



A fast-growing market

The automotive sensor market is growing rapidly worldwide. It is expected to reach between \$45 and \$55 billion by 2026 (Automotive Original Equipment and Aftermarket), with an annual growth rate of 7.5%. In Europe, the growing adoption of autonomous vehicles and advanced driver assistance technologies (ADAS) is driving this demand. Strict regulations on safety and CO² emissions are also contributing to this expansion.

The European automotive industry is undergoing a major transformation, marked by a significant transition towards more intelligent and environmentally-friendly vehicles. Sensors are essential to this development, enabling better management of vehicle safety, performance and energy efficiency. The automotive aftermarket also plays a crucial role in this dynamic. Replacement sensors are essential for maintaining and improving the safety and performance of vehicles already on the road.



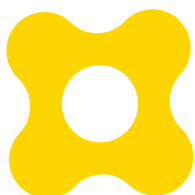
Automotive sensors:

Essential components for safety, performance, comfort, the environment and innovation

Sensors have become essential components in today's vehicles, playing a key role in a number of critical areas. Their various functions enable precise, real-time management of vehicle systems, contributing to safer, more efficient and more enjoyable driving experience.

Ensuring everyone's safety

Automotive sensors are key components in ensuring the safety of drivers, passengers and the environment outside the vehicle. They enable real-time monitoring of critical vehicle systems, such as brakes, airbags and stability control systems. Technologies such as Automatic High Beam Control, Night Vision and Forward Light Detection use advanced sensors to improve the vehicle's visibility and responsiveness in a variety of driving conditions.



Passenger comfort is a growing priority in the automotive industry, with sensors playing a central role. They are integrated into advanced systems such as automatic seat adjustment, adaptive climate control and infotainment systems. These sensors enable real-time adjustments to be made to provide a personalised and comfortable driving experience.

Preserving the environment

Sensors also help to reduce pollutant emissions by optimising engine performance and monitoring pollution levels (combustion and emissions management). In a context of increasingly strict environmental regulations, these functions are particularly important. In addition, the transition to electric and hybrid vehicles requires sophisticated thermal management systems, made possible by efficient sensors that ensure optimum performance and maximum safety.





Optimising vehicle performance

Used to monitor and adjust various aspects of driving in real time, such as engine management, adaptive suspension and transmission, these systems enable more efficient driving, improved vehicle responsiveness and an enhanced driving experience. Sensors help to maximise fuel efficiency, extend component life and improve overall vehicle performance.



Stimulating technological innovation

Innovation in automotive technology has led to the integration of sensors into new applications, opening the way to unexplored functionalities. From advanced driver assistance systems (ADAS) to autonomous vehicles, sensors are at the heart of these developments. They enable functions such as blind spot detection, parking assistance and autonomous driving, transforming the driving experience. They open up new possibilities for the mobility of the future.



SNR's range of sensors

Engine management

Engine management is crucial to vehicle performance, safety and efficiency. Engine management sensors play a central role in monitoring and controlling key aspects of the engine. They enable smooth driving, reduce emissions and optimise performance.

Engine temperature sensor - CTS

Sensor functions and technologies

The Engine Temperature Sensor (CTS) plays a crucial role in the engine by monitoring the temperature of the coolant. It transmits this information to the engine control unit (ECU), which adjusts the injection timing and ignition angle accordingly to maintain optimum performance and prevent overheating. The CTS can also display the temperature on the dashboard in the event of overheating, alerting the driver. Temperature sensors can be active or passive, each offering specific advantages in terms of accuracy and response.



Crankshaft position sensor - CKP

Sensor functions and technologies

The crankshaft position sensor (CKP) is essential for determining engine speed and crankshaft position. It is usually mounted close to the ring gear of the flywheel. The rotational movement of this ring gear creates variations in a magnetic field, generating voltage signals that are transmitted to the engine control unit (ECU). From these signals, the ECU calculates engine speed and crankshaft position, which are essential for fuel injection and ignition timing.



Camshaft position sensor - CMP

Sensor functions and technologies

The camshaft position sensor (CMP) is essential for correct engine operation. Placed on the camshaft or its pulley, it informs the engine control unit of the precise angular position, enabling injection and ignition to be managed for each cylinder. In combination with the TDC (Top Dead Centre) sensor, the CMP enables the ECU to determine the piston phase and ignition order required to start the engine.



