

Noris Automation

Solutions for transport technology

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The distinguishing features of Noris

Your project in good hands

Nuremberg sensor technology 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 Škoda, our customers also include rail vehicle component manufacturers from all over the world.

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

- Over 47,000 sensors per year for various industries
- More than 32,000 sensors for the rail sector

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

SIEMENS

ŠKODA

TSA TRAKTIONSSYSTEME AUSTRIA

ZF



Arrive safely with Noris

Our sensors in your applications



2. Bearing monitoring

Temperature sensors TA14, TA17, TA18

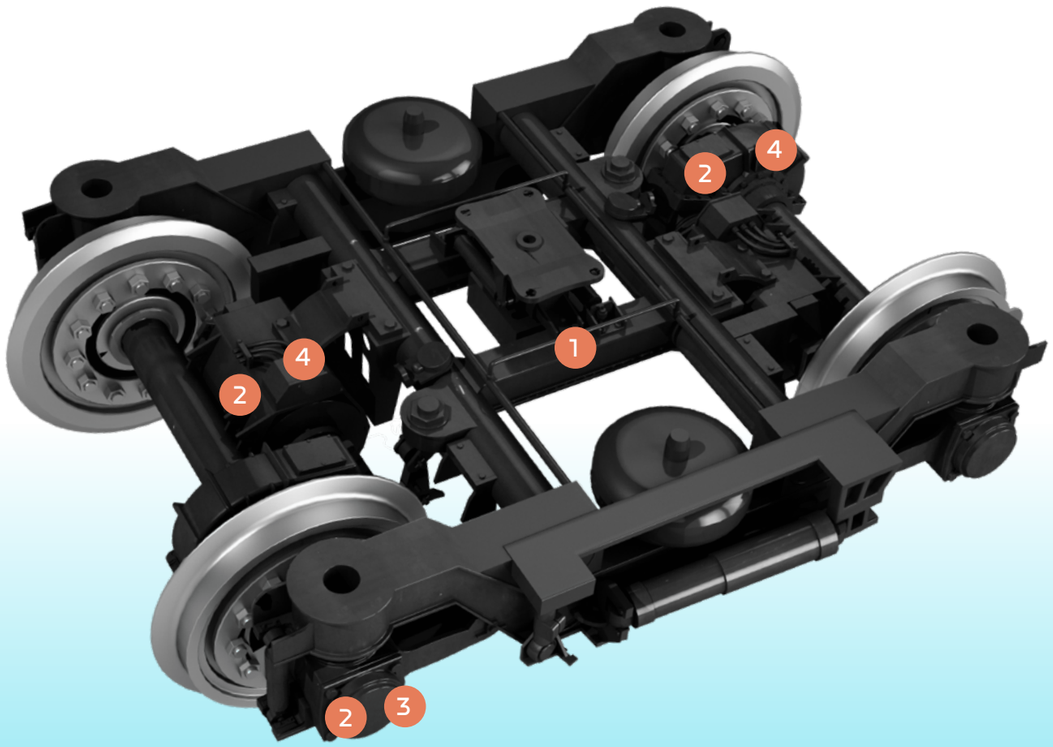
Our temperature sensors monitor various drive components, such as axle bearings for hot box detection as well as gearbox bearing temperatures.



1. Bogie monitoring

Speed sensors FA5 and FA52, multi sensor KA, temperature sensors TA14, TA17, TA18, axle pulse generators NA56, acceleration sensor BAM53

The bogie is subject to extreme mechanical stress due to the weight of the railcar and the forces generated during acceleration, travel and braking. Therefore, bogie monitoring involves measuring the speed and direction of rotation of the traction motor, bearing temperatures and wheelset vibrations to ensure safe travel.





3. Wheel slide protection and brake management

Wheel slide protection sensors FAHI52, FAHU52

Wheel slide protection sensors measure brake slide to prevent wheels from locking on the rails. They detect abrupt changes in speed, allowing the braking force to be regulated accordingly.



