Noris Group

Solutions for transport technology

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Solutions for transport technology

The distinguishing features of Noris

Your project in the best hands

Sensor technology from Nuremberg - used worldwide.

For more than 25 years, customers worldwide have been using our application-specific sensors on their rail vehicles. In addition to well-known global companies such as Siemens and Skoda, our customers also include component rail vehicle manufacturers from all over the world.

Whether railcars for high-speed trains, locomotives, trams or underground trains - every application has its own requirements and challenges and we have the right solution to them. All things considered, the figures speak for themselves:

- more than 34,000 sensors per year, 25,000 of which for the rail sector
- more than 100 individual projects with well-known customers in recent years

Whether it's a matter of measuring and monitoring speed, temperature or other important measured variables: we develop and manufacture your sensor solution in accordance with your wishes and requirements at our location in Nuremberg - as a one-off product or in series production.

Trust in our experience as an expert in the field of measuring technology.

SIEMENS

ŠKODA

TSA TRAKTIONSSYSTEME AUSTRIA

ZF

Arrive safely with Noris –

Our sensors in your application

2. Bearing monitoring

Temperature sensors TA14, TA17, TA18

Monitoring the bearing temperatures of various drive components, such as hot runner monitoring of the wheel set bearings or the bearing temperature of the gearboxes.

3. Anti-slip protection and brake management

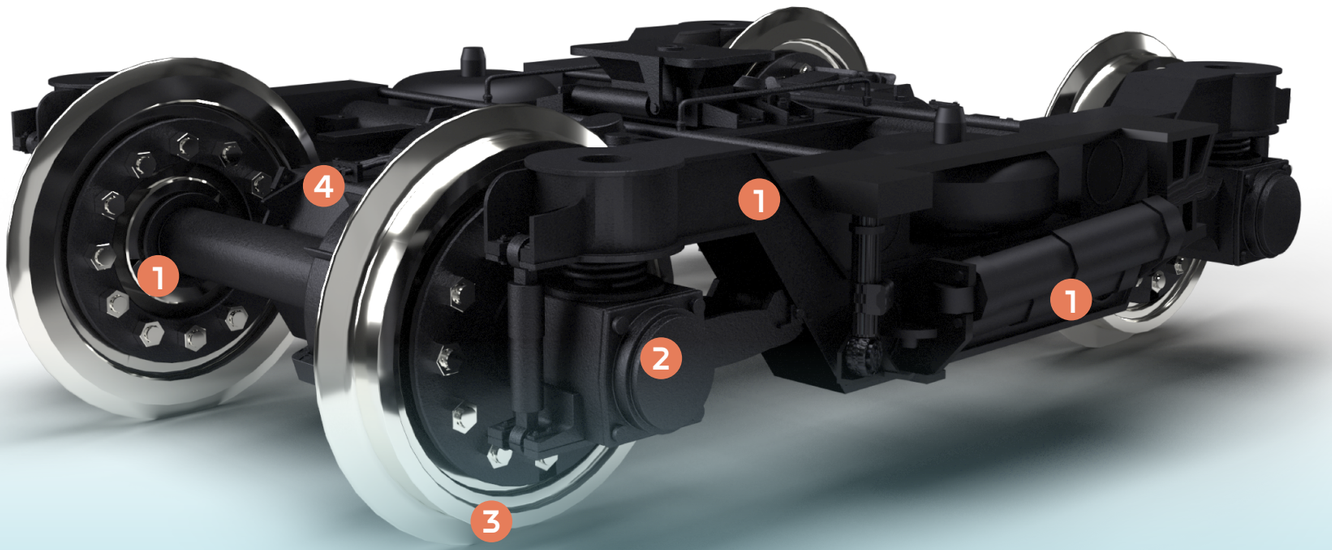
Anti-slip sensor FAHI52

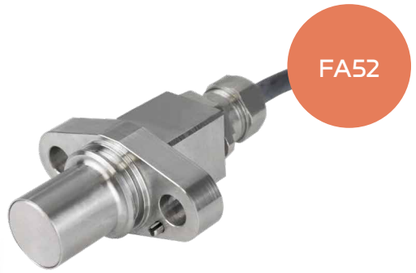
Anti-slip sensors control brake slip and prevent the wheels from sliding on the rails. They measure abrupt changes in speed. The braking force can thus be regulated accordingly.

