



Whether rotating or static – Safe acquisition of strains and temperatures in e-mobility

CSM web seminars

CSM **Xplained**
measurement technology

AXON
systems

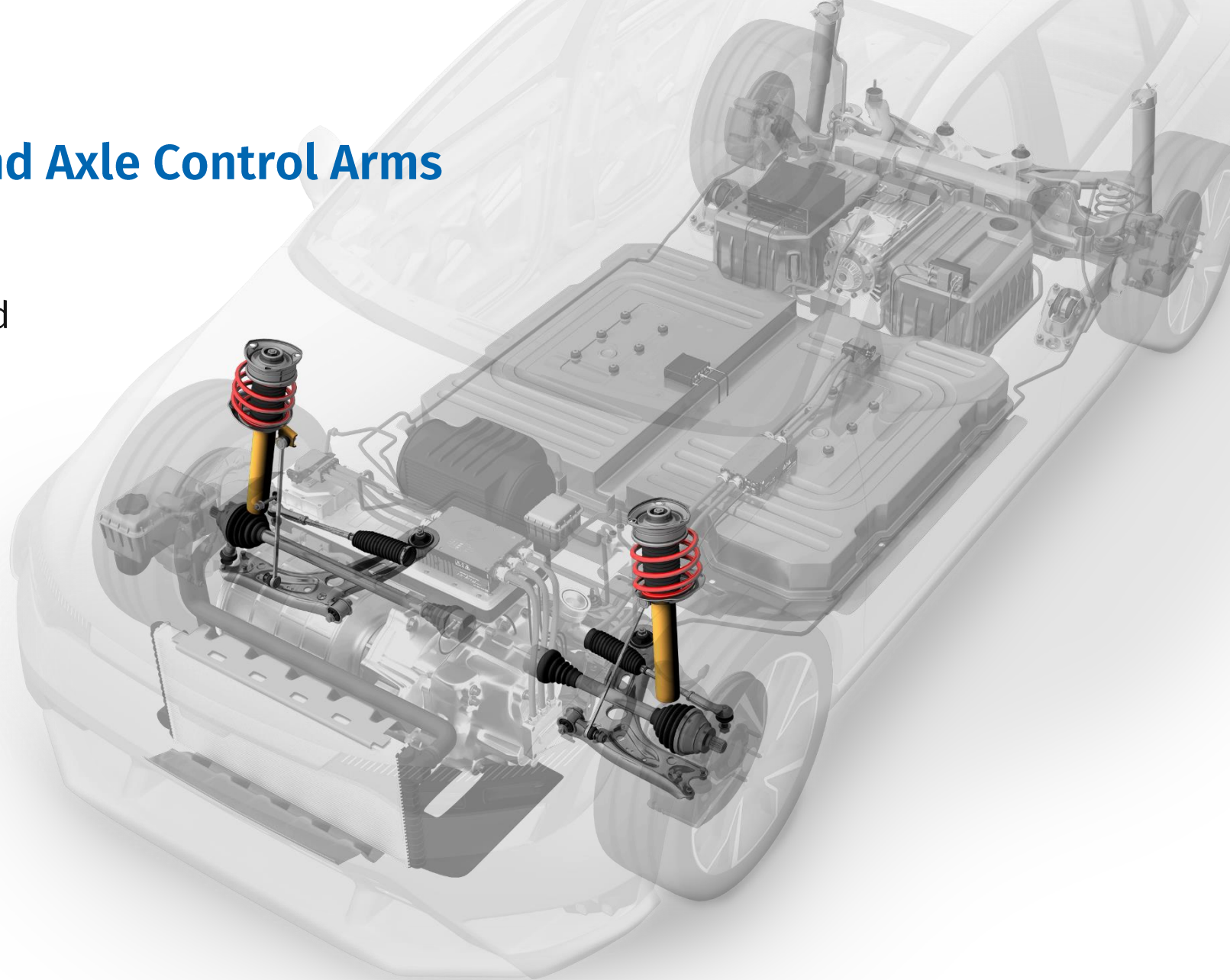
Innovative Measurement and Data Technology



Measurement on Tie Rod and Axle Control Arms

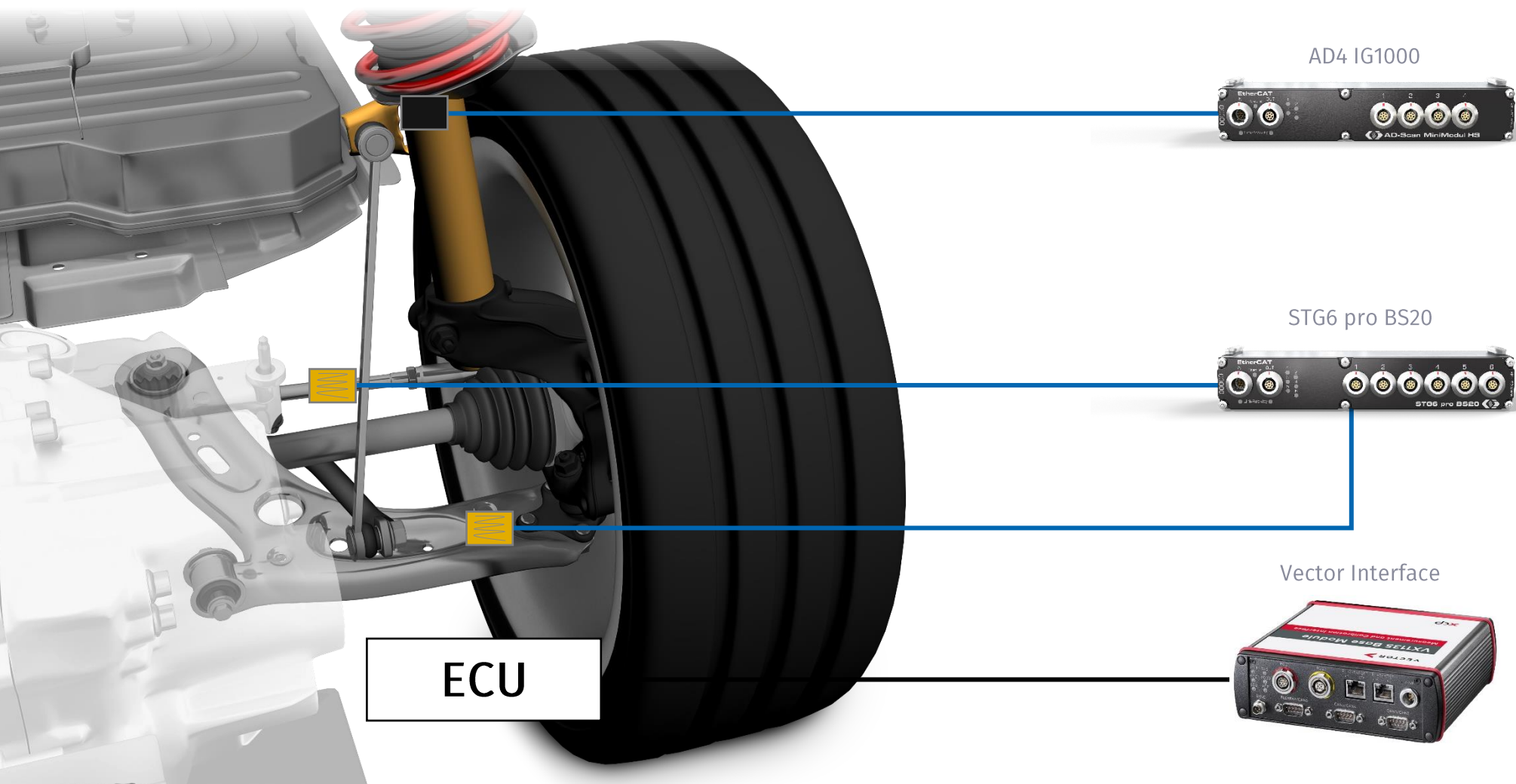
Acquisition of

- ▶ Mechanical load on the tie rod and axle control arms
- ▶ Spring travel
- ▶ Speed, etc. from ECU data

