



BOSCH
Invented for life

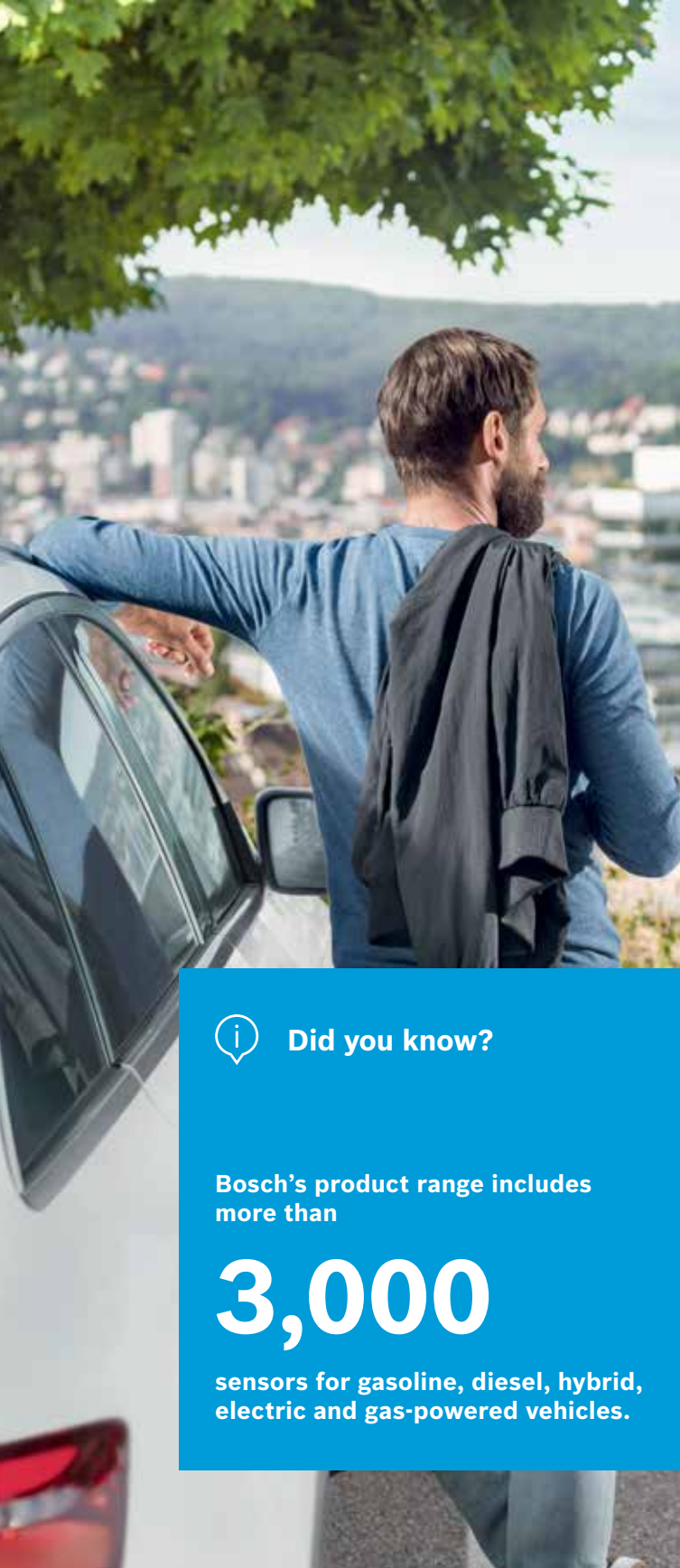
Driven by **IMPULSES**



**Measuring, sensing
and metering reliably**
Bosch sensors

A vehicle's sensory organs

Bosch sensors



No matter if they are used for improving driving dynamics or to minimize emissions – a vehicle without sensors has become unimaginable. More than 50 sensors are installed in a modern car. Transmitting signals in fractions of a second, they are the basis of state-of-the-art engine and transmission management. As the car's sensory organs, they improve performance and, at the same time, optimise the engine's use of resources.



Future-proof thanks to innovative technology

Bosch continuously advances its sensor technology: sensors are getting smaller, lighter, more powerful and digital – and more durable at the same time. Also, the sensor portfolio in the area of powertrain and exhaust-gas sensors is supplemented by innovative solutions for automated driving. Sensor-based driver assistance systems are now a crucial part of any vehicle. Finally, Bosch's proven sensor technology plays an important role in the hybridisation of the powertrain.