1. Bogie monitoring

Speed sensor FA5 and FA52, multi sensor KA, temperature sensors TA14, TA17, TA18, axle pulse generator, acceleration sensor BAM

The bogie is subject to extreme loads due to the weight of the railcar and the forces generated during acceleration, travel and braking. Therefore, in bogie monitoring, the velocity, speed and rotational direction of the traction motor, storage temperatures and vibration of the wheel sets are monitored to ensure safe travel.





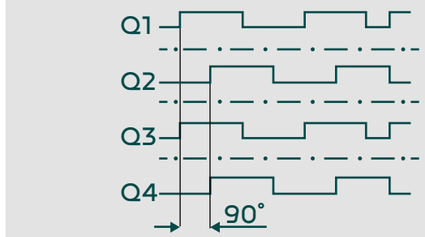
4. Traction control

Speed sensor FA52 , axle sensor, acceleration sensor

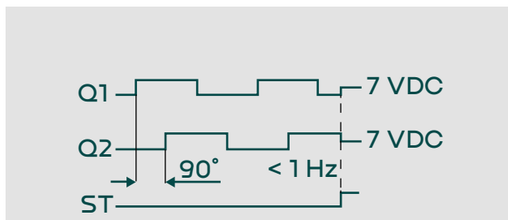
Adverse weather conditions, such as rain, ice and snow, are a challenge for rail vehicles. They influence traction and braking forces. Our sensors are used for traction control because accurate, high-resolution measurements are essential here.

Speed sensors –

Precise measurement results in harsh environments



Example: four galvanically isolated square wave signals with 90° phase shift



Example: two square wave signals with 90° phase shift and a standstill signal 7 VDC

Flexible number of channels

Suitable for your processing unit

Our sensors are available as 1-channel, 2-channel, 3-channel or 4-channel sensors, optionally with galvanic isolation of the individual channels and, depending on requirements and customer wishes, as interference-free and robust current and/or voltage signals.

Diversity of output signals

For detecting rotational direction and standstill

The output signals are available with voltage or current output. As a result, additional status signals, e.g., for detecting standstill, are possible. With output signals that are phase-shifted in relation to each other, the rotational direction can be detected as well as the speed. A wide range of applications can therefore be realised.

Your benefits at a glance

- Compact design and simple assembly
  Robust and long-lasting thanks to special casting technology for the electronics
- Insensitive to electrical interference fields
- In comparison to other manufacturers, insensitive to ferromagnetic contamination
- With cable protection for extremely harsh environments
- Also available as a sensor assembly with several speed and/or temperature sensors

Cost efficiency or expanded functionality

- Type FA5 speed sensor: Cost effective and precise for basic requirements
- Type FA52 speed sensor: For more extensive controls with expanded functionality, such as with up to 4 galvanically isolated signals or 7 V medium voltage and standstill signal.

More information about our models can be found on our website.

Frequency multiplication for high-resolution measurement signals

FAM series speed sensors can detect frequencies from 0 to 30,000 Hz. In the case of ferromagnetic scan objects, the output circuit can multiply the detected frequency by a factor of up to 4; when used with a magnetic pole wheel by up to a factor of 8 or more. As a result, extremely accurate measurements for precise applications are possible.

Explosion and fire protection in rail applications

Our sensors satisfy the fire protection requirements in rail vehicles according to EN 45545-2. Upon request, we certify our sensors according to the ATEX directive for applications in areas at risk of explosions.

