



# What Controls Your Transmission?

Today's transmission is controlled by a multitude of sensors and controllers. Many transmission-related problems are caused by these non-transmission related components. Below is a list of the most common control components found on today's vehicles. The problems they cause when they fail vary for each manufacturer. The problems listed below are the most common.

## MAS



The Mass Airflow Sensor measures airflow into the engine and is used to determine engine load. When it fails it can cause late-harsh shifts, early-soft shifts, or it can result in no shifts at all. It also affects engine performance.

## TP



The Throttle Position sensor measures throttle (gas pedal) position. It's used to determine engine load. When it fails it can cause late-harsh shifts, early-soft shifts, or it can result in no shifts at all. It also affects engine performance.

## PCM



The Powertrain Control Module controls engine and transmission functions. It is responsible for all shift timing and shift feel characteristics. When the PCM fails, the transmission can stop shifting, shift harsh or soft, or cause complete transmission failure. Some vehicles use a TCM (Transmission Control Module) rather than a PCM. Most vehicles have several modules: some have over ten. Often, other modules like the BCM (Body Control Module) play a role in transmission function.

## DSS



The Differential Speed Sensor measures vehicle speed. When it fails the transmission can stop shifting or shift late and harsh. It may also inhibit overdrive and the converter clutch.

## MAP



The Manifold Absolute Pressure sensor measures manifold pressure. It's used to measure engine load. When it fails it can cause late-harsh shifts, early-soft shifts, or it can result in no shifts at all. It also measures altitude, and controls engine performance.

## IAT



The Intake Air Temperature sensor measures the temperature of the air while it enters the intake of the engine. It's used to control the air/fuel mixture of the engine. It's also part of the pressure control system for the transmission. When it fails, the transmission will shift harder than normal.

## OD



The driver of the vehicle uses the Overdrive Switch to disable overdrive. When it fails, either the transmission will not shift into overdrive, or the driver will not be able to disable overdrive.

## VSS



The Vehicle Speed Sensor measures vehicle speed. When it fails the transmission can stop shifting or shift late and harsh. It may also inhibit overdrive and the converter clutch.

## AC



The air conditioner sensor signals the PCM when the air conditioner is on (or off). The AC switch will affect engine RPM at a stop. A malfunctioning AC switch can result in problems that feel as though they are transmission related.

## BRAKE



The Brake Switch measures brake pedal position. Its primary function as it relates to the transmission is to release the converter clutch while braking. When it fails the converter clutch won't apply, or it may chug while coming to a stop.

## TR



The Transmission Range sensor tells the PCM the position of the transmission shifter. The PCM uses this information to control which gears of the transmission to enable or disable. When the TR sensor fails it can cause wrong gear starts, no up shifts, or what feels like a falling-out-of-gear condition.

## CT



The Coolant Temperature sensor measures engine coolant temperature. It's used to inhibit overdrive and the converter clutch when the engine is too cold. When it fails it can result in no overdrive or converter clutch. It also affects engine performance.

## TSS



The Turbine Shaft Sensor measures input shaft speed. The PCM uses the information provided by the TSS to determine whether or not the transmission is slipping. When it fails it usually results in shift timing problems. Depending on the manufacturer, it can cause multiple shift-timing and shift-feel problems.

## TFT



The Transmission Fluid Temperature sensor measures the temperature of the transmission's oil (ATF). Its primary function is to inhibit overdrive and converter clutch operation when cold. On some models it also inhibits certain gears based on the temperature (too hot or cold). When it fails it can cause late shifts, wrong gear starts, no overdrive or converter clutch.

**NOTE:** The sensors and switches listed are the most common ones used on vehicles with computer-controlled transmissions. The problems created by malfunctions of these sensors vary with the manufacturer. Some auto manufacturers use sensors not listed here. Many transmission-related problems are caused by nothing more than a bad battery. Always make sure your battery is in good condition. Doing so can prevent a transmission related problem.

**Your local ATRA member has the tools and expertise to diagnose your transmission — and the whole-car problems.**

