WHEEL SPEED SENSORS

#SECURITYINSIDE

NTN SNR

With You

HISTORY

CREATOR of the instrumented wheel bearing, NTN-SNR developed a new technology for series production and launched it on the market in 1997: ASB® (**Active Sensor Bearing**).

That technology makes it possible to replace so-called passive technology with "active" technology, comprising an active sensor and a seal with an integrated magnetic encoder. The latter features a series of very precise north and south poles that send a digital signal corresponding to the rotary speed of the wheel. The vehicle's on-board computers need that information to operate systems such as ABS, ESC, hill-start assist, etc.

This solution offers a number of benefits, including:

- Signal detection at low speed (down to zero)
- Integration of the magnetic ring with the bearing seal: system miniaturisation
- Reduced number of parts: simplified wheel installation
- More precise data acquisition
- Standardisation of components

Building on the strength of that experience, and with the aim of providing an ever increasing range of services, today NTN-SNR offers a full line of wheel speed sensors.

SENSOR MARKET

The wheel speed sensor market is booming. More than 90% of vehicles on the road today are equipped with wheel speed sensors. A vehicle has from two to four such sensors – in most cases fitted opposite the bearing. All third-generation type wheel bearings are equipped with this technology, which requires the presence of 4 sensors per vehicle.

Other factors having an impact on the market include:

- Electronic stability control (ESC), which has been mandatory in the USA since September 2011 and in the member states of the EU since the end of 2014.
- Strong growth of ABS and ESC systems in developed countries over the past ten years.
- Similar growth currently found in emerging markets such as China, India and Brazil.
- The demand for ABS systems, which was **45.7 million** units in **2009 has reached 100 million** in **2017**.

WHAT DOES A WHEEL SPEED SENSOR DO?

A speed sensor plays an essential role in the operation of many on-board systems. The sensor measures the speed of the wheel on the magnetic encoder seal or on the toothed wheel located on the bearing.

On recent vehicles, wheel speed sensors transmit speed data to many other systems which control vehicle dynamics along with a wide range of ancillary functions.

WARNING!

LOSS OF THE ASB® SIGNAL MAY HAVE SERIOUS CONSEQUENCES

The ASB fault light will illuminate on the dashboard: the ABS system is switched off.

ABS

Helps prevent the wheels from locking up during sudden emergency braking, and reduces stopping distance while maintaining controlled steering response.

NAVIGATION

Even inside a tunnel, without a satellite signal, the ASB® makes it possible to calculate your position on the map.

ESC

Enables the vehicle to maintain its controlled path if the tyres lose road traction.

HILL-START ASSISTE

Prevents the vehicle from rolling backward when starting out on an incline.

ASR

Traction control system to regulate acceleration in order to prevent the drive wheels from slipping and losing road contact.

ACC

Enables a vehicle operating under cruise control to maintain a safe distance from the vehicle ahead of it.

SPEED

Enables the computer to interpret and display the exact speed of the vehicle.

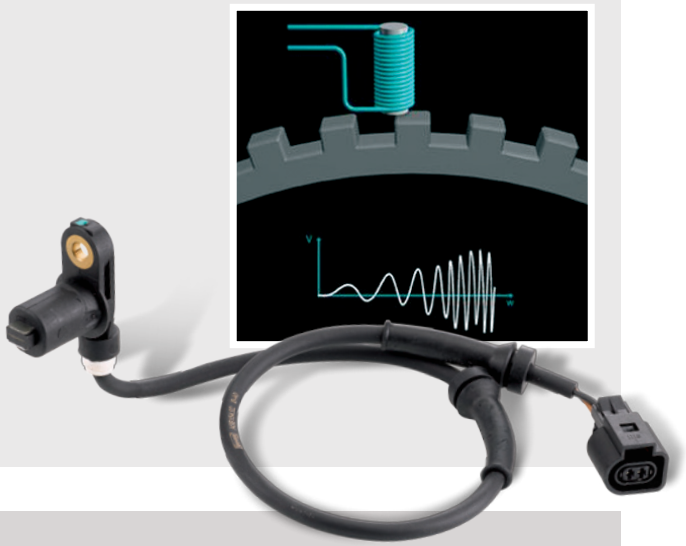
PARK ASSIST

Enables the vehicle to park itself automatically without the driver having to turn the steering wheel.

AVAILABLE TECHNOLOGIES

PASSIVE SENSORS

A toothed wheel is mounted on the wheel bearing.
The sensor consists of a coil, which is wound around a magnetic core and a permanent magnet. When rotating, the teeth of the wheel generate a magnetic field, the frequency of which gives the speed of rotation of the wheel. This technology cannot detect very low speeds, nor can it recognise the direction of rotation of the wheel. Passive sensors are used only opposite toothed wheels.



