Technical Bulletin

February 2021 TSB-VSA-EMS- 022021-01

TIPS & TRICKS

Oxygen Sensors: How do they work?

Applications

All engine models

Oxygen Sensor Main Functions

Oxygen Sensors, also known as **Lambda** Sensors or **O2** Sensors are critically important for your vehicle. Their principle is based on a **comparison** between the measurement of the remaining Oxygen **concentration** in the exhaust gases and the Oxygen **content** in the ambient air. The sensor sends **signal** to the **ECU** to control the fuel injection and air supply in a **closed** loop, along with other sensors.
The sensor **does not** actually measure the **Oxygen concentration**, but rather the **difference** between the **amount** of Oxygen in the exhaust gas and the **amount** of Oxygen in the air.

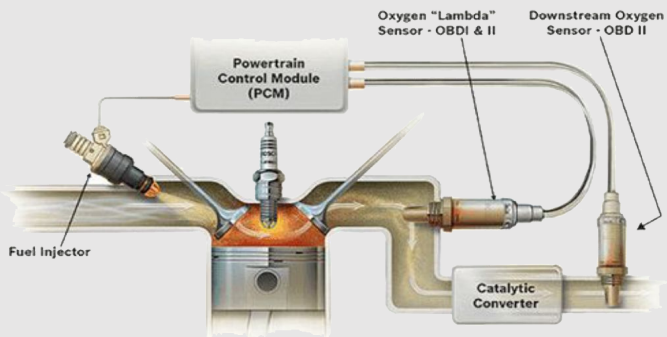
Oxygen Sensors are essential for correct engine management and for efficient emission reduction. They provide :

- **Engine performance** : For maximum power output, the engine requires a **precise** mapping of the air–fuel ratio throughout the range of RPM and manifold pressure.
- **Fuel economy:** An air–fuel mixture **leaner** than the stoichiometric ratio will result in near-optimal fuel mileage and **minimum** CO2 emissions.
- **Emission reduction**: The catalytic converter operates at **maximum** efficiency for an air–fuel mixture near the stoichiometric ratio.

Oxygen Sensor Location

Modern petrol engines are equipped with at least two Oxygen sensors:

- The **upstream Oxygen** Sensor is located before the catalytic converter. Its role is to provide information for **adjustment** of the air-fuel mixture ratio.
- The **downstream Oxygen** Sensor is located after the catalytic converter. It monitors the catalytic converter function which converts the harmful gases into **less** harmful ones (from **CO, NOx & HC** into **CO2, H2O & N2**)



Installation tips

- Make sure you order the **correct** sensor corresponding to the vehicle model
- Thimble, Planar & Wideband sensors are **not** interchangeable
- Do **not** install the part if any damage is **visible**
- **Start** working once the engine has **cooled down**
- **Disconnect** the battery
- **Unplug** the connector and **remove** the old Oxygen Sensor
- Do **not** add any **grease** or **spray** on the sensor thread, sensors **already come** with it
- When **installing** the new Oxygen Sensor, make sure the cable is **not twisted**, **bent** or **tense**. **Remove** the protective cap
- Tighten at **35-45 Nm**
- **Connect** and secure the cable the way as the original was, ensuring that the cable is **not** placed near any **hot** or **moving** element
- **Reconnect** the battery