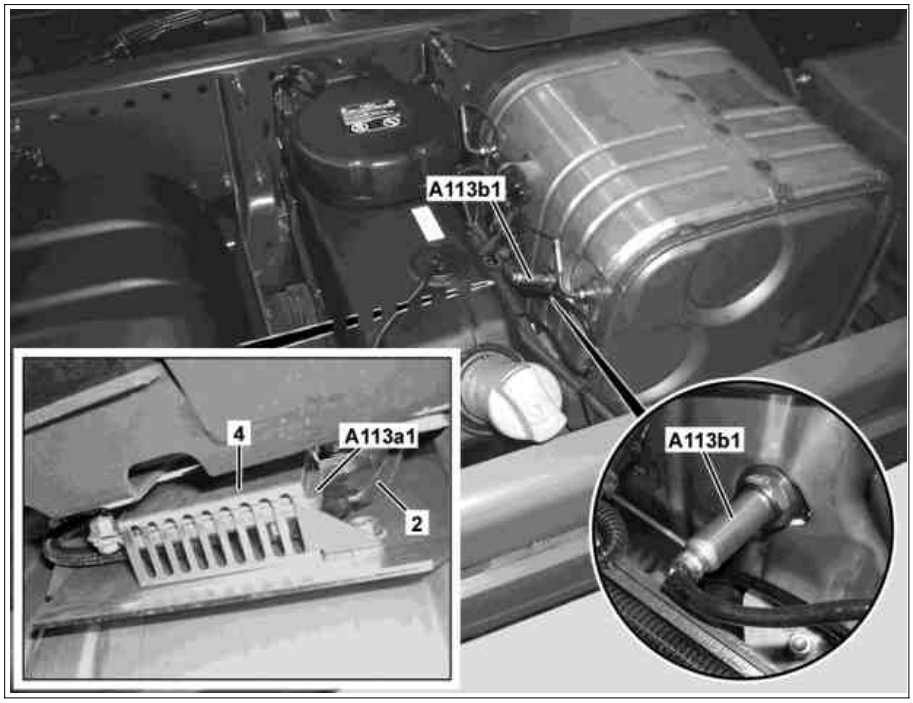
ENGINE 900.9 in MODEL 970, 972, 975, 976 with CODE (MS4) BlueTec 4
ENGINE 900.9 in MODEL 970, 972, 975, 976 with CODE (MS5) BlueTec 5
ENGINE 902.9 in MODEL 970, 972, 974, 975, 976 with CODE (MS4) BlueTec 4
ENGINE 902.9 in MODEL 970, 972, 974, 975, 976 with CODE (MS5) BlueTec 5
ENGINE 924.9 in MODEL 970, 972, 974 with CODE (MS4) BlueTec 4
ENGINE 924.9 in MODEL 970, 972, 974 with CODE (MS5) BlueTec 5
ENGINE 902.9 in MODEL 950.5 /6, 952.5 /6, 953.6, 954.5, 957 with CODE (MS4) BlueTec 4
ENGINE 902.9 in MODEL 950.5 /6, 952.5 /6, 953.6, 954.5, 957 with CODE (MS5) BlueTec 5
ENGINE 926.9 in MODEL 950.5 /6, 952.5 /6, 953.6, 954.5, 957 with CODE (MS4) BlueTec 4
ENGINE 926.9 in MODEL 950.5 /6, 952.5 /6, 953.6, 954.5, 957 with CODE (MS5) BlueTec 5

Location

Shown on model 970
2 Electrical line
4 Bracket

A113a1 NOx sensor controller unit
A113b1 NOx sensor

The NOx sensor (A113b1) is screwed in from the outside into the outlet chamber of the muffler with reduction catalytic converter. The NOx sensor controller unit (A113a1) is attached to a holder. Both components are connected inseparably with each other via an electrical line (2) and together create the NOx sensor with controller unit (A113)



W14.40-1392-06

Task

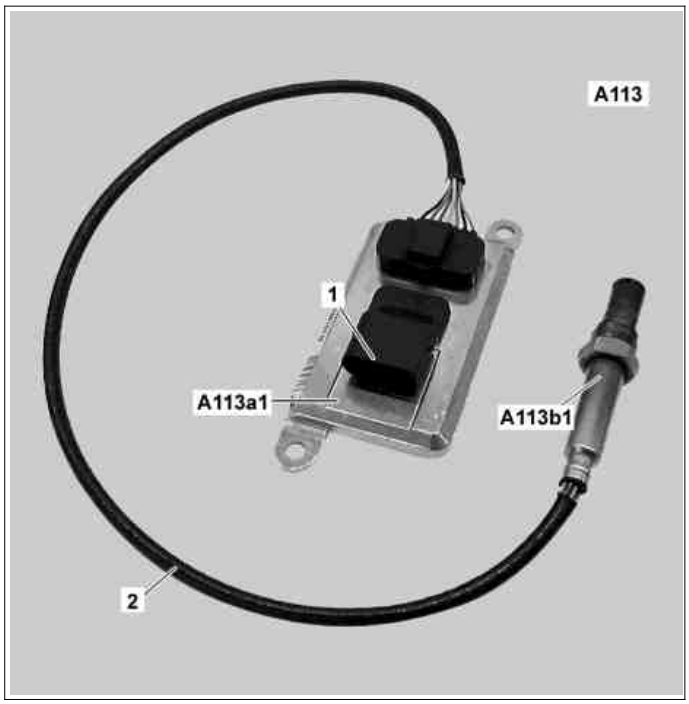
The NOx sensor with controller unit (A113) serves to detect the NOx concentration in the exhaust and monitoring of the emission limits prescribed by the lawmakers.