Competence and know-how

Thanks to decades of experience and cross-product competence, Bosch understands the technical requirements of motor vehicles. Bosch sensors benefit from this know-how. Bosch provides reliable solutions meeting the relevant technical requirements and standing out for their high quality.



Did you know?

Bosch's product range includes more than

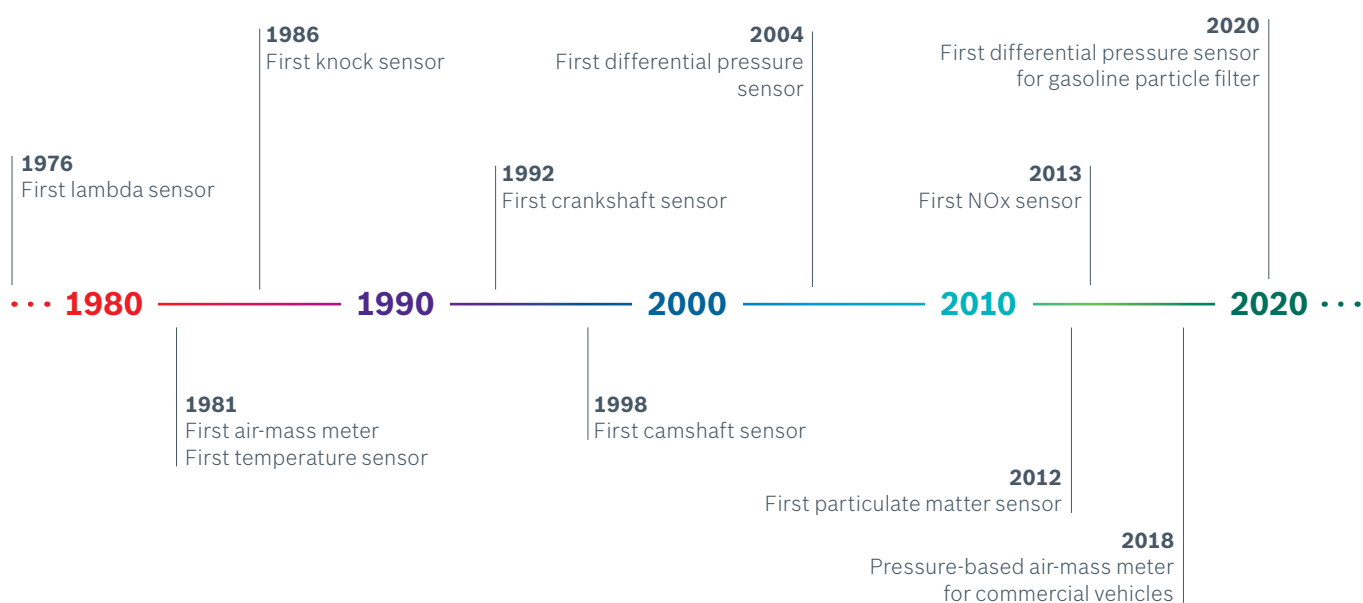
3,000

sensors for gasoline, diesel, hybrid, electric and gas-powered vehicles.

Powertrain and exhaust-gas sensors

Overview

Bosch offers a wide range of sensors for the powertrain and exhaust system. Sensors ensure the nowadays important plus in performance, economy and safety in motor vehicles. At the same time, Bosch exhaust-gas sensors help to reduce nitrogen oxides and CO₂, as well as to comply with applicable emission standards.



High quality

Many car manufacturers rely on the comprehensive know-how and high quality Bosch provides. All Bosch sensors undergo a strict manufacturing and release process and meet very high quality standards. They are tailored to specific vehicle types and easy to change.

Early adopters

More than 50 years spent in the development and manufacture of sensors make Bosch a strong partner. Bosch is one of the pioneers of exhaust-gas treatment and is the inventor of the lambda sensor, particulate matter sensor and hot-film air-mass meter. Bosch sensors support efficient and resource-saving engine operation.

From original equipment to the aftermarket

Sensors play a major role in the aftermarket business as they are delivered to international vehicle manufacturers in large numbers as original equipment. Today, all passenger cars and commercial vehicles (on- and off-highway) are equipped with sensor systems.

Sensors for engine management

Product range & details



Hot-film air-mass meter

Hot-film air-mass meters measure the actual air mass flow so the air-fuel mixture can be optimised. This contributes to efficient combustion and powerful engine performance.



Intake manifold and boost-pressure sensor (MAP)

Intake manifold and boost-pressure sensors measure quickly and precisely the pressure and temperature of the intake air entering internal-combustion engines. The sensor optimizes fuel injection and air control.