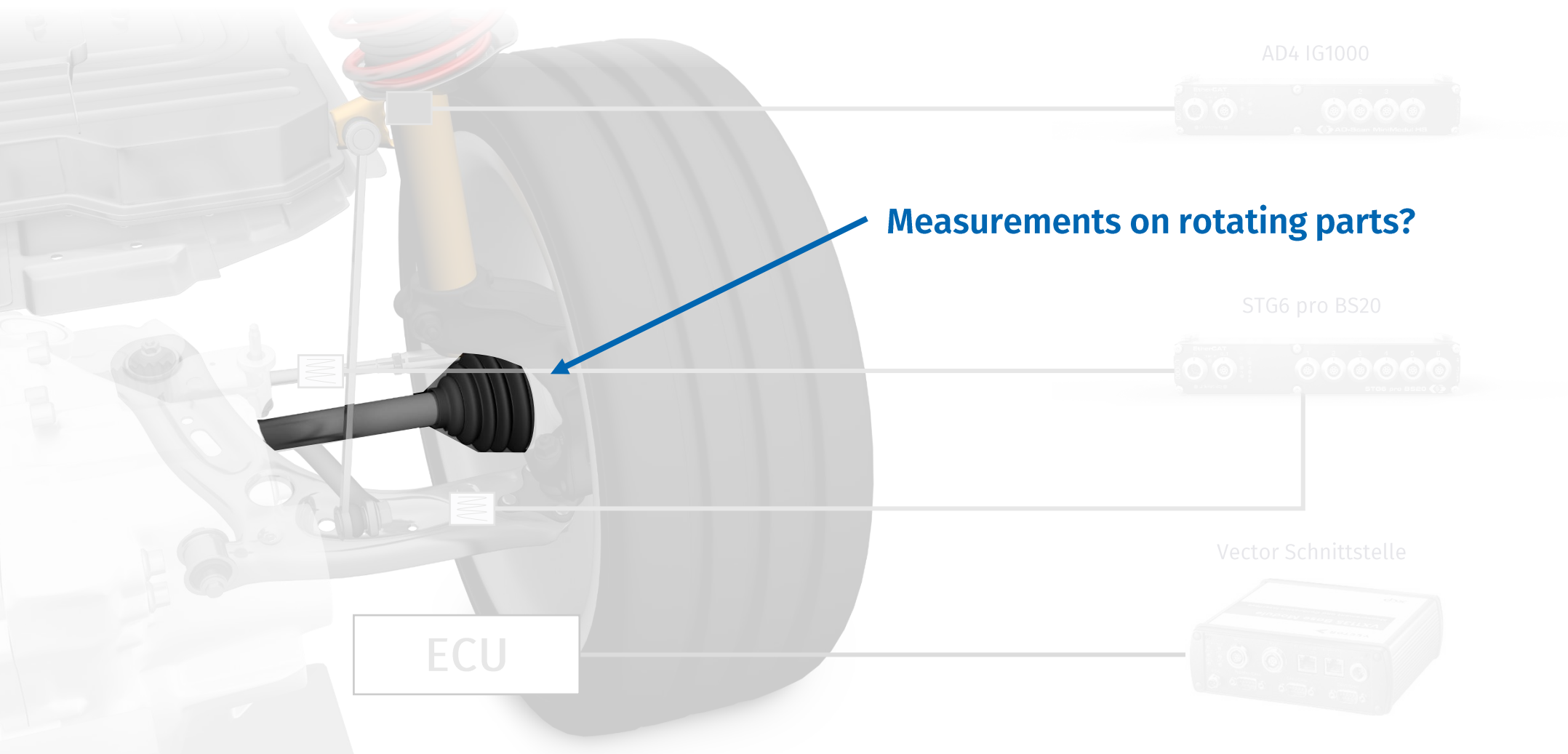




Measurement on Tie Rod and Axle Control Arms



Measurement on Tie Rod, Axle Control Arms and Drive Shaft

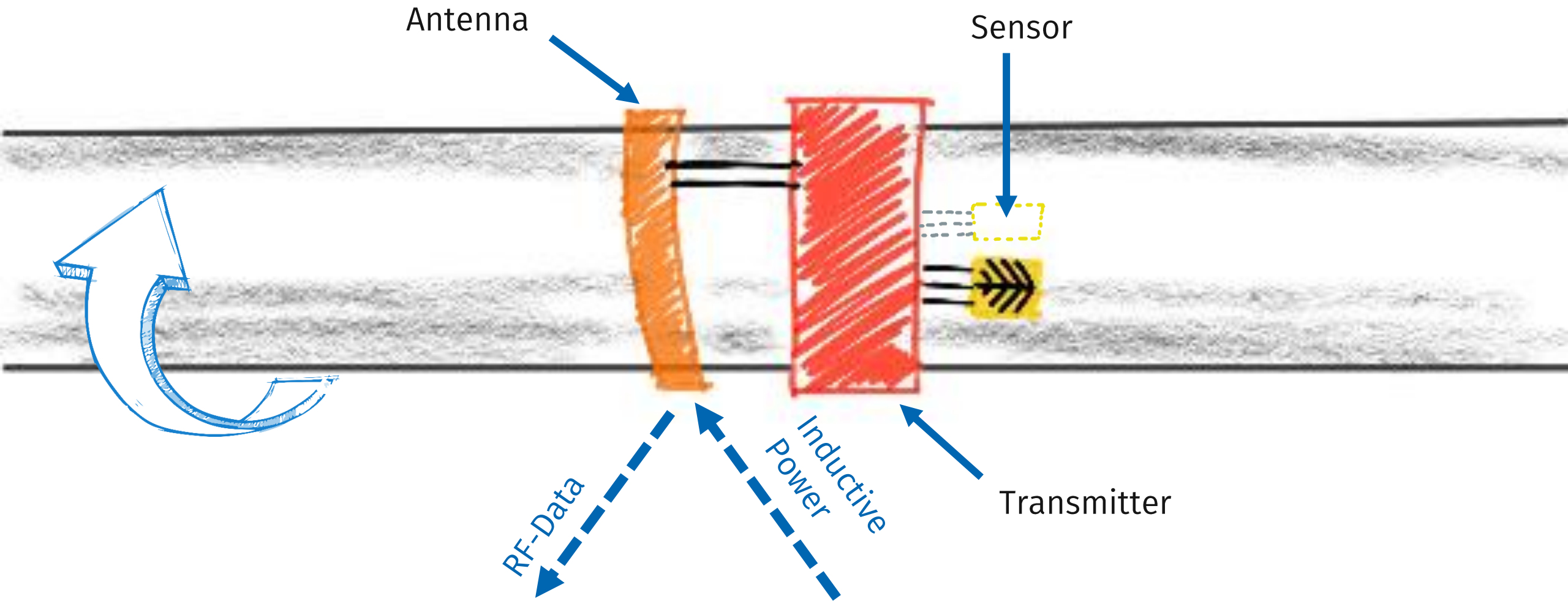