An overview of selected features of our speed sensor types

Technical data	FAH	FAHU	FAM
Measuring principle	Magnetic	Magnetic	Magnetic
Max. measuring channels	2 + Status signal	4	2
Scan object material	Ferromagnetic	Ferromagnetic	Ferromagnetic
Galvanic isolation (option)	Yes	Yes	No
Number of square wave signals	2 ... 4	4	2 ... 4
Module size (standard)	m1 ... m3	m1 ... m3	m1 ... m2
Frequency range (input)	0 ... 25 kHz	0 ... 25 kHz	0 ... 30 kHz
Rotational direction detection	Yes	Yes	No
Housing material	Stainless steel	Stainless steel	Stainless steel, measuring surface aluminium

Temperature sensors –

Customised for your application

Mechanical designs, wide variety

The right mechanical design for every application

Flange designs are often used in transport technology. However, every application is different and an “off the peg” sensor is very rarely suitable. Customised adaptations are our day-to-day business. Our modular systems are designed for this:

- Adjustable sensor tube length (immersion depth)
- Flange designs with straight, 45° or 90° angled cable outlet
- Rotating sensor head and cable connection with rotation stop (option) to minimise torsion stress. This ensures flexibility when laying connector cables.
- Freely selectable connector plug
- Designs developed for your application

Sensor with straight cable outlet

Sensor with 45° cable outlet

Robust measuring elements for rough environments

High measuring accuracy and reliability

Our type TA temperature sensors are usually used in rail applications with Pt100 or Pt1000 measuring elements in accordance with EN 60571. Depending on the application and requirements of the accuracy class, the sensors can be structured in a two, three or four-wire version.

Sensor with 90° cable outlet

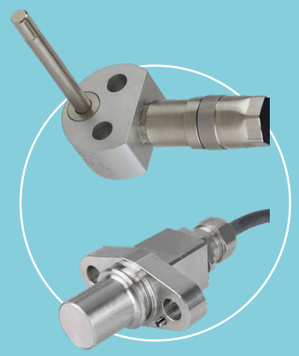
Sensor assemblies –

Optimised for use in the underfloor sector

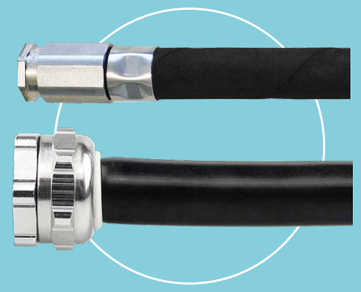
Sensors, design, cable protection and connection selectable

Combine your own individual cable harness here

Customer-specific sensor assembly



various sensors or designs



various connector cables

various connector versions

Protection against stone and rock impacts and high temperatures in extreme environments

Over many years, we have gathered experience with our sensors in various application environments. We have perfected cable protection in the process:

- A sensor without cable protection may be sufficient for applications under normal environmental conditions (without rock impacts or other mechanical force.
- A corrugated tube made of polyamide provides protection against mechanical impacts.
- We ensure maximum protection with rubber protective tubing with textile fibre reinforcement. This is long-lasting, flexible and resistant to mechanical impacts.

When things hot up – sensors for higher temperature ranges

Our Pt100/Pt1000 measuring elements are used for measurements in the temperature range from -40 to 250 °C. We offer sensors with different measuring elements for applications with higher temperature ranges.

Your benefits at a glance

- Wide standard temperature measuring range from -40 to 250 °C
- Customer-specific connector plug
  Adaptable designs, e.g., flange with straight or angled cable outlet
- With various cable protection versions to protect against heat, stone and ice impacts

Axle pulse generator –

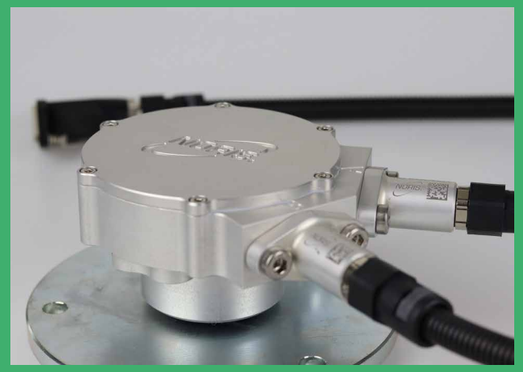
Speed measurement for anti-slip protection and skid control

Maintenance-free, compact, and robust design

Also suitable for refit projects

For detecting the speed of a wheel set, axle pulse generators are commonly used. Our pulse generator type NA56 uses two speed sensors which provide independent output signals for various applications, such as speed detection, comfort protection, or event recording and odometry.