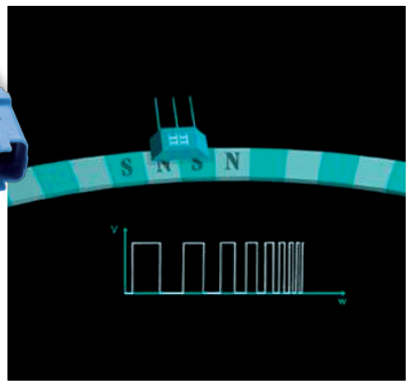
ACTIVE SENSORS

The main advantage of an active system is that it delivers a signal with constant amplitude, even at low speed or zero speed. This enables greater precision in the use of the rotary speed signal and improves the function of all systems associated with that signal.
Active sensors are mainly used opposite a magnetic encoder (located on the wheel bearing): ASB® technology. Some active sensors are also used with a toothed wheel.

There are three different types of active sensors:

- **ACTIVE HALL EFFECT SENSOR:**
  The sensor comprises a semi-conductor coupled with an electronic circuit. It produces an alternating current. The electronic part of the sensor converts the analogue signal of the current to a digital signal.

NORTH AND SOUTH POLES



- **ACTIVE HALL EFFECT SENSOR IN COMBINATION WITH A MAGNETIC ENCODER SEAL ON THE WHEEL BEARING:**
  the magnetic field is generated by the north and south poles of the magnetic encoder seal as they pass in front of the sensor. The toothed wheel is replaced by a magnetic encoder.

- **ACTIVE MAGNETO-RESISTIVE SENSORS:**
  This technology makes it possible to detect the signal in complex arrangements where the sensor is located at a greater distance from the encoder seal.

WHEN TO REPLACE THE WHEEL SPEED SENSOR?

When the sensor requires replacement, an ABS indicator light appears on the dashboard. The driver can also feel the effects on the brake pedal caused by the false triggering of the ABS.

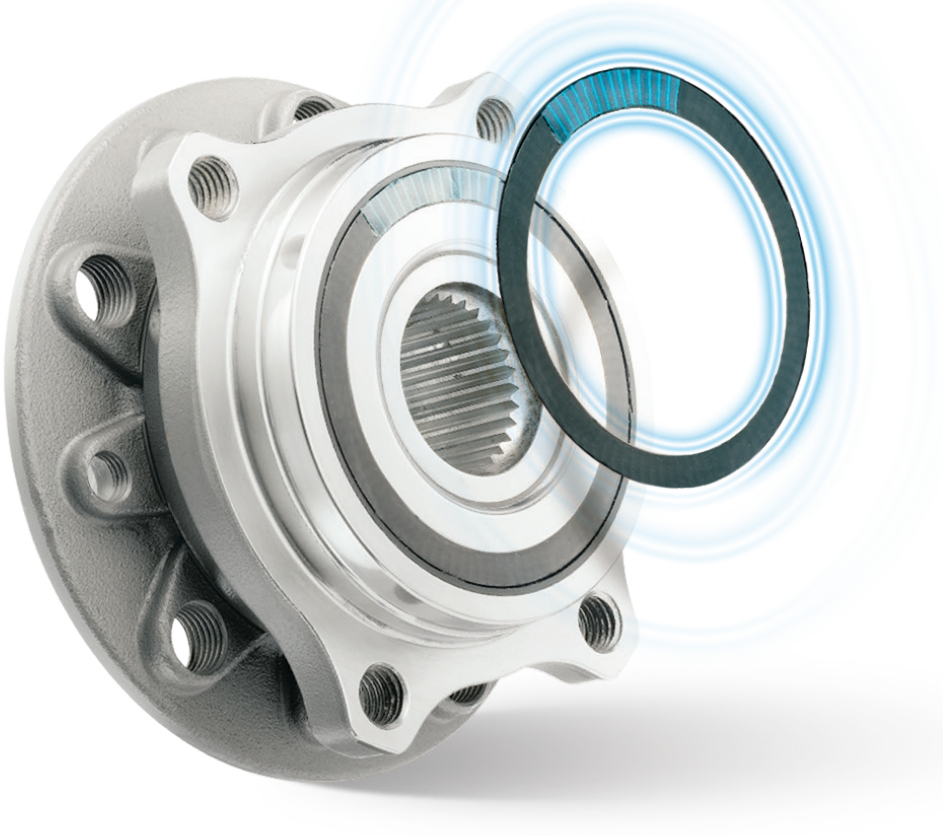
The sensor is the source of the problem in around 80% of all ABS system faults.