AXON Systems

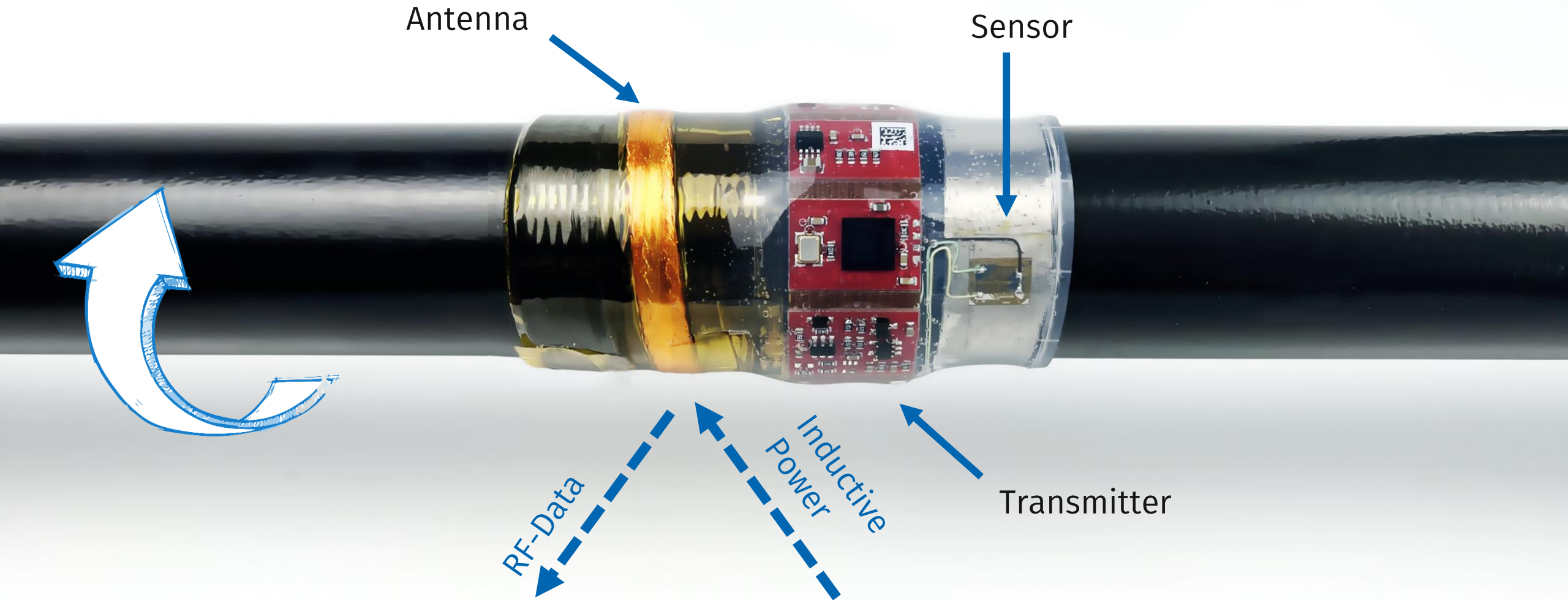
AXON Systems on
www.axon-systems.de



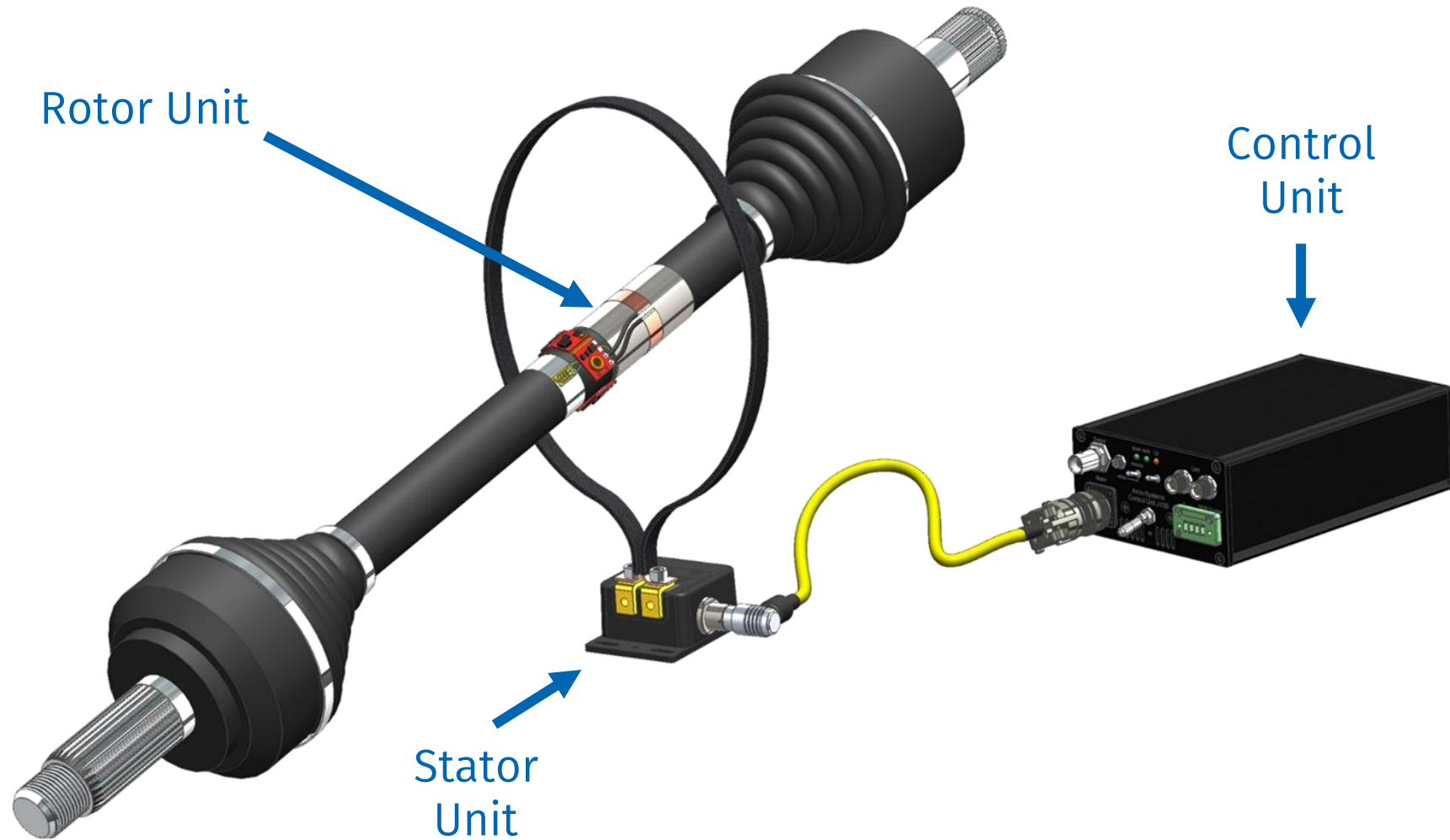
Telemetry solution from AXON Systems - Measuring Shaft