The system is particularly robust due to the combination of optimised bearing and mechanical structure, providing a clear and interference-free output signal even under strong vibrations. Inside the housing, a toothed wheel is installed as standard or, as an option a magnetic pole wheel, which is connected to the axis of the wheel set. This makes the system impervious to external influences or contamination.



Number of measuring channels and output signals can be configured

Outstanding EMC properties

Depending on the speed sensor types used, different output signals are available.

- For measuring very low frequencies and output of a standstill signal
- For high temperature stability and repeat accuracy
- Design and connection variable due to modular system

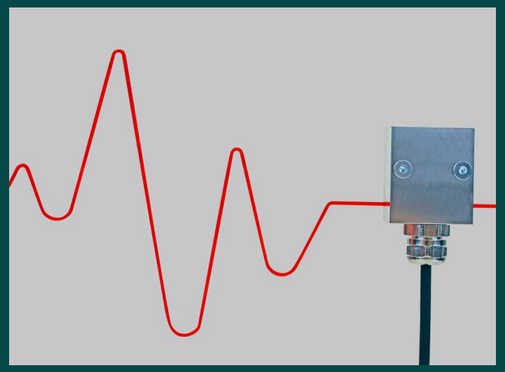
Axle pulse generator

Your benefits at a glance

- Robust, compact and maintenance-free design
- Diversity of output signals
- Measurement range from 0 - 25,000 Hz
- With frequency multiplication for precise control as option
- Simple adaptation of the mounting flange and the insert shaft for various applications (retrofit)

Acceleration sensors –

With high measuring accuracy



very low noise

Acceleration sensors as fixed part of condition monitoring

Perfect for predictive maintenance

Among other things, acceleration sensors are used to monitor running stability and the condition of the bogie in rail vehicles. During travel, they detect accelerations (vibrations) and irregularities in wheel-rail contact. In addition to safe operation and detecting wear, maintenance cycles can also be planned more efficiently.

For demanding applications

On the wheel set bearings to monitor the bogie condition and for derailment detection.

Due to the compact stainless steel design the acceleration sensor type BAM is very robust and long-lasting. It can be easily adapted to customer requirements. Its most important properties include:

- Measuring very low frequencies by means of a capacitive MEMS sensor
- High temperature stability and repeat accuracy
- Design and connection variable due to modular system
- Also available as a multiple sensor with speed and/or temperature recording (cf. page 20)

Acceleration sensor

Your benefits at a glance

- Measuring up to three axles
- High measuring accuracy due to very low noise
- Large measuring range + / - 50 g or + / - 100 g
- Large frequency range from 1 - 20,000 Hz

Multi sensors –

for combined measurements

One sensor for many applications

Combination of up to three sensors in one housing

The type KA multiple sensor combines several sensors in one housing and is particularly suited to vibration measurement to detect wear processes.
In addition to the acceleration sensor, a temperature and/or speed sensor can be integrated in the multiple sensor. As a result, the sensor can also be used to renew old systems (retrofit) where only one measuring point is provided (e.g., for speed).

