

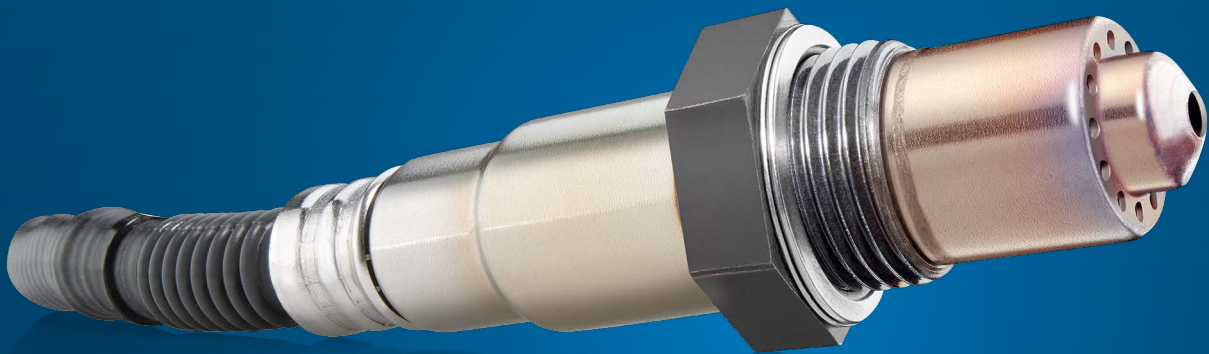
Invented for life



**BOSCH**

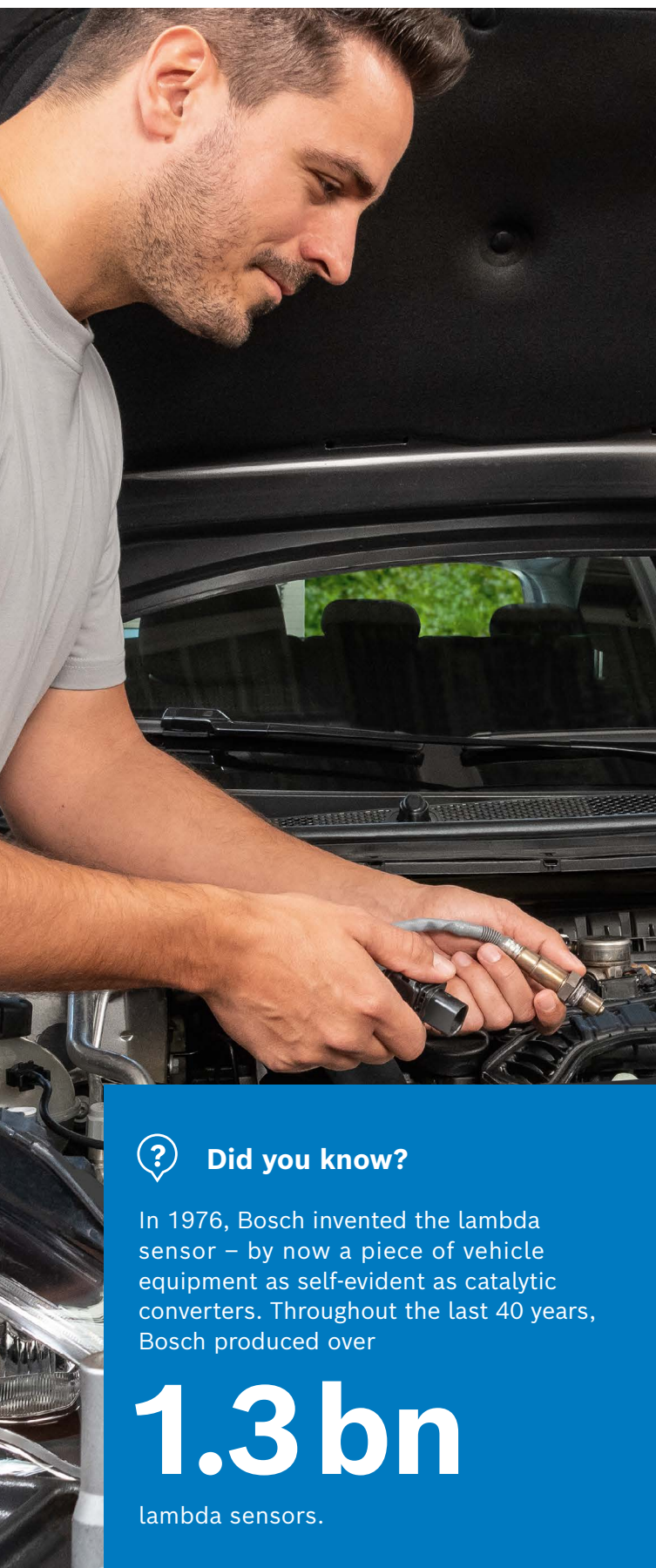
# Lambda sensors

Precisely measuring for an optimized combustion



# Lambda sensor

## Overview



### Did you know?

In 1976, Bosch invented the lambda sensor – by now a piece of vehicle equipment as self-evident as catalytic converters. Throughout the last 40 years, Bosch produced over

# 1.3 bn

lambda sensors.