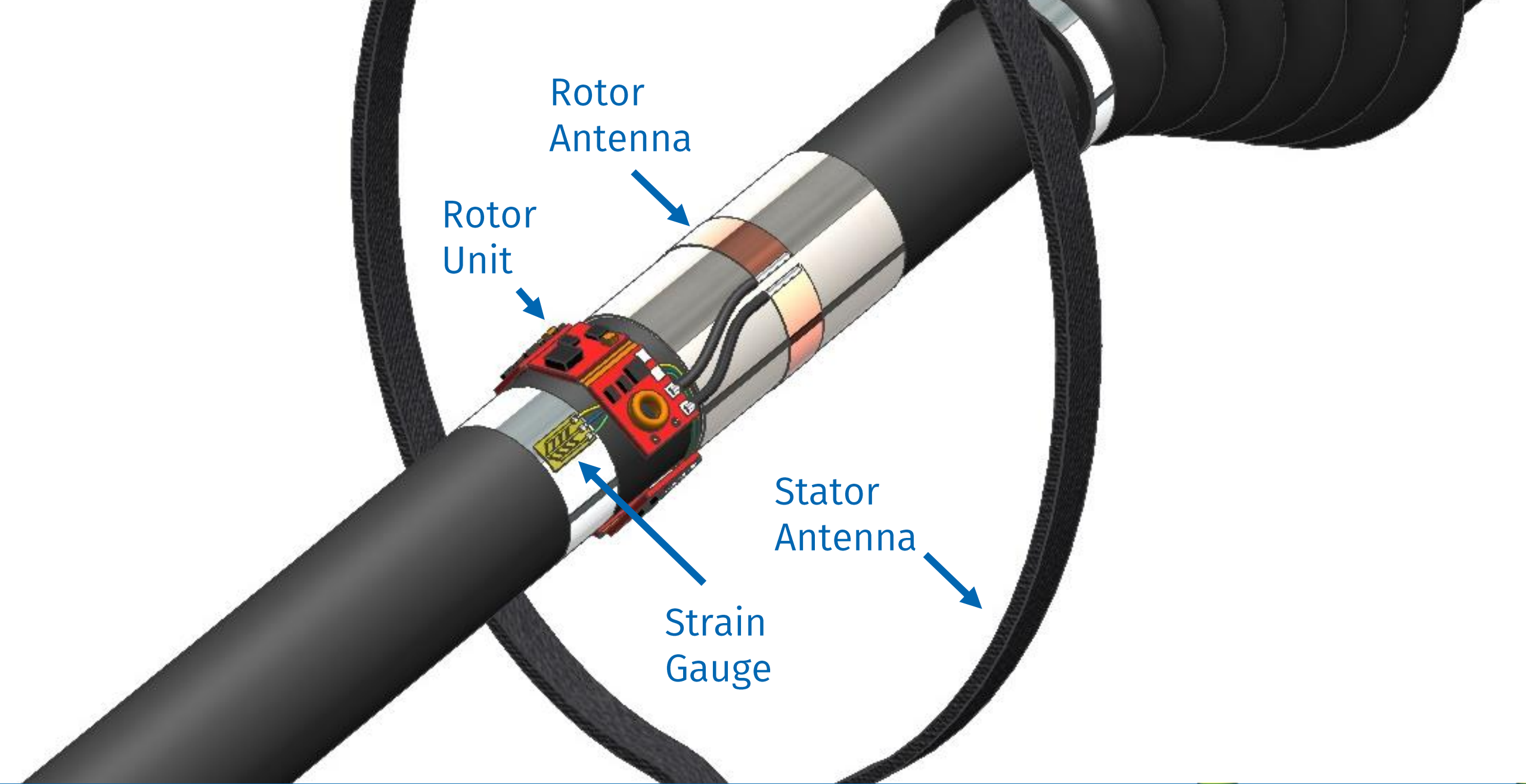


Telemetry solution from AXON Systems - Measuring Shaft



Telemetry solution from AXON Systems – System Overview





Rotor Unit

Main Requirements:

- ▶ Robust
- ▶ Space saving
- ▶ High operating temperature range
- ▶ High precision measurements

Rotor Unit

- ▶ Precision sensor signal amplifier
- ▶ Signal processing
- ▶ Signal transmission
- ▶ Different designs