One sensor, many designs

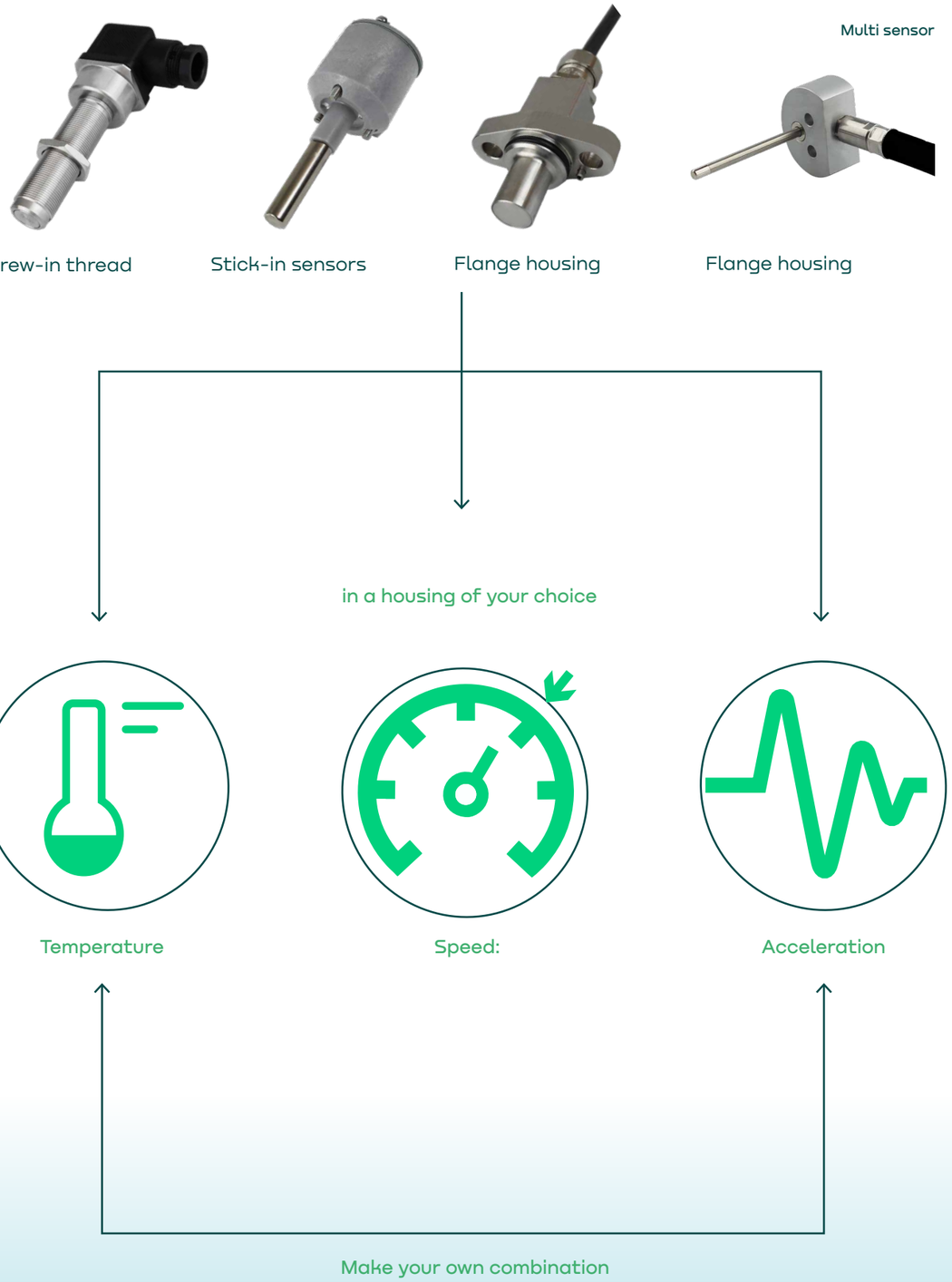
Space-saving design and mechanically compatible with Noris standard design

The different design and connection versions from which you can choose the right model for your application are another advantage:

- Flange housing or stick-in sensor
- Screw-in sensor with external thread
- Customer-specific connector cable with open cable end or a connector cable of your choice. Upon request, with cable protection for use under extreme ambient conditions

Your benefits at a glance

- Any measuring combination of acceleration, speed and/or temperature in a single housing
- Space-saving design
- Mechanically compatible with Noris standard designs (threaded and flange sensors).
- Easy to assemble and service: minimal installation, wiring and maintenance work



Analogue indicators –

for visualisation in the driver's cab

Advantages of analogue indicators

That's why railways companies use analogue clocks

Analogue indicators are used where a low-cost solution is needed to visualise speed, temperature, braking force, etc. In comparison to digital displays, they offer intuitive legibility and thus clear advantages:

- Clear display of measured values from every angle and at all times of day and night.
- Quick detection whether measured values are in the "green zone".
- Fast trend recognition
- Robustness, durability and high availability

Indicator with stepper motor or simple moving-coil instruments

Our indicators can do much more than just display

Analogue indicators with moving-coil instruments are cost-efficient and are suitable for simple applications where no additional functions are needed. They directly process the standard voltage or current input signals.

noriMeter type analogue indicators are fitted with a microprocessor-controlled, high-resolution stepper motor. Thanks to their electronics, they can be fitted with additional useful functions.