There are two main types of **CKP et CMP** sensors :

Inductive sensor: Produces an electromagnetic field disturbed by the passage of the flywheel teeth, generating a sinusoidal signal proportional to the speed of rotation.

Active-effect or Hall-effect sensor: Used in modern engines, sends a precise electronic signals to the ECU each time a magnet in the encoder passes the sensor.

Respect for the environment and standards



As sustainability and compliance with environmental regulations become top priorities, it is crucial for vehicles to adapt to ecological requirements. Sensors play a key role in this transition, enabling vehicles to meet stringent standards while reducing their environmental impact. By monitoring and optimising various aspects of the vehicle, these sensors contribute not only to performance and safety, but also to a cleaner future.

Exhaust gas pressure sensor - EGP

Sensor functions and technologies

The exhaust gas pressure sensor is an essential component of emission control systems for diesel vehicles. It measures the difference in exhaust gas pressure between the inlet and outlet of the particulate filter, or in relation to atmospheric pressure. This measurement is crucial for monitoring the saturation state of the particulate filter and providing accurate information to the engine management system.

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The exhaust gas pressure sensor is a key component in diesel emission control systems. It helps to :

- reduce emissions of harmful particles into the atmosphere,
- ensure that particulate filters work properly.



Exhaust gas temperature sensor - EGT

Sensor functions and technologies

Exhaust gas temperature sensors are essential to protect exhaust line components from critical overheating. As engines have become cleaner, more economical and more powerful, sensor technology has become more sophisticated to meet these new requirements.

These sensors, originally designed to protect the catalytic converter, now play a crucial role in protecting all exhaust system components. They take the form of sensors connected to the exhaust line, measuring the temperature of the gases before or after the turbocharger or particulate filter. The temperature data is transmitted to the vehicle's on-board computer.

By providing accurate information on exhaust gas temperature, the sensor helps to regulate the engine to reduce emissions and improve combustion efficiency, helping to maximise engine performance and longevity while protecting the environment.





Comfort and safety

Tyre pressure sensor - TPMS

Sensor functions and technologies

The Tyre Pressure Monitoring System (TPMS) constantly monitors tyre pressure and alerts the driver if tyres are under-inflated. It also helps to reduce fuel consumption and CO² emissions, while optimising tyre performance and life.

Technologies :

- **TPMS Indirect** : Uses the ABS system to detect abnormal wheel rotation speed, indicating underinflation.
- **TPMS Direct** : Pressure sensors fitted to tyre valves measure pressure and temperature in real time, transmitting the data to the ECU via a wireless connection.



The tyre pressure sensor, installed inside the tyre and coupled to the valve, work with a small built-in battery. It uses a piezoelectric membrane to measure pressure (and sometimes temperature). It also transmits the information via a wireless connection to a receiver, which triggers visual or audible alerts in the event of abnormal pressure.

TPMS aims to reduce the risk of accidents, tyre wear and fuel consumption, while improving vehicle safety and fuel efficiency by maintaining optimum tyre pressure.

Wheel speed sensor - ASB

Wheel speed sensor

ASB® (Active Sensor Bearing) technology is essential to the smooth operation of many on-board vehicle systems. The ASB® sensor bearing transmits wheel-related information to the vehicle's various ECUs, contributing to safety and overall performance.

Technologies :

- **Active**: Uses the ABS system to detect abnormal wheel speed.
- **Passive** : Wheel-mounted speed sensors measure speed in real time and transmit data to the ECU.



The ASB® sensor bearing is fitted with a magnetic encoder seal with a precise series of north and south poles. These poles are detected by a sensor as the wheel rotates, this generates a digital signal corresponding to the wheel's rotation speed. This signal is then sent to the vehicle's ECUs to manage various systems such as ABS, ESP and other stability control and navigation systems.