Weight:
Less than 5 grams

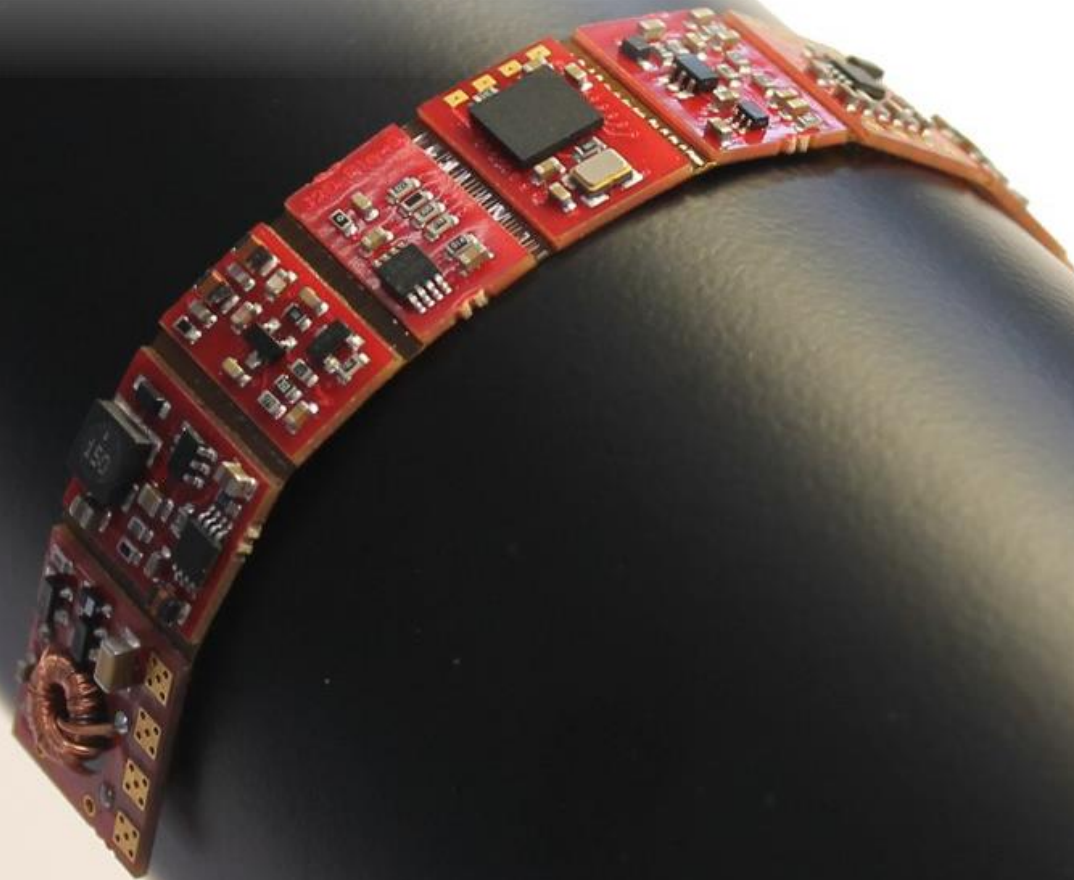
Rotor Unit

Digital Data

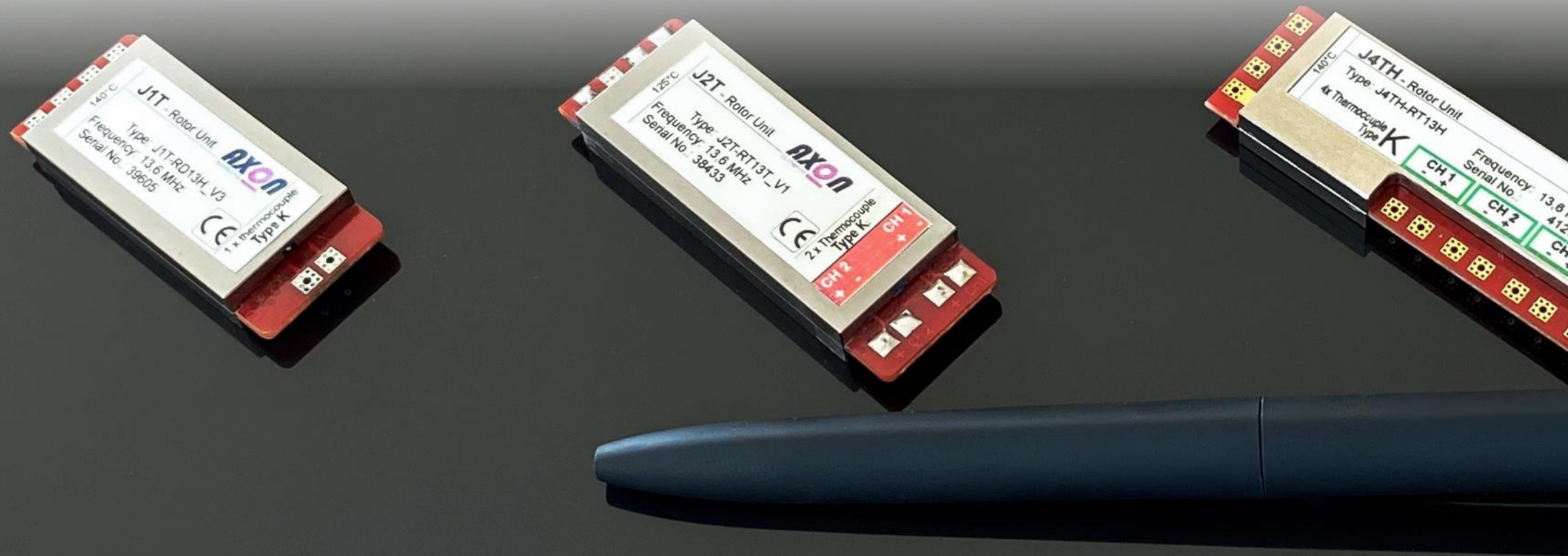
- ▶ Sensor measurement value
- ▶ Available inductive power
- ▶ Transmitter ID (serial number)
- ▶ Type of connected sensor
(e. g. thermocouple type)
- ▶ Operating temperature