Sensing the adequate mixture for a more efficient and low-emission combustion: Since its invention, the lambda sensor has made a significant contribution to help meet with current and future emission standards. The lambda sensor precisely measures the residual oxygen content in the exhaust gas and supplies the engine control unit with the necessary data for the optimum air-fuel mixture.



### The developer's know-how

In 1976, Bosch invented the lambda sensor. Thanks to decades of experience and constant ongoing development, it is still state-of-the-art.



### High market coverage

With more than 1,600 different lambda sensors for diesel, gasoline and hybrid applications, Bosch offers the right lambda sensor for every vehicle in the European market – tailored to the requirements of the respective engine.



### Services for modern vehicles

As a developer of innovative solutions and a supplier of hybrid and electric drive technologies for original equipment, Bosch is a creator of the technological changes in the vehicle and workshop market.

# Lambda sensor

## Program and product details



	Switching-type lambda sensor	Wideband lambda sensor
	<p><b>Switching-type lambda sensors</b> detect the “stoichiometric mixture” (<math>\lambda = 1</math>) and compare the residual oxygen content of the exhaust gas with the oxygen content of the ambient air. They detect the transition from rich to lean air/fuel ratio and vice versa. Depending on the oxygen content of the exhaust gas, they generate a voltage of approx. 20 to 900 mV.</p>	<p><b>Wideband lambda sensors</b> can also measure lean (<math>\lambda &gt; 1</math>) and rich mixtures (<math>\lambda &lt; 1</math>) with high accuracy. This allows lambda sensors to be used for additional engine control functions (e.g. secondary air diagnosis). Wideband lambda sensors define the lambda value using the pump current featuring zero mA at <math>\lambda = 1</math>.</p>
Application		
Advantages at a glance	<ul style="list-style-type: none"> <li>■ Easy to fit thanks to vehicle-specific connector</li> <li>■ Quick and easy fitting, as all lambda sensors come with a pre-greased thread</li> <li>■ High reliability over a long service life due to functional and quality tests in accordance with the same standards as for original equipment parts</li> </ul>	

### From the beginning Bosch

Bosch lambda sensors are the original equipment in many vehicles. For replacements, workshops can easily find the right sensors and – when it comes to switching-type lambda sensors – often have the choice between the Bosch original range the Bosch universal range.

Only the Bosch lambda sensor original program covers more than 70% of the European vehicle market.



### Workshop tips

# 10 for 1,000

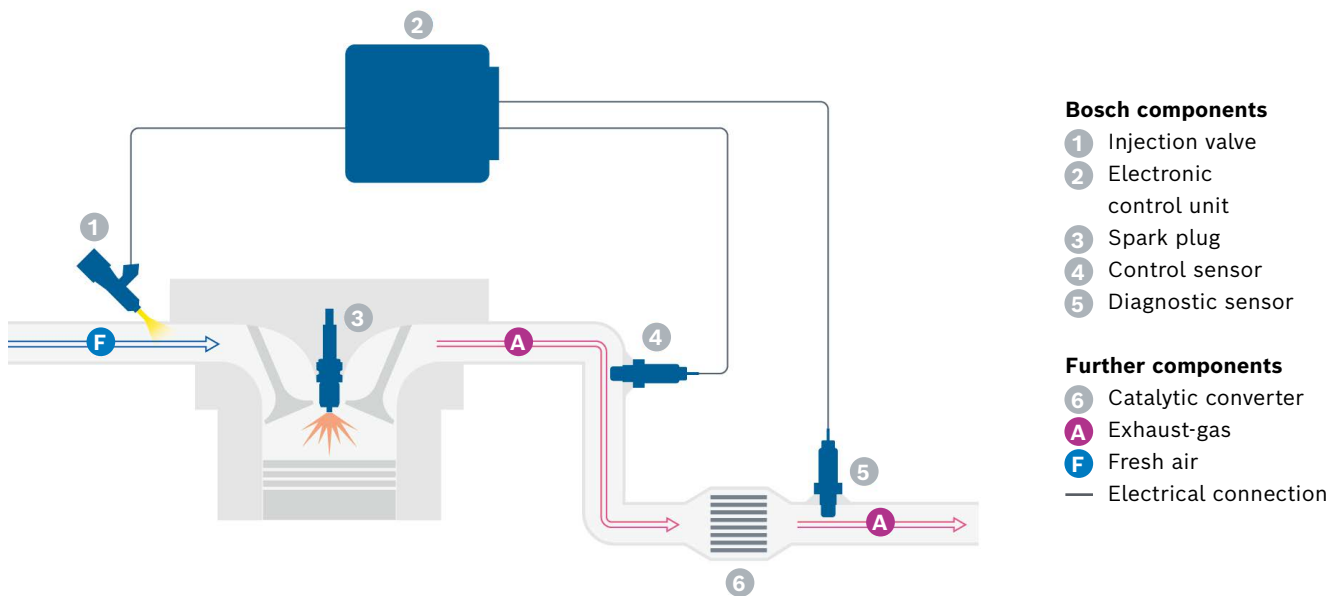
**10 universal lambda sensors replace around 1,000 original lambda sensors** with different sensor elements and heating performance. That saves costs in warehousing.