4. Traction control

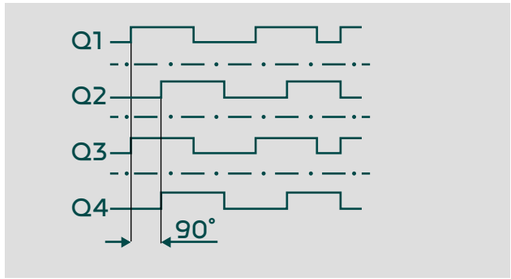
Speed sensors FA5 and FA52, axle pulse generators NA56, acceleration sensor BAM53

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

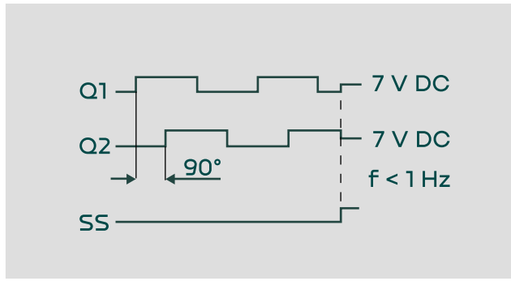
Speed sensors

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 with 7 V DC

Flexible number of channels

Suitable for your processing unit

Our speed sensors are available as 1-channel, 2-channel, 3-channel or 4-channel sensors, optionally with galvanic isolation of the individual channels.

Diversity of output signals

Direction and standstill detection

The sensor provides either voltage or current output signals. This allows for additional status signals, such as standstill detection. By using phase-shifted output signals, both rotational direction and speed can be determined, enabling a wide range of applications.

Your benefits at a glance

- Compact design and simple assembly, robust and long-lasting thanks to proprietary potting technology for the electronics
- Resistant to electromagnetic interference
- Highly resistant to ferromagnetic contamination compared to other manufacturers
- With optional cable protection for extremely harsh environments
- Also available as a sensor assembly with multiple speed and/or temperature sensors

Cost efficiency and expanded functionality

- Type FA52 speed sensor: for more complex control systems with enhanced functionality such as up to 4 galvanically isolated signals or a 7 V DC status level and standstill signal.
- Type FA5 speed sensor: cost-effective and precise for basic requirements.

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

Pulse multiplication for high-resolution measurement signals

FAM series speed sensors can detect frequencies from 0 to 30,000 Hz. For ferromagnetic scan objects, the output circuit can multiply the signal frequency by a factor of up to four, and by a factor of eight or more when used with a magnetic pole wheel. This enables extremely accurate measurements for precision applications.

Explosion and fire protection in rail applications

Our sensors meet the fire protection requirements for rail vehicles according to EN 45545-2. Upon request, we certify our sensors according to the ATEX directive for applications in potentially explosive atmospheres.

An overview of selected features of our speed sensor types

Technical data	FAH	FAHU	FAM
Measuring principle	Magnetic	Magnetic	Magnetic
Max. number of 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
Pulse multiplication	No	No	Yes
Housing material	Stainless steel	Stainless steel	Stainless steel, measuring surface: aluminium



Temperature sensors and sensor assemblies

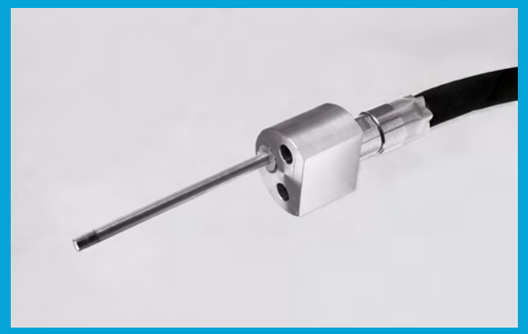
Customised for your application

Versatile designs and options

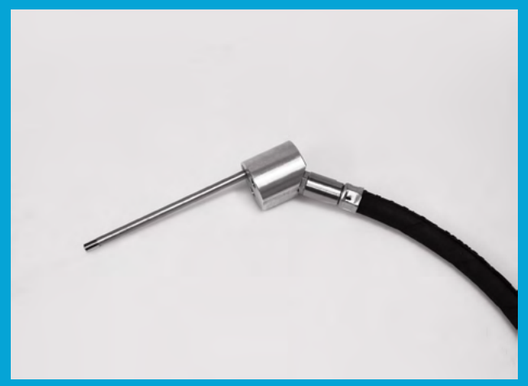
The right mechanical design for any application

Flange designs are often used in transport technology. However, every application is different and an “off-the-shelf” sensor is very rarely suitable. Bespoke adaptations are our core business:

- Adjustable sensor tube length (immersion depth)
- Flange designs with straight, 45° or 90° angled connection outlet
- Rotatable sensor head and connection outlet with rotation stop (optional) to minimise torsional stress. This ensures flexibility when routing cables
- Customisable connector plugs
- Designs developed for your application



Sensor with straight connection outlet



Sensor with 45° connection outlet

Robust measuring elements for harsh environments

High-precision measurement and reliability

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



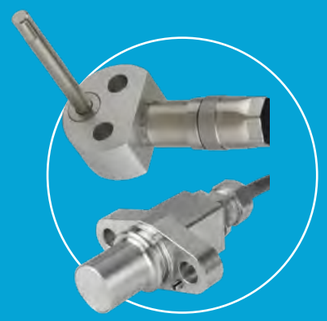
Sensor with 90° connection outlet

Sensors, design, cable protection and connection selectable

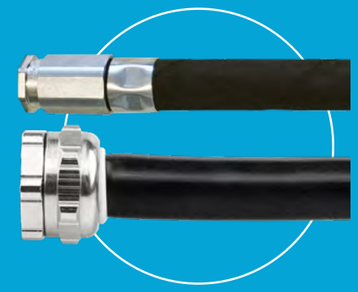
Customisable combination

Customer-specific sensor assembly





Various sensors and designs



Various connector cables



Various connector versions

Protection against ballast, ice impact and high temperatures in extreme environments

Over many years, we have gathered experience with our sensors in a wide range of operating environments. We have continuously refined our cable protection:

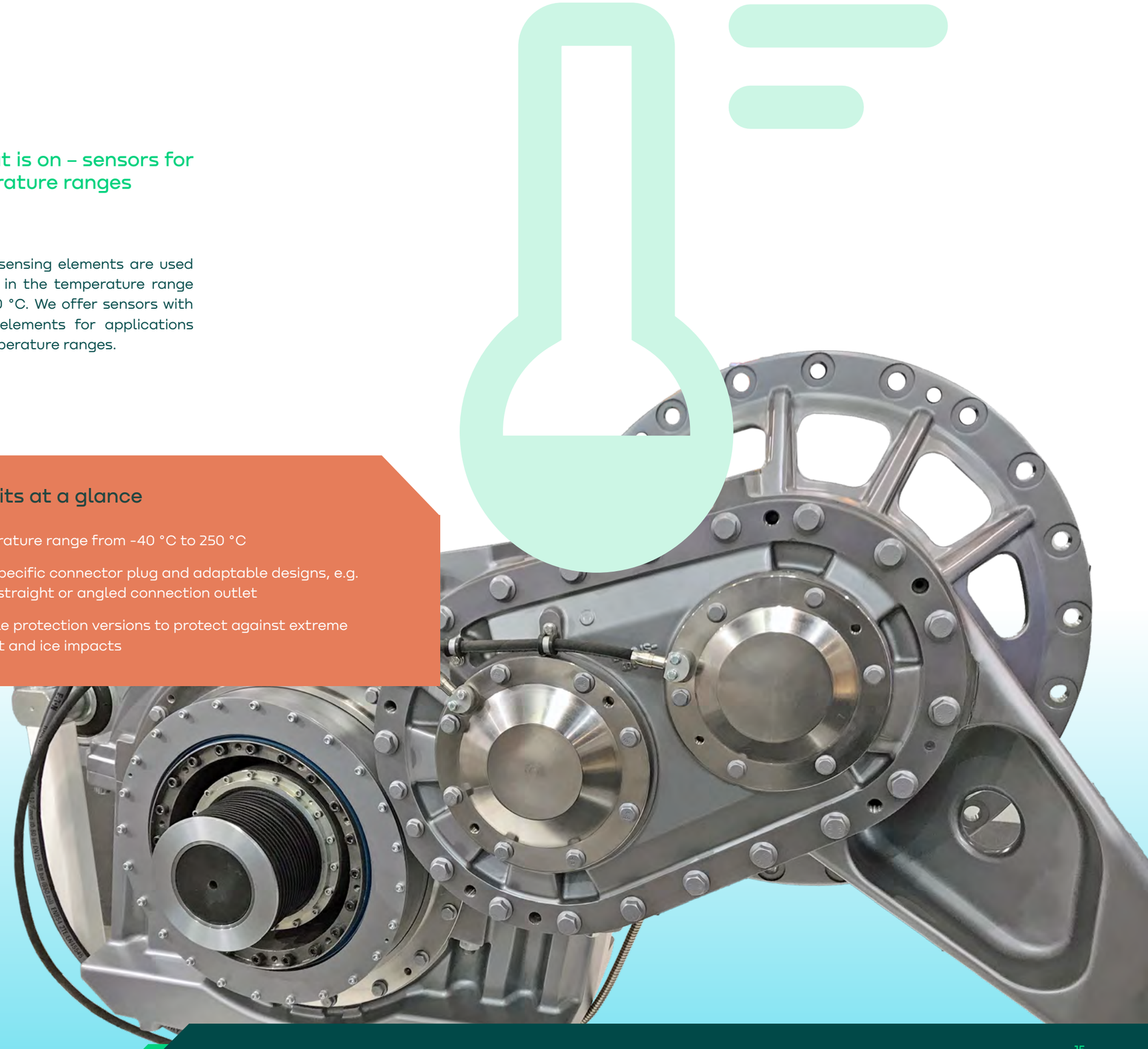
- A sensor without cable protection may be sufficient for applications in normal environmental conditions (without impact from ballast, ice or other mechanical force).
- Polyamide corrugated tubing offers protection against moderate mechanical impact.
- We ensure maximum protection with rubber protective tubing with textile-fibre reinforcement. This is long-lasting, flexible and resistant to mechanical impacts.