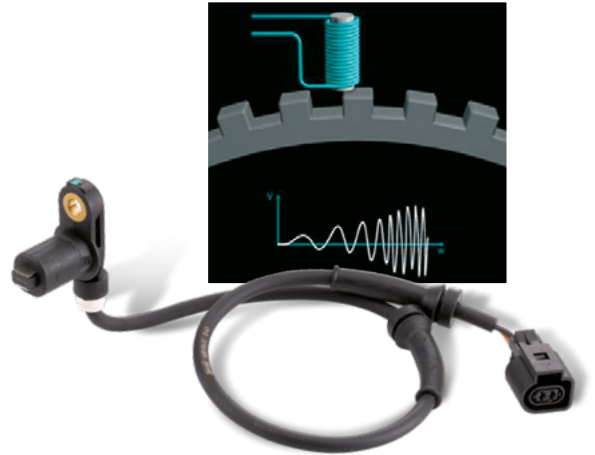
Technologies on offer

Passive sensor

A toothed wheel is attached to the wheel bearing.

The sensor consists of a coil wound around a permanent magnetic core. When rotating, the teeth on the wheel pass the sensor, this generates a magnetic field, the frequency of which gives the wheels rotational speed. This technology does not allow detection at very low speeds, nor detection of the direction of rotation of the wheels.

Passive sensors are only used with a toothed wheel.



Active sensor

The main advantage of active technology is that the signal has a constant amplitude, even at low or zero speed. This means that the speed signal can be used more accurately and all the systems linked to it operate more efficiently.

Active sensors are mainly used in conjunction with a magnetic encoder (located on the wheel bearing): ASB® technology. Some active sensors are also used with a toothed wheel.

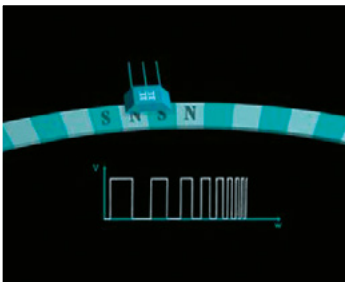
There are 3 different types of active sensors

1. Active hall-effect sensor:

The sensor consists of a semiconductor coupled to an electronic circuit. This produces an alternating current. The electronic part of the sensor converts the analogue current signal into a digital signal.



NORTH AND SOUTH POLES



2. Active hall-effect sensor in conjunction with a magnetic encoder seal fitted into the wheel bearing:

A magnetic field is produced by the north and south poles of the magnetic encoder seal passing in front of the sensor. The toothed wheel is replaced by a magnetic encoder in the bearings seal.

3. Active magneto-resistive sensor :

This technology enables signal detection in complex architectures where the sensor is further away from the encoder than normal.



SNR: A major player in the European automotive aftermarket

Advantages of the SNR sensor range

The SNR brand has established itself in Europe as a leader in the automotive aftermarket, with a number of strategic advantages. Our range of sensors benefits from our rich heritage in data capture, combining precision mechanics and advanced electronics. This synergy enables us to offer high quality products, recognised for their reliability and performance.

Technical expertise and legitimacy

With over 30 years' experience, the Group has unrivalled technical expertise in the field of sensors. We have acquired solid legitimacy thanks to our patent on ASB® (Active Sensor Bearing) technology and the successful marketing of wheel speed sensors over many years. This innovation revolutionised the market, confirming our position as a pioneer and our ability to offer cutting-edge solutions.

Commitment to quality and sustainability

The quality and durability of our products are at the heart of our commitment. All our SNR sensors undergo rigorous testing to guarantee their performance and longevity in extreme conditions. Our manufacturing process complies with the strictest standards, ensuring reliable and robust products.

Assistance services and technical support

The Group offers first-class assistance and technical support services to help our customers use and maintain our products. Our team of experts is available to provide technical advice, training and customised solutions to meet your specific needs. This commitment to our customers enables us to maintain a relationship of trust and ongoing satisfaction.





Connect your senses to the future of mobility

Make the world
a responsive*
road to drive



1500 sensors...1500 sensitivities.

SNR is expanding its offer with a wide range of sensors. Whether it's temperature, pressure, speed, position or air quality, our sensors provide a response to the challenges of a changing world that is increasingly sensitive to the environment.

People are meeting, connecting and moving... SNR sensors keep pace with this movement. They provide them with the optimum readings they need for safety, comfort and an unrivalled driving experience.

Tomorrow's vehicles will be autonomous, communicating and even safer. Our expertise in mechatronics, built up over more than 30 years, captures the most precise point between the road and your emotions.



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