- Alarm function is measured values are exceeded
- Alarm LED and flashing display
- Control function for sensor or auxiliary energy failure (live zero function)
- Min-max display function to save and display the highest or lowest measured value and much more

Your benefits at a glance

- Round or square housing in various sizes
- Individual scale design
- For all standard analogue industrial standard, frequency and temperature signals

Quality and green transformation

High-quality products from Germany used all over the world

First class products thanks to excellent processes

The standards that we follow, e.g., DIN EN 50155 for rail applications, are in the interests of quality assurance and safety, among other things. They establish clarity about the properties of our products.

We have introduced processes, including those according to ISO/TS 22163, to ensure and continuously improve quality and reliability.

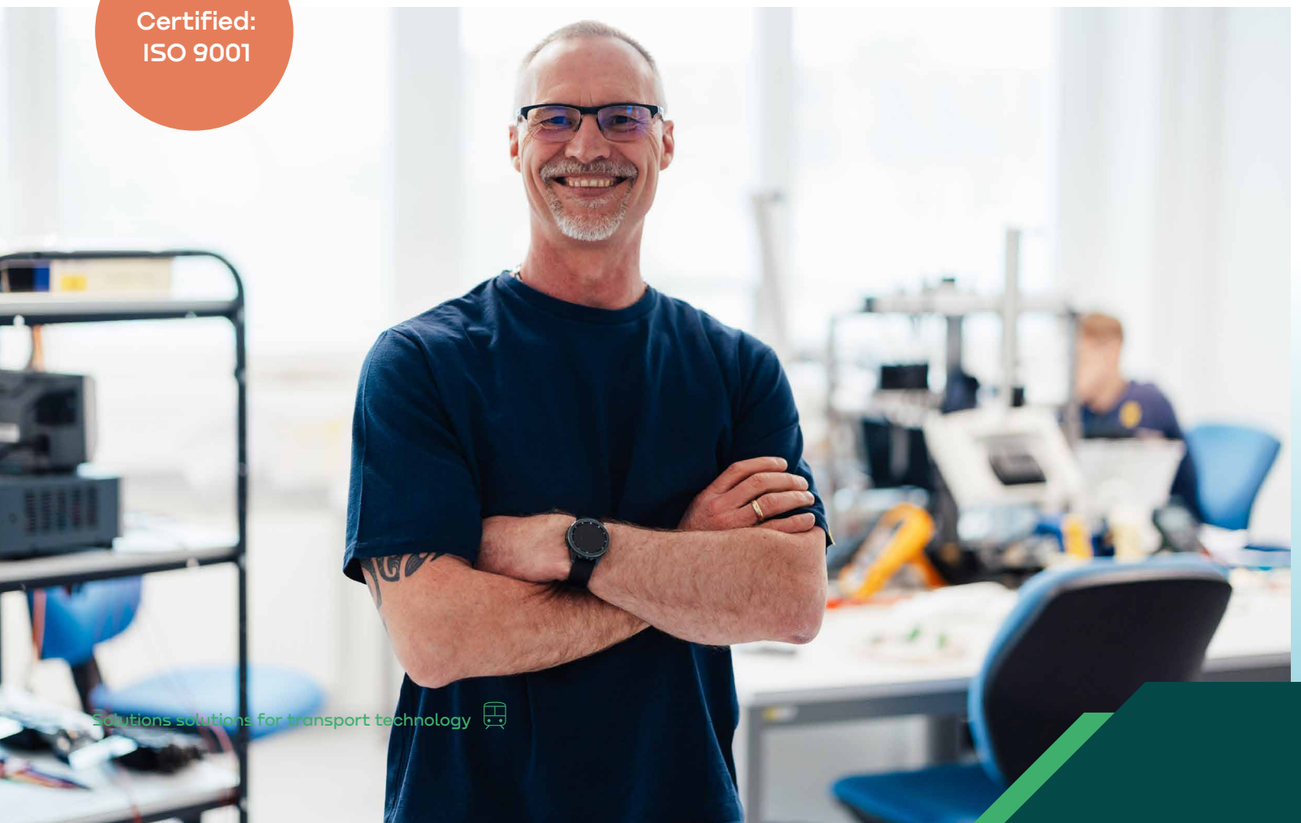
Trained expert staff and great testing depth