When the heat is on – sensors for higher temperature ranges

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

Your benefits at a glance

- Wide temperature range from -40 °C to 250 °C
- Customer-specific connector plug and adaptable designs, e.g. flange with straight or angled connection outlet
- Various cable protection versions to protect against extreme heat, ballast and ice impacts



Axle pulse generators

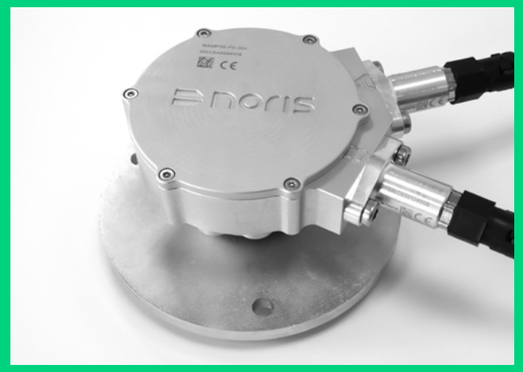
For wheel slide protection



Maintenance-free, compact, and robust design

Also suitable for retrofit projects

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



The system is particularly robust due to the combination of optimised bearing arrangement 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 axle of the wheelset. This makes the system impervious to external influences or contamination.



Configurable channels and output signals

Outstanding EMC characteristics

A range of output signals is available, depending on the speed sensor type.

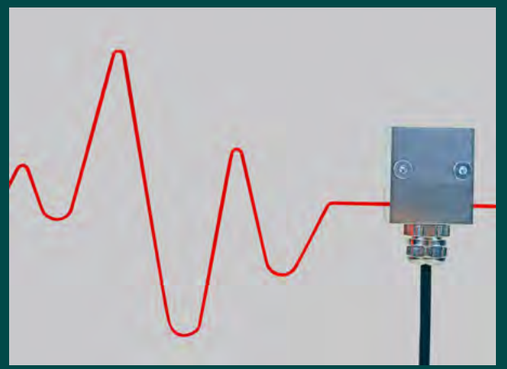
- Measurement of very low frequencies and standstill signal output
- High temperature stability and repeat accuracy
- Versatile design and connection options due to a modular system

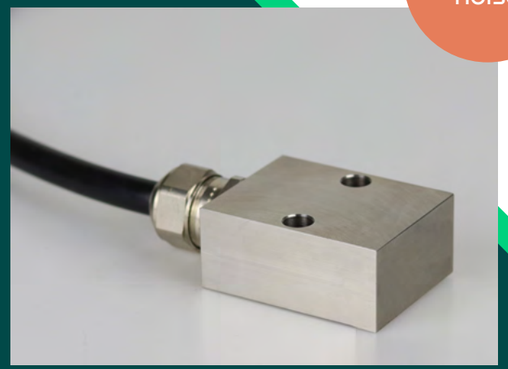
Your benefits at a glance

- Robust, compact, and maintenance-free design
- Wide range of output signals
- Measurement range from 0 Hz to 25,000 Hz
- Optional pulse multiplication for precision controls
- Simple adaptation of the mounting flange and drive shaft for various applications (retrofit)

Acceleration sensors

Ultra-low noise and high measuring accuracy





Ultra-low noise

An integral part of condition monitoring

Perfect for predictive maintenance

Acceleration sensors are used to monitor operational stability and bogie condition in rail vehicles. During transit, they detect accelerations (vibrations) and anomalies in the wheel-rail interface.