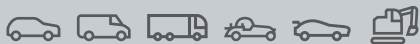
Rail pressure sensor

Rail pressure sensors measure the fuel pressure in the high-pressure fuel rail of engines with gasoline direct injection and diesel engines. High-pressure sensors are also suitable for hydraulics, for example in construction machines.



Oil and fuel pressure sensor

Oil and fuel pressure sensors provide quick and highly accurate measurement of fuel and oil pressure in areas of low to medium pressure in all kinds of internal-combustion engines (gasoline, diesel, CNG, LPG) as well as hydraulic systems. Some variants include an integrated temperature sensor.



All benefits at a glance

- ▶ **Functional and quality tests based on the standards that also apply to original equipment:** for high performance and reliability across a long service life
- ▶ **Durable design:** exceptional resistance to deformation, cracking and rupture thanks to high-quality materials
- ▶ **Broad variety of sensors:** suitable sensors for numerous applications, pressure and RPM ranges

Workshop tip

Change the air filter when the air-mass meter is replaced!



The air filter cleans and protects downstream engine components from dirt and damage.

Sensors for engine management

Product range & details



Crankshaft-speed sensor

Crankshaft-speed sensors measure the speed and position of the crankshaft. The results are used by the engine control unit to determine the exact injection and ignition timing.



Camshaft-position sensor

Camshaft-position sensors determine the camshaft position. Highly accurate measurements allow precise injection and ignition timing.



Turbocharger speed sensor

Speed sensors for turbochargers detect the rotational speed of exhaust-gas turbochargers. They provide a key input parameter for the efficient management of the turbocharging system.



Temperature sensor

Temperature sensors measure the temperature of various operating media such as fuel, coolant, oil and air. They support efficient and safe engine operation.



Knock sensor

Knock sensors detect engine knock reliably and accurately, contributing to the engine's performance and durability.



Workshop tip

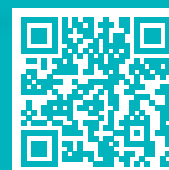
The comprehensive **diagnostics solutions** (KTS 560, KTS 590 and ESI[tronic]) offered by Bosch enable targeted and fast diagnosis of the various sensors.



Sensor technology in the engine compartment



Find here a video about how the powertrain sensors work and interact.



Exhaust-gas sensors

Product range & details



Lambda sensor	Particulate matter sensor	NOx sensor
<p>Lambda sensors measure the oxygen content of the exhaust gas and supply the necessary information for optimal air/fuel mixture to the engine control unit. Thereby they provide the basis for more efficient and lower-pollutant combustion.</p>	<p>Particulate matter sensor reliably monitor the diesel particle filter and help reduce particulate emissions.</p>	<p>NOx sensors measure the nitrogen oxide content of the exhaust gas, supporting diagnosis and regulation of NOx reduction.</p>



Exhaust-gas temperature sensor	Differential pressure sensor
<p>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 to comply with emission limits and optimum engine performance.</p>	<p>Differential pressure sensors measure the pressure drop between two points of the particle filter. They report the charge status of the particle filter and monitor its function. This provides a demand-based, fuel-efficient concept for particle filter regeneration.</p>

All benefits at a glance

- ▶ **Functional and quality tests in accordance with the same standards as for original equipment parts:** for high performance and reliability over a long service life
- ▶ **High-quality materials and robust design:** for excellent temperature and corrosion resistance in the demanding environment of the exhaust-gas system
- ▶ **Trouble-free installation:** saves time, increases the workshop's efficiency and reduces downtime for the vehicle



Exhaust-gas treatment



Find here a video about how exhaust-gas treatment works.



Other sensors

Product range & details



Ultrasonic sensor

Ultrasonic sensors detect distances to obstacles and monitor space when parking and maneuvering. This allows comfortable and automatic parking as well as emergency braking functions at low speeds.



Wheel speed sensor

Wheel-speed sensors detect the rotational speed of wheels using a non-contacting measurement principle. They pass the information on to the relevant control unit.



All benefits at a glance

- ▶ **Powerful and reliable across a long life cycle:** thanks to functional and quality checks based on the standards that also apply to original equipment
- ▶ **Compact design:** for easy installation and a wide range of applications
- ▶ **Highly sensitive measurement:** for improved safety on the road



Bosch Electronic Service

Professional repair of electronic vehicle components



- ▶ convenient processing
- ▶ reliable solutions
- ▶ quick service

bosch-repair-service.com

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 and effective 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 technical support
- ▶ Comprehensive educational and training offers
- ▶ Targeted sales and marketing support

Find out more at:
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