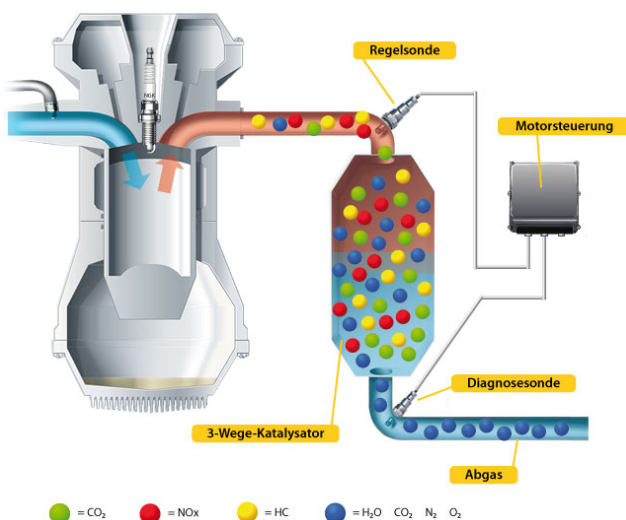


## Oxygen sensor

The oxygen sensor is an instrument for managing the exhaust emissions of petrol, diesel and gas engines. It is an oxygen concentration sensor which measures the residual oxygen content of the exhaust gases and...

### Function

The oxygen sensor is an instrument for controlling the exhaust emissions of petrol, diesel and gas engines. It is an oxygen concentration sensor which measures the residual oxygen content of the exhaust gas and then transmits a signal to the engine control unit in the form of an electric voltage. The oxygen sensor voltage allows the control unit to detect whether the mixture is too lean or rich. If the mixture is too rich, the control unit reduces the quantity of fuel in the A/F ratio and increases it if the mixture is too lean.



The value measured by the oxygen sensor allows the control unit to adjust the amount of fuel injected to obtain an optimum mixture. This creates ideal conditions for treatment of the exhaust gases in the catalytic converter. Is the engine load taken into account here. There may also be a second oxygen sensor, the diagnostic sensor (downstream of the catalytic converter). This detects whether the control sensor (upstream of the cat) is functioning to optimum effect. The control unit can then calculate how to compensate for this.

### Configuration in the exhaust gas system

In more recent engines, the exhaust system has an oxygen sensor upstream and downstream of the catalytic converter. The exhaust gases flow over the electrode side of the sensor element, while the other is in contact with the outside air. The outside air acts as a reference here for measurement of the residual oxygen content. The system has been simplified by the latest generation of oxygen sensors, in which the reference value measured against the outside air is replaced by a reference voltage.

## Types of oxygen sensors

Today there are basically two different types of sensor: the binary and the universal exhaust gas oxygen (UEGO) sensor.

The binary exhaust gas oxygen sensor

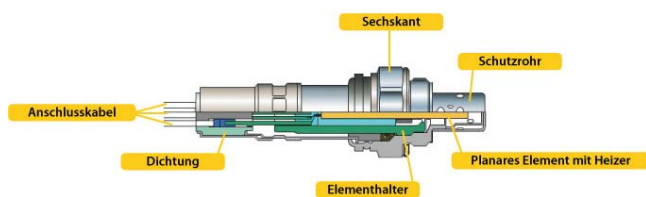
When at operating temperature (from 350 °C), the binary sensor generates a change in electric voltage depending on the oxygen level in the exhaust. It compares the residual oxygen content in the exhaust with the oxygen level of the ambient air and identifies the transition from a rich mixture (lack of air) to a lean mixture (excess air) and vice versa.

The universal exhaust gas oxygen sensor



The universal exhaust gas oxygen sensor is extremely accurate when measuring both a rich and lean air/fuel ratio. It has a greater measuring range and is also suitable for use in diesel and gas engines.

Nowadays heated oxygen sensors are used to ensure the oxygen sensors



reach operating temperature more quickly and can thus intervene earlier in the emission control process. Heated HEGO sensors no longer always have to be installed close to the engine.

## Structure of oxygen sensor

Finger-type sensor

The core of the finger-type sensor consists of a finger-shaped ceramic element. It is heated by a heater incorporated in the sensor as control is only possible with a minimum operating temperature of 350 °C.

The exhaust gases flow over the electrode side of the sensor element, while the other is in contact with the outside air. The outside air acts as a reference here for measurement of the residual oxygen content. To protect the sensor element from combustion residues and condensate in the exhaust gas, the sensor housing is fitted with a protection tube on the exhaust gas end.

### Planar sensor

The planar oxygen sensor is manufactured using thick-film-technology. The shape of the sensor element resembles an elongated plate. Both the measuring cell and the heating element are integrated in this plate, so allowing the sensor to attain its operating state more quickly. Here too suitable protection tubes are used to protect the sensor element from combustion residues and condensate in the exhaust.

## Environmental protection

Exhaust emissions standards and limit values are becoming increasingly stringent. Oxygen sensors became indispensable long ago to ensure the efficient reduction of emissions. More recent vehicles usually feature the configuration with two oxygen sensors described above. Here the two oxygen sensors monitor each other and so regulate functioning of the catalytic converter. This is the only way to further reduce exhaust emissions in coming years.

Development of the planar universal exhaust gas oxygen sensor has made another important contribution to ensuring vehicle engines are more environmentally friendly. They reach their operating temperature in less than five seconds and so guarantee maximum control quality even in the emission-intensive cold start phase.

Oxygen sensors are subject to extreme loads. Perfect functioning of the oxygen sensor is necessary if your engine is to be reliable - so ensuring low fuel consumption, low pollutant emissions and compliant exhaust emission values.

When expressed in figures, this represents a cut in fuel consumption by as much as 15 percent compared with older or defective oxygen sensors.

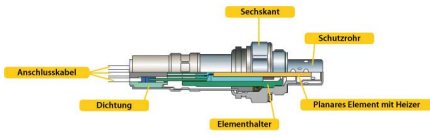
If you switch to the oxygen sensor at the right time, you can also avoid costly damage to your cat and improve vehicle performance.

## Werterhalt

Lambdasonden können durch eindringendes Öl zerstört werden. Wie und warum das Öl dort hin gelangt und wie das Problem gelöst wird, erklärt folgendes Video:

<https://www.youtube.com/watch?v=0UNYv8L0hzY>

## Bilder



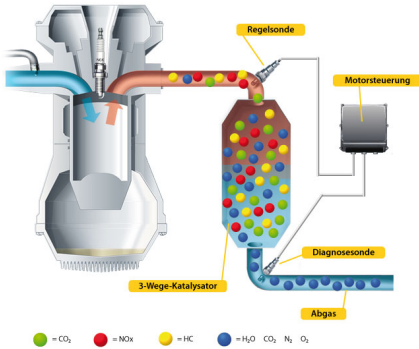
Structure of UEGO sensor



Universal exhaust gas oxygen sensor



Oxygen sensor, side view



Closed loop A/F control

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Quelle:

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[cardictionary.com/cardictionary/electric/products/oxygen-sensor-1.html](http://cardictionary.com/cardictionary/electric/products/oxygen-sensor-1.html)