In addition to ensuring safe operation and identifying wear, these sensors enable more efficient planning of maintenance cycles.

For demanding applications

For bogie condition monitoring and derailment detection

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

- Measurement of very low frequencies via capacitive MEMS technology
- High temperature stability and repeatability
- Versatile design and connection options thanks to a modular system
- Also available as a multi sensor for speed and/or temperature measurement

Your benefits at a glance

- Measurements on up to three axes possible
- High accuracy thanks to an ultra-low noise floor
- Wide measurement range +/- 50 g or +/- 100 g
- Wide frequency range from 1 Hz to 20,000 Hz

Multi sensors

For combined measurements

One sensor for a wide range of applications

Combining up to three sensors in a single housing

The type KA multi sensor combines various sensing functions within one compact housing and is particularly suited for structure-borne noise measurement to detect wear processes. In addition to the acceleration sensor, temperature and/or speed sensors can be flexibly integrated.

This combined solution is ideal for the modernisation of existing systems (retrofit), where often only a single measuring point is available (e.g. for speed detection).

One sensor, multiple designs

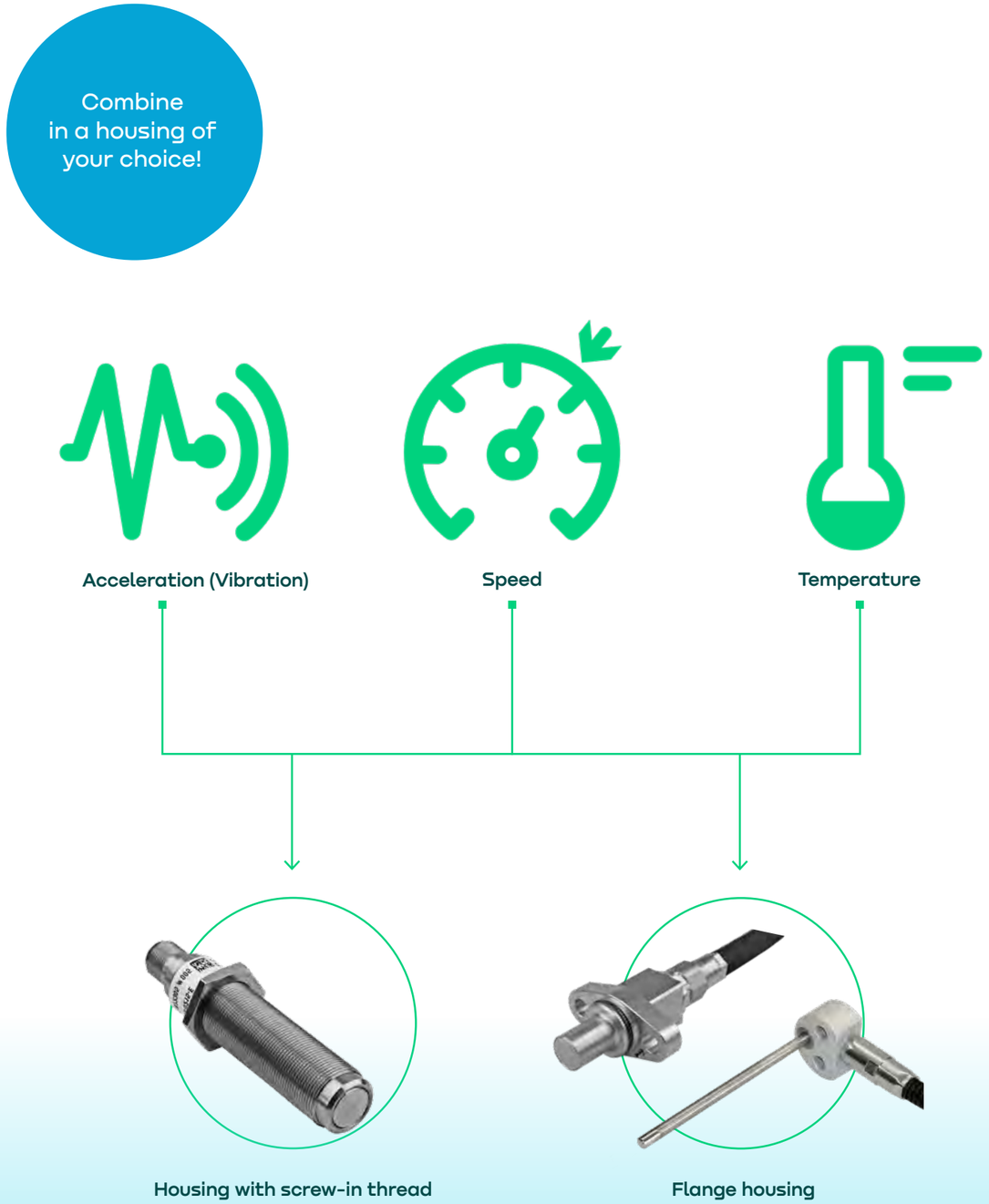
Space-saving design and mechanically compatible with standard Noris designs