A great advantage for you as our customer lies in the great testing depth that we offer you. In our internal manufacturing, interim testing stages outside the requirements of the standards are a matter of course. We have invested in automated testing stations to make the manufacturing process more efficient.

All inspections and tests are carried out by specially trained skilled staff to ensure the highest possible quality of our products.

Even customer-specific special testing requests are possible with us and, if required, can be seamlessly integrated in the manufacturing process.

Certified:
ISO 9001



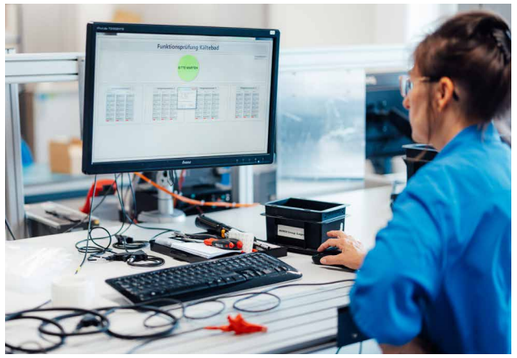
As a supplier, we will support you in the green transformation

Sustainable management means constantly weighing up economic, ecological and social concerns against each other and harmonising them.

As a company, we are aware of our responsibility and involve our employees, partners and suppliers in this process.

Producing quality: Our sensors are manufactured under strict quality controls to ensure that they comply with the highest standards. Our processes are certified for this according to standards, such as ISO 9001 and, imminently, ISO/TS 22163.

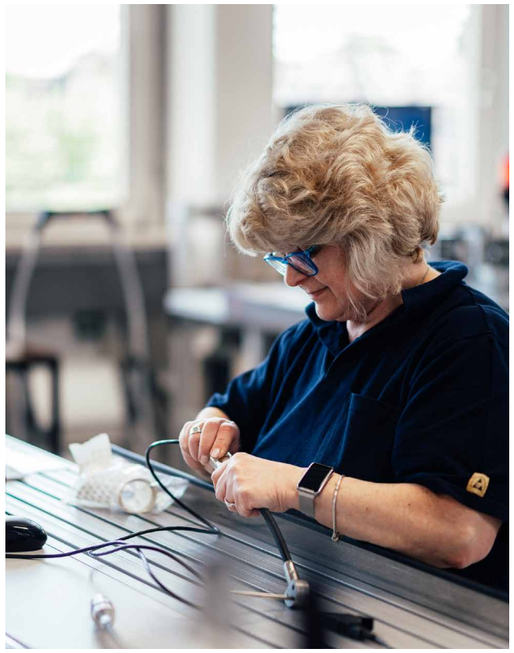
Reducing rejects: Thanks to the continuous improvement of our productions processes and training of our staff, we are reducing rejects to a minimum. This leads to a more efficient use of resources and helps us to minimise our environmental impact.



Protecting resources: We rely on sustainable production methods and materials. This includes minimising our energy consumption and using recycled or recyclable materials wherever possible. We continuously test and expand our product portfolio in this regard.

Switching to renewable energies: In the field of renewable energies, we generate some of the energy we need ourselves in the form of solar energy and store it in energy storage systems for our own use.

A focus on ecology: Since 2016 we have been continuously working on minimising our ecological footprint along our products' life cycles:



- when developing new products, we consider sustainability, environmental compatibility and safety.
- Our aim is to have at least 90% net zero manufacture at our biggest location in Nuremberg by 2028.
- Looking towards our goal of net zero production, we are increasingly relying on the use of renewable energies and investment in modern technologies.

Certified: ISO 14001

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