RF-Data

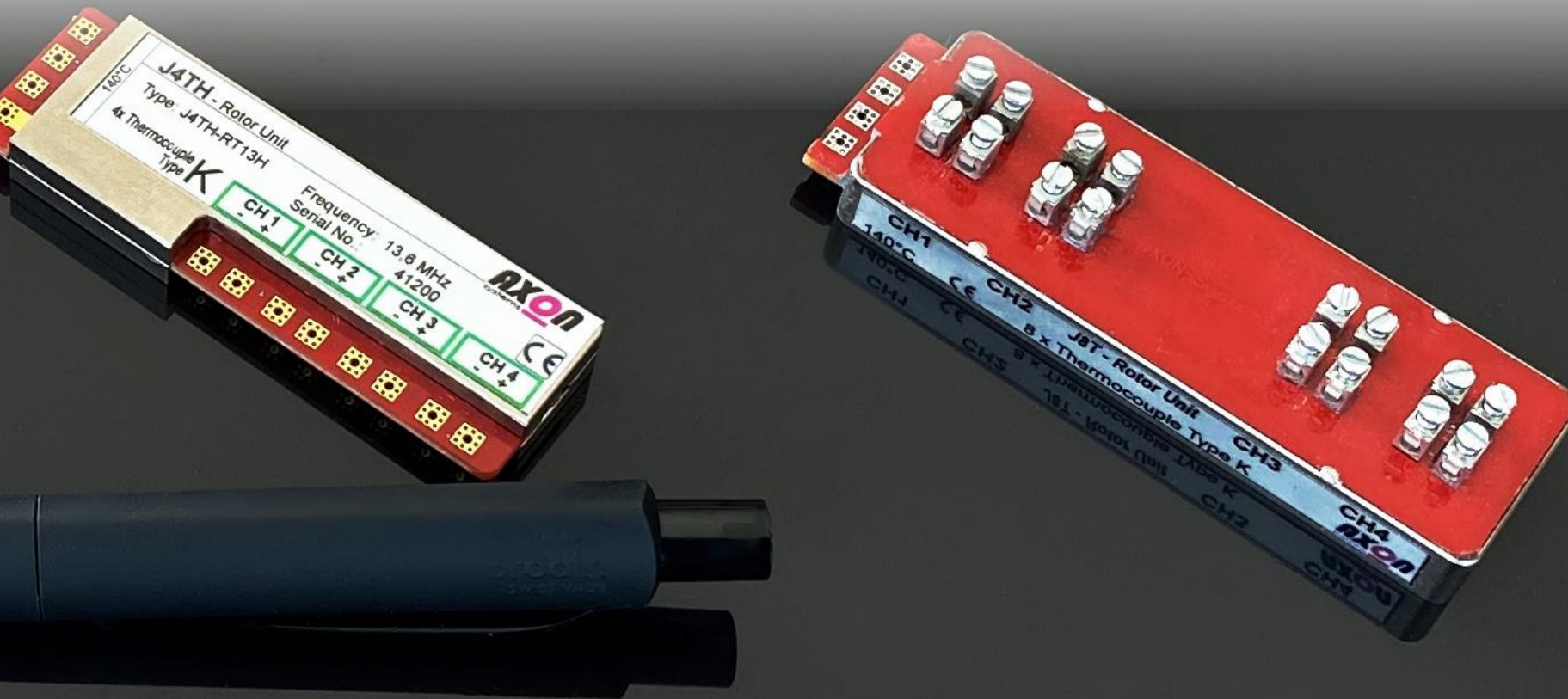
Rotor Unit



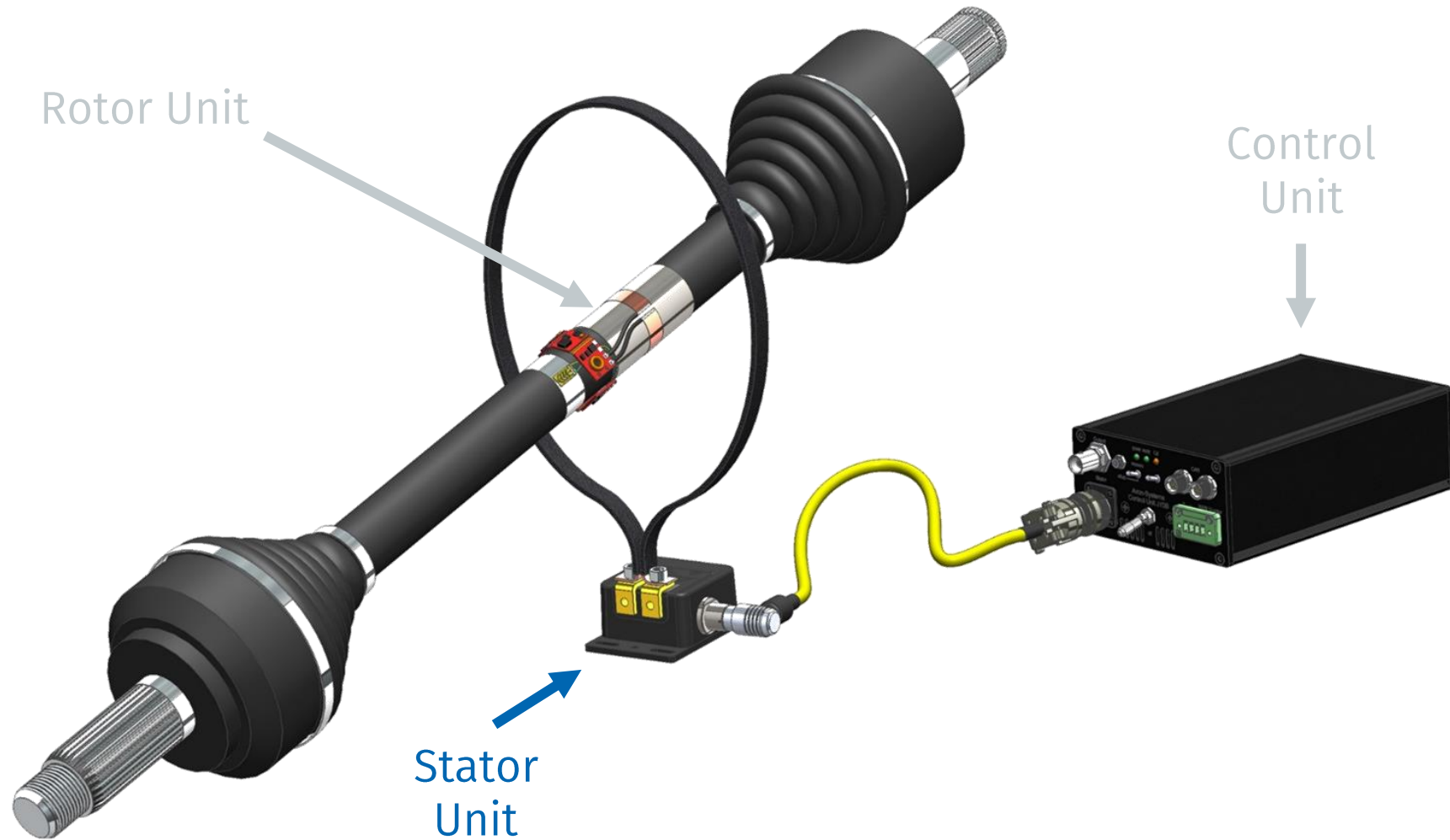
Rotor Unit – Various designs for different requirements



Rotor Unit – Various designs for different requirements



Stator Unit



Stator Unit

Main Requirements:

- ▶ Robust
- ▶ Flexible
- ▶ High operating temperature range
- ▶ Large transmission distances

Stator Unit

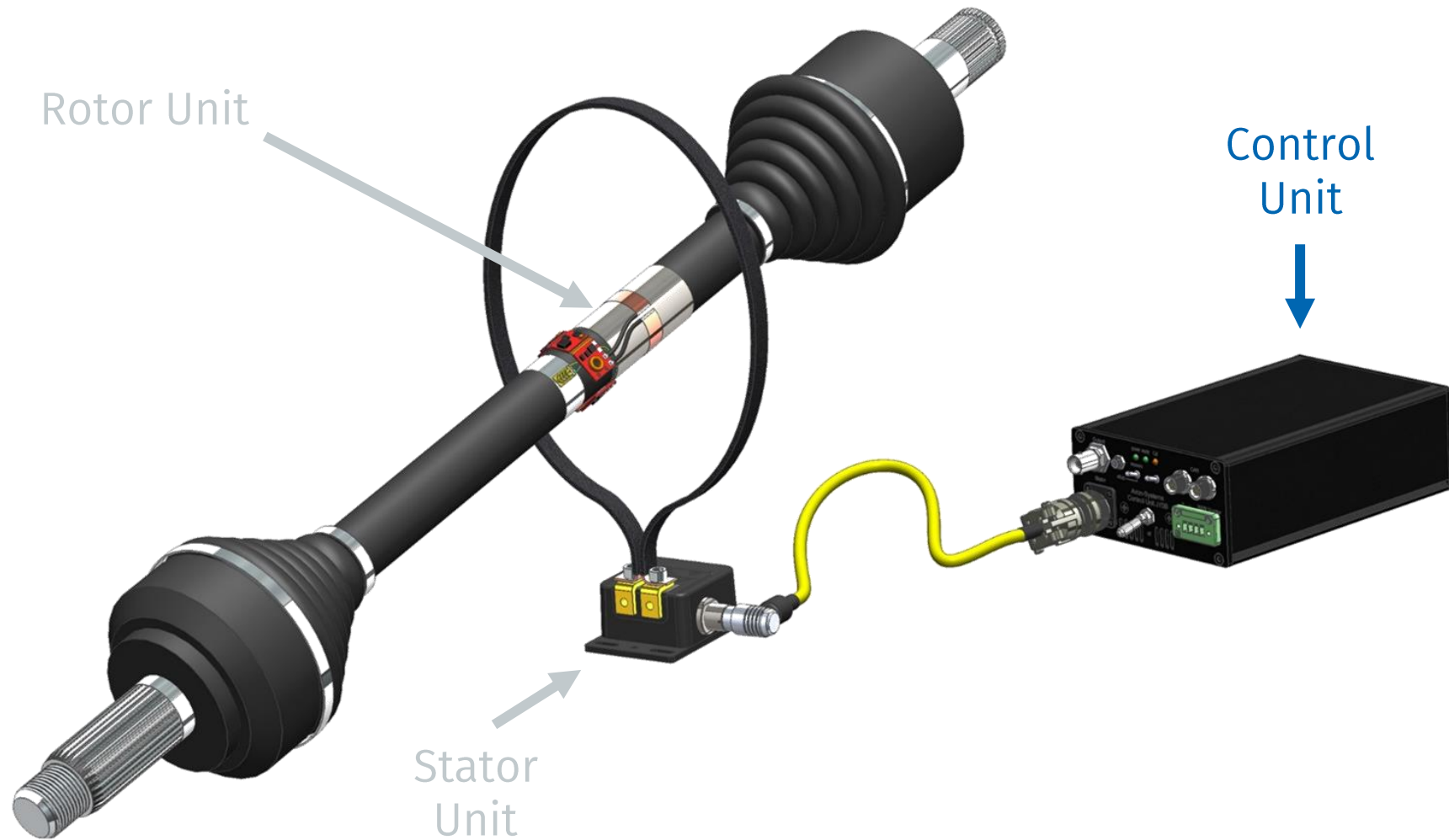
- ▶ Wireless data transmission
- ▶ Inductive power supply