# Lambda sensor Technology

**Superbly geared to each other, they make exhaust-gas treatment more effective:**

Modern exhaust-gas systems feature at least two lambda sensors: The air/fuel mixture is optimized by a control sensor upstream of the catalytic converter, its effectiveness by a diagnostic sensor downstream of it.

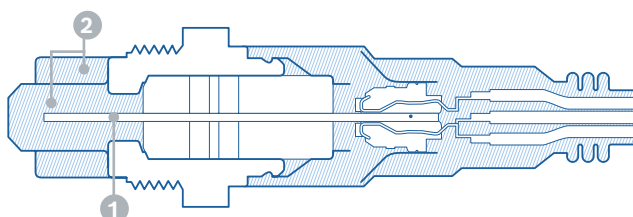
**As an example: Lambda sensor controlling the intake manifold injection**



## Types of lambda sensors in the workshop

Older vehicles often still have finger probes, with a sensor ceramic at the core. A separate heater brings them to their operating temperature up to 350°C. In case of repair finger sensors have to be replaced by lambda sensors of the same type. They are still available in the Bosch workshop program.

Today most modern lambda sensors are designed as planar sensors – named after their flat sensor shape. Planar lambda sensors are particularly fast in getting ready for operation – since in addition to the measuring cell also the heating element is integrated in the sensor.