The NOx sensor (A113b1) represents the actual measuring probe while the electronic NOx sensor controller unit (A113a1) serves to compute the NOx raw values.

Design

1 *Electrical connection*
2 *Electrical line*

A113 *NOx sensor with controller unit*
A113a1 *NOx sensor controller unit*
A113b1 *NOx sensor*



W14.40-1343-12

The NOx sensor (A113b1) is similar in construction to a wideband oxygen sensor. It is fitted with its basic elements such as the so-called Nernst cell and the oxygen pump cell.
Its front part in the measuring probe which projects out into the exhaust consists of a metal housing with openings and a gas-permeable ceramic body inside made out of zirconium dioxide. The surfaces of the ceramic body are fitted on both sides with electrodes made out of a thin platinum layer. The measuring probe is in contact with outside air via a reference air duct.

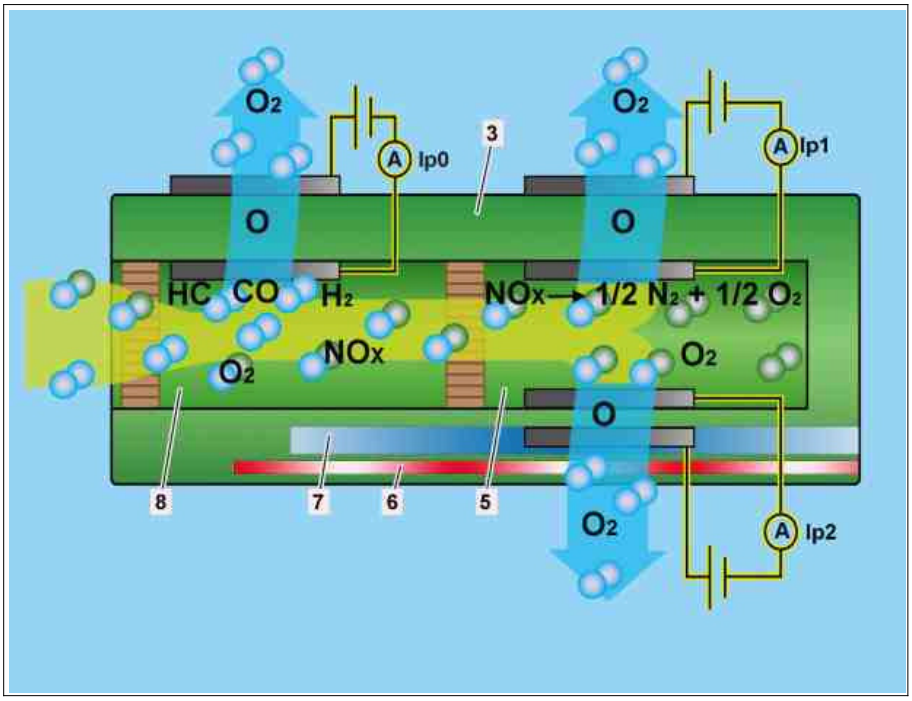
The metal housing protects the ceramic body inside against mechanical stress and sudden increases in temperature.

The NOx sensor (A113b1) is fitted with an integral heating element which serves to rapidly achieve the required operating temperature of about 800 °C for the chemical processes taking place therein.
The electrical line (2) between the sensor and controller unit has a defined length of about 60 mm.

Function

3 *Measuring probe (ceramic body)*
5 *Chamber*
6 *Heating element*
7 *Reference air passage*
8 *Chamber*

Ip0 *Pump current (main pump electrode)*
Ip1 *Pump current (auxiliary pump electrode)*
Ip2 *Pump current (measuring electrode)*



W14.40-1350-76

The NOx sensor (A113b1) functions according to the principle of the so-called oxygen ions line according to which the wideband oxygen sensor also functions.

The gas then passes over a further diffusion barrier and arrives in the second chamber (5) where it is broken down with the aid of a

Part of the exhaust flowing past the measuring probe (3) passes through a diffusion barrier into the first chamber (8).
In this case the O_2 concentration is regulated at a defined value by means of the so-called pump voltage applied to an electrode until the oxygen content differs either side of the ceramic body.
The special properties of the ceramic body create the signal voltage (Nernst voltage) at its friction planes. This is the measure for the residual oxygen content in the exhaust.
The traces of HC, CO and H_2 in the exhaust oxygenate at the electrode made out of platinum.

second NOx electrode into NO and O_2. The O_2 concentration is also regulated to close to zero at the same time with the aid of a further electrode. The nitrous oxide concentration is deduced from the size of the pump current (Ip2) required.
The electronic NOx sensor controller unit (A113a1) serves to compute the required pump voltages, to regulate the complex system and to compute the NOx raw value.
It receives the analog signal from the NOx sensor (A113b1) and digitalizes it. It then passes this on as digital CAN signals at a defined transfer rate to the SCR frame module control unit which then passes these through to the engine control (MR) control unit.