

Oxygen Sensors Before Catalytic Converter

In order to maintain optimum efficiency of the catalytic converters, the system endeavours to provide the stoichiometric air-fuel mixture ratio ($\text{Lambda} = 1$) for combustion.

Due to the two-channel design of the exhaust system, a type LSH25 oxygen sensor before the catalytic converter is used per cylinder bank.

The oxygen sensors measure the residual oxygen in the exhaust gas and send corresponding voltage values to the DME control unit. Here the mixture composition is adapted corresponding to the lambda control by varying the injection timing.

The oxygen sensors are heated electrically as a temperature of approx. 300 °C is required for effective operation of the oxygen sensors. The heating is controlled by the DME dependent on the operating time, load and engine speed.

The operation of the oxygen sensors is monitored as part of on-board diagnosis. Malfunctions are recognized in the DME e.g. by changes in the lambda control frequency, the jump times or the signal amplitudes. Malfunctions cause fault codes to be entered in the DME fault code memory.

In the event of the oxygen sensors failing, the DME determines the injection times dependent on load and engine speed based on pilot control characteristic maps and adaptation values. In this way it is possible to maintain engine operation while also preventing damage or destruction of the catalytic converter as the result of overheating.