

Frequently Asked Questions about Oxygen Sensors



What does an oxygen sensor do?

The oxygen sensor monitors the engine's air to fuel ratio by measuring the amount of free oxygen in the exhaust. It reports this information to the engine control unit or ECU. Approximately every 10 milliseconds the ECU uses this information to make corrections to the air to fuel mixture for maximum efficiency.



What is an oxygen sensor made of?

An oxygen sensor is a solid electrolyte galvanic cell. Electrolyte is zirconium oxide, which is the same material synthetic diamonds are made from. This material is stabilized with a rare element called Yttria. The cell (thimble or flat plate) is then coated with pure platinum, which acts as a conductor/electrode (like battery plates).



How does the oxygen sensor work?

The sensor works as a result of the varying quantities of oxygen in the exhaust versus the amount in the atmosphere. Voltage is produced by the difference in the two amounts. If the amount of oxygen in the exhaust is closer to the amount in the air, the engine is lean and the voltage is low (under 250mv). If the engine is rich the voltage is high (about 950mv).



Are all oxygen base sensors generally the same?

No. The base sensor design and elements vary greatly. Below is a list of the most widely used base sensors.

- Single wire unheated standard zirconia sensors.
- Two wire unheated standard zirconia sensors.
- Three wire unheated standard zirconia sensors.
- Three wire heated titania sensors.
- Four wire heated standard zirconia thimble type isolated ground sensors. Within this sensor group there are multiple heater types.
- Four wire heated standard zirconia thimble type case ground sensors. Within this sensor group there are multiple heater types.
- Four wire heated standard zirconia planar type isolated ground sensors. Within this sensor group there are multiple heater types.
- Four wire heated zirconia thimble type air fuel ratio sensors.
- Four wire heated zirconia planar type air fuel ratio sensors.
- UEGO five wire wide air fuel ratio sensors.



What is a universal oxygen sensor?

A universal sensor is a base sensor, which does not include the direct fit connector. Splicing is necessary for installation. Universals were widely used in the early years of vehicles equipped with oxygen sensors.

The possibility exists that the user could select the wrong base sensor by assuming that all sensors with the same wire count are equal. All Oxygen Sensors are not created equally. Each type is matched to the make, model and sub-model application and cannot be mixed. It is impractical to offer a universal sensor for many applications due to heater types, ground types and other characteristics. Improper selection of the universal sensor could result in serious damage to the engine management system, including failure of the engine control unit (ECU) and/or the catalytic converter.



What will damage an oxygen sensor?

Natural aging, shock from accidents, antifreeze poisoning, excessive oil consumption or leakage, silicone poisoning due to incorrect use of silicone gasket sealers, etc.



What do oxygen sensor wire colors mean?

Typically the colors depict the connections inside the sensor; however, various manufacturers choose different colors. For example; some manufacturers use white wires for the heater & others use black. For this and many other reasons it is best to use a direct fit connector to avoid confusion.