Another advantage is the wide range of designs and connection options, allowing you to choose the perfect model for your application:

- Flanged housing or plug-in sensor
- Threaded sensor
- Bespoke connection cable with flying leads or a connector of your choice
- Optional cable protection for use in extreme environments

Your benefits at a glance

- Flexible combination of acceleration, speed and/or temperature sensor in a single housing
- Space-saving design thanks to compact construction
- Mechanically compatible with standard Noris models (threaded and flanged sensors)
- Easy installation and service due to minimal wiring and maintenance



Analogue indicators

For visualisation in the driver’s cab



Advantages of analogue indicators

Robust and reliable in daily operation

Analogue indicators are used where a cost-effective and durable solution is required to display speed, temperature, braking force, etc. In comparison to digital displays, they offer intuitive readability 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”
- Rapid trend monitoring
- Robustness, durability and high availability

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

- Limit value monitoring
- Alarm LED, flashing pointer and dial
- Control function for sensor or auxiliary power failure (live-zero function)
- Minimum-maximum value display function to save and indicate the highest or lowest measured value

Indicators with stepper motor or moving-coil instruments

Our indicators provide additional features

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

Your benefits at a glance

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

Quality and responsibility

Certified processes implemented sustainably

First-class products thanks to excellent processes

The standards that we follow, e.g. EN 50155 for rail applications, ensure quality assurance and safety. They establish clarity about the properties of our products.

In order to ensure the highest quality and reliability in the long term and to drive continuous improvement, we have implemented processes in accordance with internationally recognised standards, including ISO/TS 22163 (IRIS).

Skilled specialists and in-depth testing

A decisive advantage for you is our exceptional depth of testing. Intermediate testing stages that go beyond normative requirements are standard practice in our in-house production. We continuously invest in automated testing stations to ensure our production processes are both efficient and reliable.

All inspections and tests are carried out by specially skilled experts to guarantee the highest possible product quality. Even bespoke testing requirements can be accommodated and seamlessly integrated into the production process as needed.

Certified:
ISO 9001
ISO/TS 22163
ISO 14001



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

Sustainable management means constantly balancing economic, ecological and social factors with each other and aligning them.

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

- Ensuring quality: We manufacture our sensors under strict quality controls and meet the highest standards. Our processes are certified to ISO 9001 and ISO/TS 22163 (IRIS).
- Minimising waste: Continuous process optimisation and targeted employee training reduce waste and enable more efficient use of resources.
- Sustainable production methods: We rely on energy-efficient processes as well as recycled and recyclable materials, and continuously develop our product portfolio.
- Using renewable energy: Our photovoltaic system covers part of our energy requirements. Surplus energy is stored and used as needed.





A focus on ecology

Since 2016, we have been continuously working on minimising our environmental footprint throughout our products' life cycles:

- Sustainability, environmental and climate compatibility, and safety are integral parts of our product development. Our company is certified according to ISO 14001.
- Our aim is to have at least 90% net-zero manufacturing at our biggest location in Nuremberg by 2028.
- Working towards our goal of net-zero production, we are increasingly relying on the use of renewable energies and investments in modern technologies.



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