The transmission must be full of the appropriate fluid and in good mechanical condition before proceeding with the diagnosis.

## Step 4

I would need a diagnostic scanner with an integrated oscilloscope, a digital volt/ohmmeter (DVOM), and a reliable source of vehicle information to diagnose a code P077A.

I like to connect the scanner to the vehicle diagnostic port and retrieve all stored trouble codes and freeze-frame data next. Prior to clearing any codes, I would write this information down as it may prove helpful as my diagnosis unfolds.

## Step 5

Search for applicable technical service bulletins (TSB) using your vehicle information source. Finding a TSB that matches the symptoms and stored codes (for the vehicle in question) will likely lead to a speedy and accurate diagnosis.

Utilize the scanner data stream to observe output speed while test driving the vehicle. Narrowing the data stream to display only pertinent fields will increase the speed and accuracy of data delivery. Inconsistent or erratic signals from input or output speed sensors may lead you to wiring, electrical connector, or sensor problems.

## Step 6

Disconnect the output speed sensor and use the DVOM to perform a resistance test it. Your vehicle information source should yield wiring diagrams, connector views, connector pin-out charts and manufacturer's recommended testing procedures/specifications. If the output speed sensor does not comply with specifications, it should be considered defective.

## Step 7

Live data from the output speed sensor can be obtained using the oscilloscope. Probe the output speed sensor signal wire and the sensor ground wire. You may need to jack or lift the vehicle in order to perform this type of testing. After the drive wheels are safely lifted off the ground and the vehicle is secure, run up the drivetrain while observing the waveform pattern on the oscilloscope. You are looking for glitches or inconsistencies in the waveform pattern created by the output speed sensor signal.

- Disconnect connectors from related controllers when performing circuit resistance and continuity tests with the DVOM. Failure to do so may result in controller damage

## Severity Description

The conditions which contribute to a code P077A being stored could result in (or be the result of) catastrophic transmission failure, it should be rectified with urgency.

## Reference Sources

P077A Output Speed Sensor Circuit - Loss Of Direction Signal, OBD-Codes.