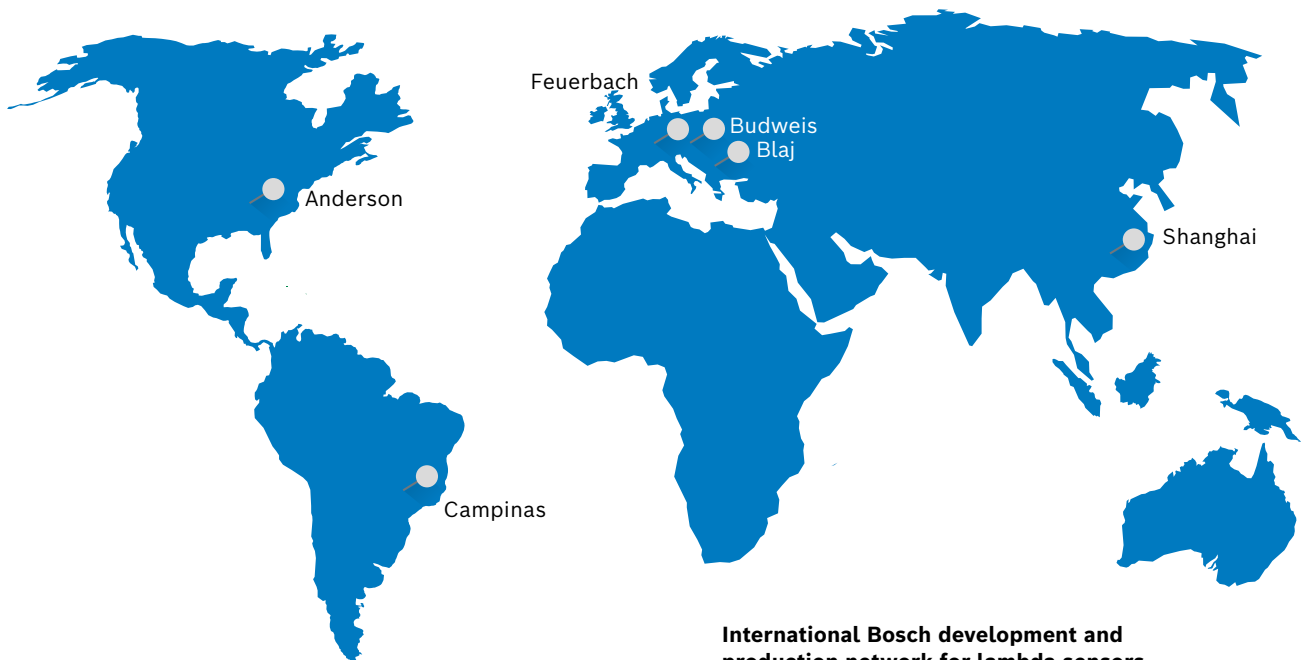


### Planar sensor (fig.)

- 1 Planar sensor element
- 2 Double-walled protective tube

# Lambda sensor Production

**Bosch is not only the inventor of the lambda sensor**, but also one of the leading lambda sensor manufacturers worldwide. More than 50 million lambda sensors are manufactured annually in Bosch's global development and production network.



#### International Bosch development and production network for lambda sensors

- Anderson, USA (production)
- Blaj, Romania (production)
- Budweis, Czech Republic (development)
- Campinas, Brasil (production)
- Feuerbach, Germany (development and production)
- Shanghai, China (production)



#### Did you know?

In its international development and production network Bosch produces reliable quality at the level of the

**original equipment.**

The high quality standards are equally carefully controlled and secured in all participating manufacturing countries.



# Lambda sensor

## Quality standards

**Reliability has a name:** workshops all over the world use Bosch lambda sensors in vehicles in large numbers. Standardized production processes and rigorous testing ensure excellent Bosch quality at the high level of the original equipment.



### Strict manufacturing and approval processes

The manufacturing processes of Bosch lambda sensors are subject to a uniform and strict quality management. Every lambda sensor goes through an approval process in accordance with the same standards as for original equipment parts. In this way only products are provided and sold that equal the high Bosch quality standards.



### Demanding performance tests

All lambda sensors produced are subjected to a stringent series of quality and performance tests. They are tested in various procedures under extreme conditions for service life, vibration resistance and robustness.



### Did you know?

The individual steps of the lambda sensor production are completed with a visual inspection and an electrical test. This ensures

# high quality

over the entire life cycle.

# Exhaust-gas sensors

## Program and product details

Use the vehicle search at [boschaftermarket.de](https://boschaftermarket.de) and quickly find the right lambda sensor



Particulate matter sensor	NOx sensor
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**Particulate matter sensors** reliably monitor the diesel particle filter and help reduce particulate emissions.

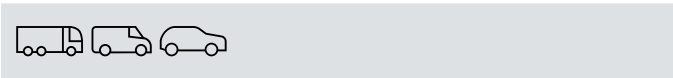
**NOx sensors** measure the nitrogen oxide content of the exhaust gas, supporting diagnosis and regulation of NOx reduction.



Exhaust-gas temperature sensor	Differential pressure sensor
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**Exhaust-gas temperature sensors** monitor the optimum temperature range and protect high-quality components such as turbochargers, catalytic converters and diesel particle filters in the hot exhaust-gas system. They ensure an ideal control behavior of the exhaust gas cleaning components.

**Differential pressure sensors** measure the pressure drop between two points of the particle filter and report its charge status. This provides a demand-based concept for particle filter regeneration.



### Advantages at a glance

- **High performance and reliability** over a long service life thanks to functional and quality tests in accordance with the same standards as for original equipment parts
- **Excellent temperature and corrosion resistance** in the demanding environment of the exhaust-gas system thanks to high-quality materials and robust design
- **Saves time and increases the workshop's efficiency** through trouble-free installation and reduced downtime for the vehicle



## Exhaust-gas treatment



Find out more by scanning the QR Code.



# What drives you, drives us

Bosch technologies are used in most vehicles worldwide.  
People, and assuring their mobility, is what we are focused on.

Therefore, we have dedicated over 130 years of pioneering spirit  
and expertise in research and manufacturing to achieving this.

We provide the aftermarket and workshops worldwide with modern diagnostic and workshop  
equipment and a wide range of spare parts for passenger cars and commercial vehicles:

- solutions for efficient vehicle repairs
- innovative workshop equipment and software
- one of the world's most comprehensive ranges of new and exchange parts
- large network of wholesale customers, for quick and reliable parts supply
- competent hotline support
- comprehensive educational and training offers
- targeted sales and marketing support

**Find out more at:**  
[boschaftermarket.com](https://boschaftermarket.com)

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