Stator Unit



Control Unit



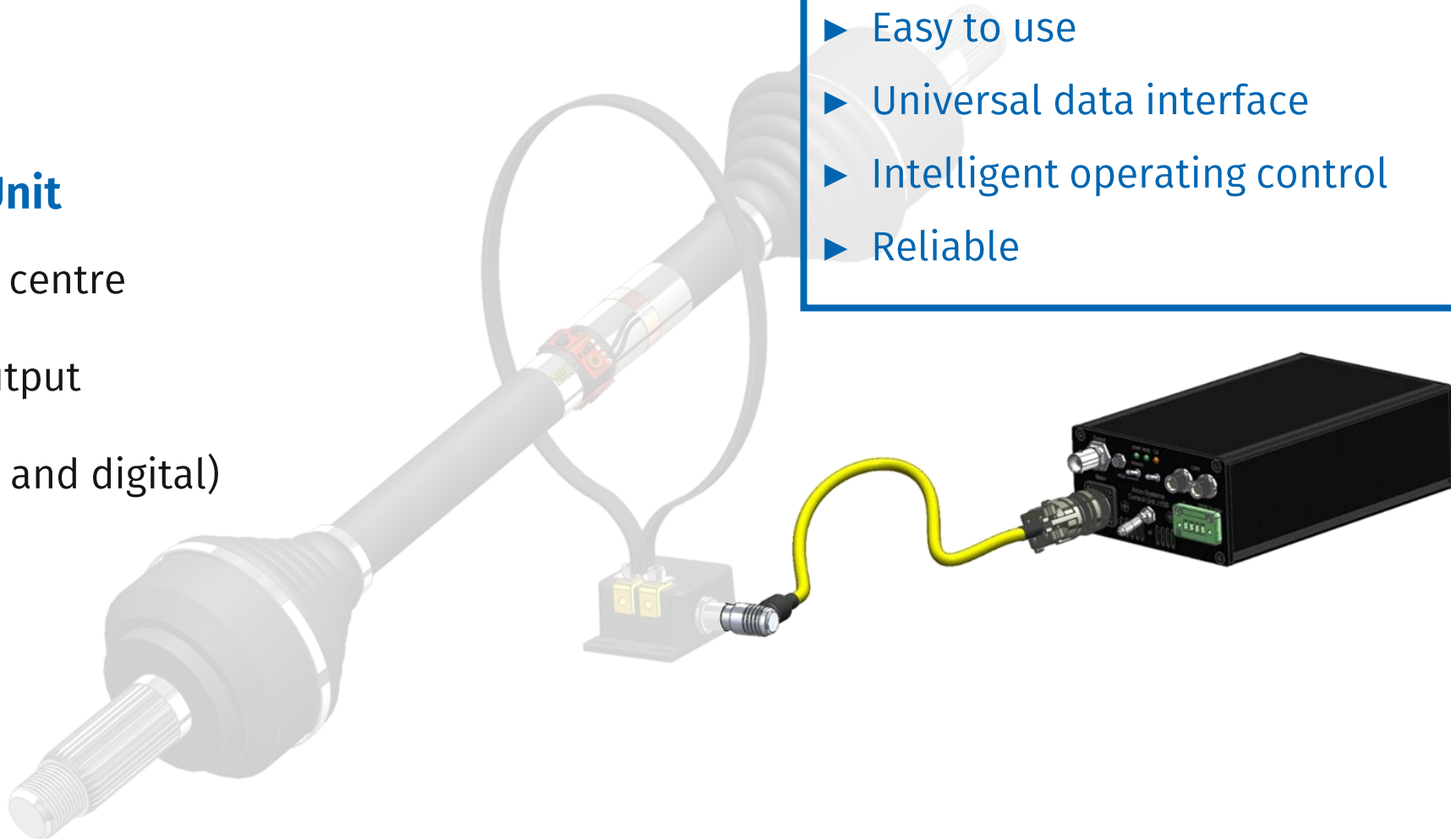
Control Unit

Control Unit

- ▶ Control centre
- ▶ Data output
(analog and digital)

Main Requirements:

- ▶ Easy to use
- ▶ Universal data interface
- ▶ Intelligent operating control
- ▶ Reliable



Control Unit

- ▶ Digital interfaces (e. g. CAN bus) configuration software
- ▶ Providing continuous information about operating conditions, such as available inductive power on the rotor side, RSSI, Serial number of Rotor Unit and signal receiving status
- ▶ Commands receivable via CAN-Bus, e.g. auto zero



Product Lines

Strain Gauge **J1DB**



1 or 2 channels

CAN bus interface

$\pm 10V$ Analoge output

Intelligent power transmission

Temperature **JXTH**



1 up to 16 channels

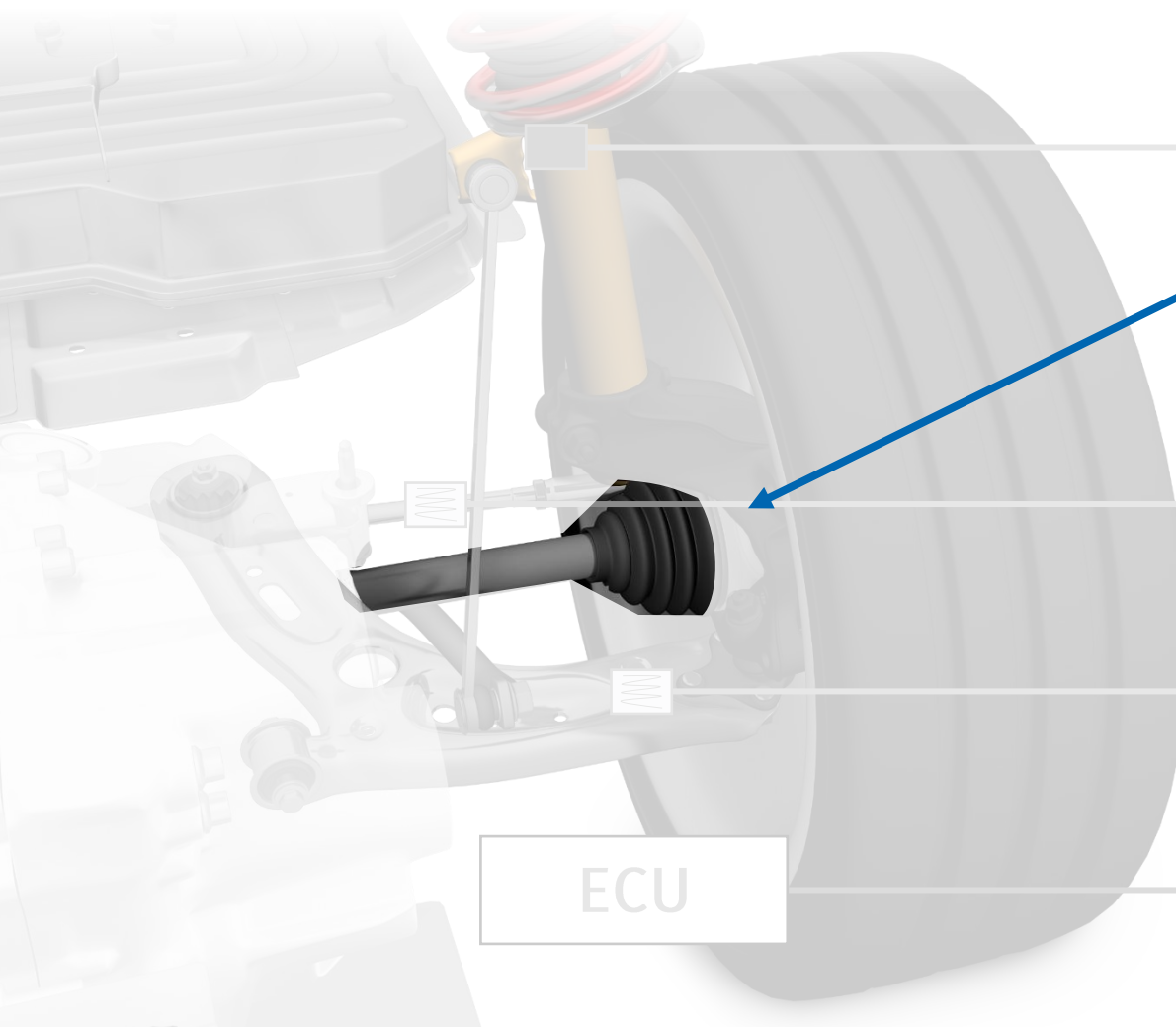
CAN bus interface

5mV/°C analoge output

Intelligent power transmission

Linearization

Measurement on Tie Rod, Axle Control Arms and Drive Shaft



Challenges with installation

- ▶ Limited installation space₂₀
- ▶ Protected against environmental influences
- ▶ Application