WHY DO SPEED SENSOR FAIL?

The wheel speed sensor is not a wearing part; however a failure can immobilize the vehicle. As part of security it is essential to be able to supply a quality part and in the shortest time.

The location of the sensors leaves them very exposed to extremely harsh conditions. NTN-SNR products are tested and have been proven able to withstand all types of aggressive environments.

There are many possible causes of wheel speed sensor failure.



EXTERNAL	INTERNAL
Fouling of the sensor	Defective coil
Cut-off of the beam	Loose connection at the connection level
Impact (e.g. road debris) on the sensor or the sensor holder	Defective integrated circuit
Water penetration Damage during installation/removal	

WARNING!

A WHEEL SPEED SENSOR IS A SENSITIVE COMPONENT
Handle it with care, because it is subject to damage during bearing replacement.

SPEED SENSOR IS A SAFETY COMPONENT
A defective ASB® signal will deliver the wrong information, where

- Unintentional triggering of the ABS can disrupt the behaviour of the vehicle;
- The computer can misinterpret the speed of each wheel: the ESP system can no longer guarantee control over the trajectory;
- The speed is displayed incorrectly and there is a consequent risk of unintended and dangerous exceeding of the speed limit;

For optimum wheel speed sensor operation, the magnetic target of the bearing must be in good working order.

THE NTN-SNR PRODUCT RANGE

NTN-SNR offers a full line of wheel speed sensors combining all of the technologies available on the market.

Our wheel speed sensor range includes nearly 300 product numbers. 65% of those product numbers relate to active sensors and 35% relate to passive sensors, thereby covering the full spectrum of technologies on the market. Our range serves more than 7,000 vehicle applications.

WHY IS AN NTN-SNR SENSOR THE RIGHT CHOICE?

Their position as wheel bearing specialists enabled NTN-SNR to develop ASB® technology in collaboration with vehicle manufacturers.

CREATOR of ASB®, **NTN-SNR** chose to license the ASB® technology to other suppliers, which made it possible for this system to establish itself as a **GLOBAL STANDARD**.

It was therefore logical that we should extend our offer by providing our customers with the component that linked our core business in wheel bearings with our expertise in ASB® technology – the sensor itself.

NTN-SNR QUALITY

NTN-SNR sensors are 100% tested and quality controlled on the production line. This enables us to guarantee complete reliability of our products.

- Thermal resistance test from -40 to +150°C
- Leak-tightness test
- Vibration test
- Mechanical strength test

NTN-SNR IS:

- The CREATOR of ASB® technology
- This means technical expertise in the design and manufacture of ASB® bearings
- 100% quality control on the production lines
- Extensive testing of all products
- **The first bearing manufacturer to launch its own range of sensors**, thereby creating the direct link between sensor and wheel bearing kit, in order to facilitate product identification in a dedicated catalogue

#SECURITYINSIDE

NTN-SNR PROVIDES ITS CUSTOMERS WITH ALL POTENTIALLY USEFUL TECHNICAL INFORMATION:

a sensor catalogue

Dedicated to sensors with a link to the wheel bearing kit

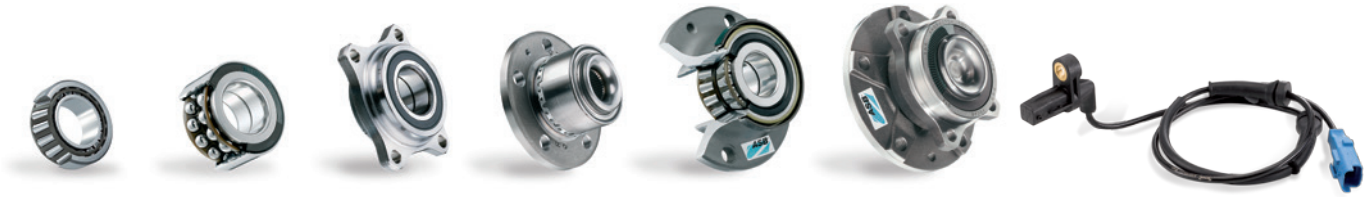
TechInfo

Product installation/removal recommendations based on the expertise and know-how of our technicians

TechScaN'R

Technical data via IOS & Android smartphone application (free download, 3D photos, direct scan of the part number on the box or in the catalogue).

FOR YOUR SAFETY AND THE SAFETY OF YOUR CUSTOMERS, CHOOSE NTN-SNR QUALITY AND EXPERTISE



WHEEL RANGE

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