AD4 IG1000

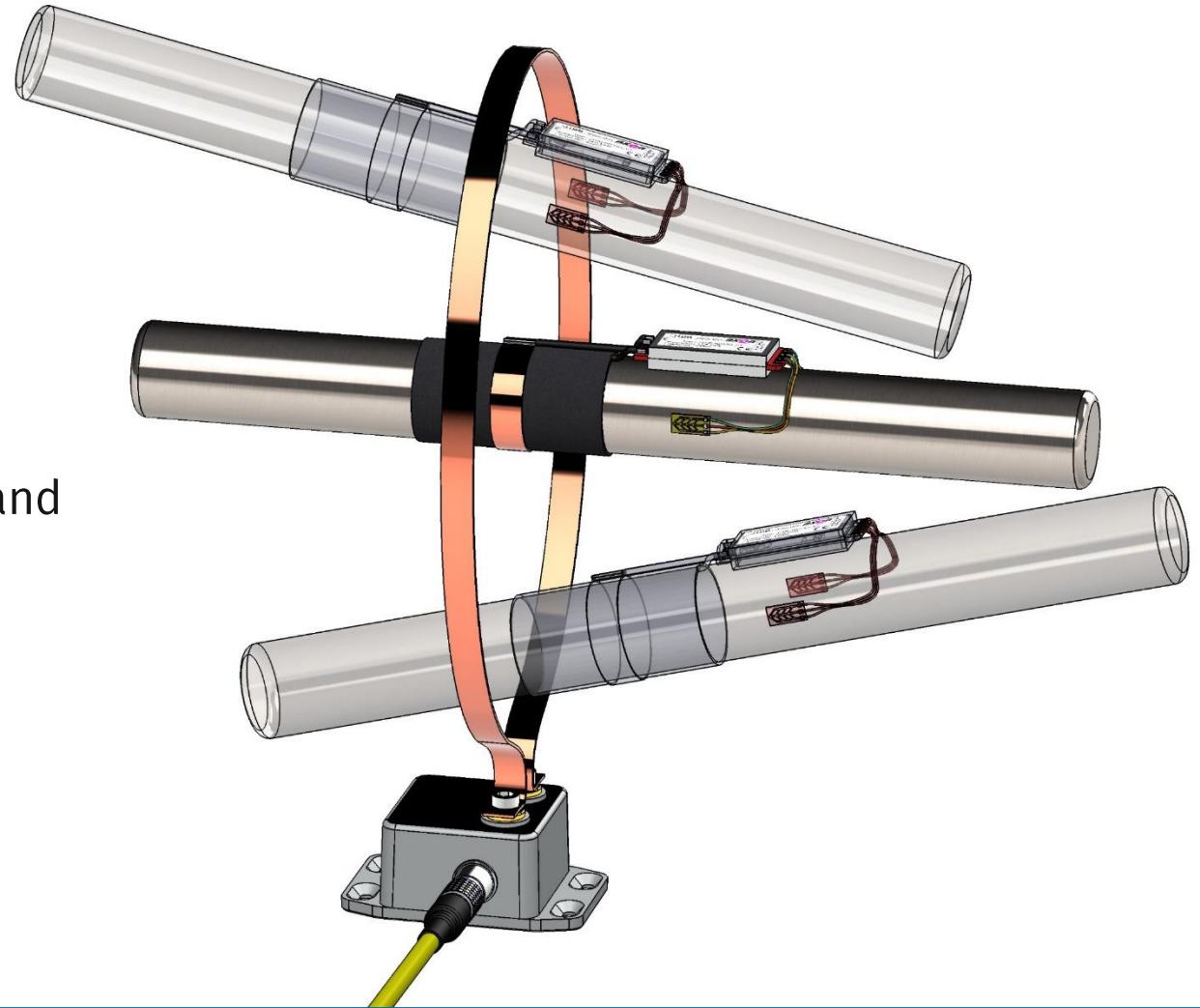


Vector Schnittstelle



Installation – Confined Spaces

- ▶ Easy setup
- ▶ Interruption-free transmission
- ▶ Stator antenna can be adapted in shape and size according to installations space situation
- ▶ Distances between rotor and antenna up to 80mm



Installation – Confined Spaces

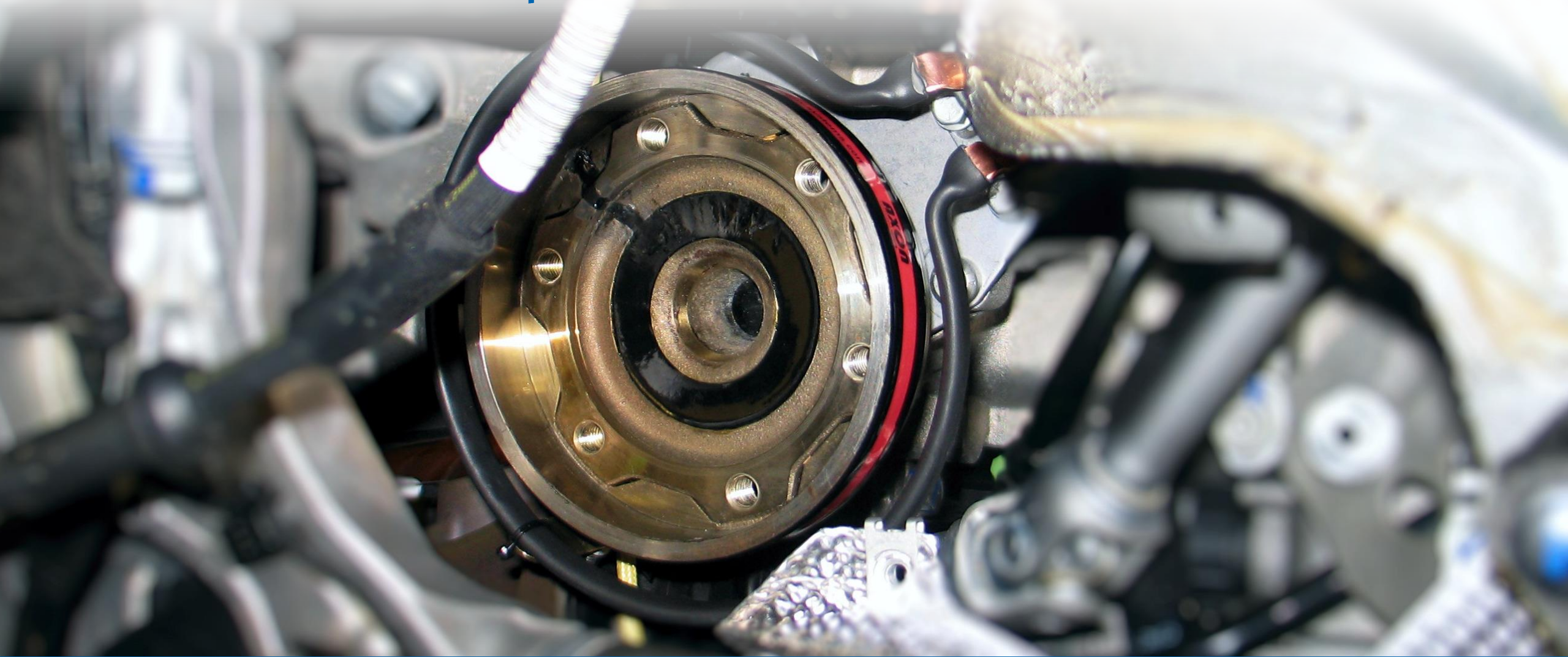


Installation – Confined Spaces



Installation – Confined Spaces

Allowing full installation in less than 20mm axial space



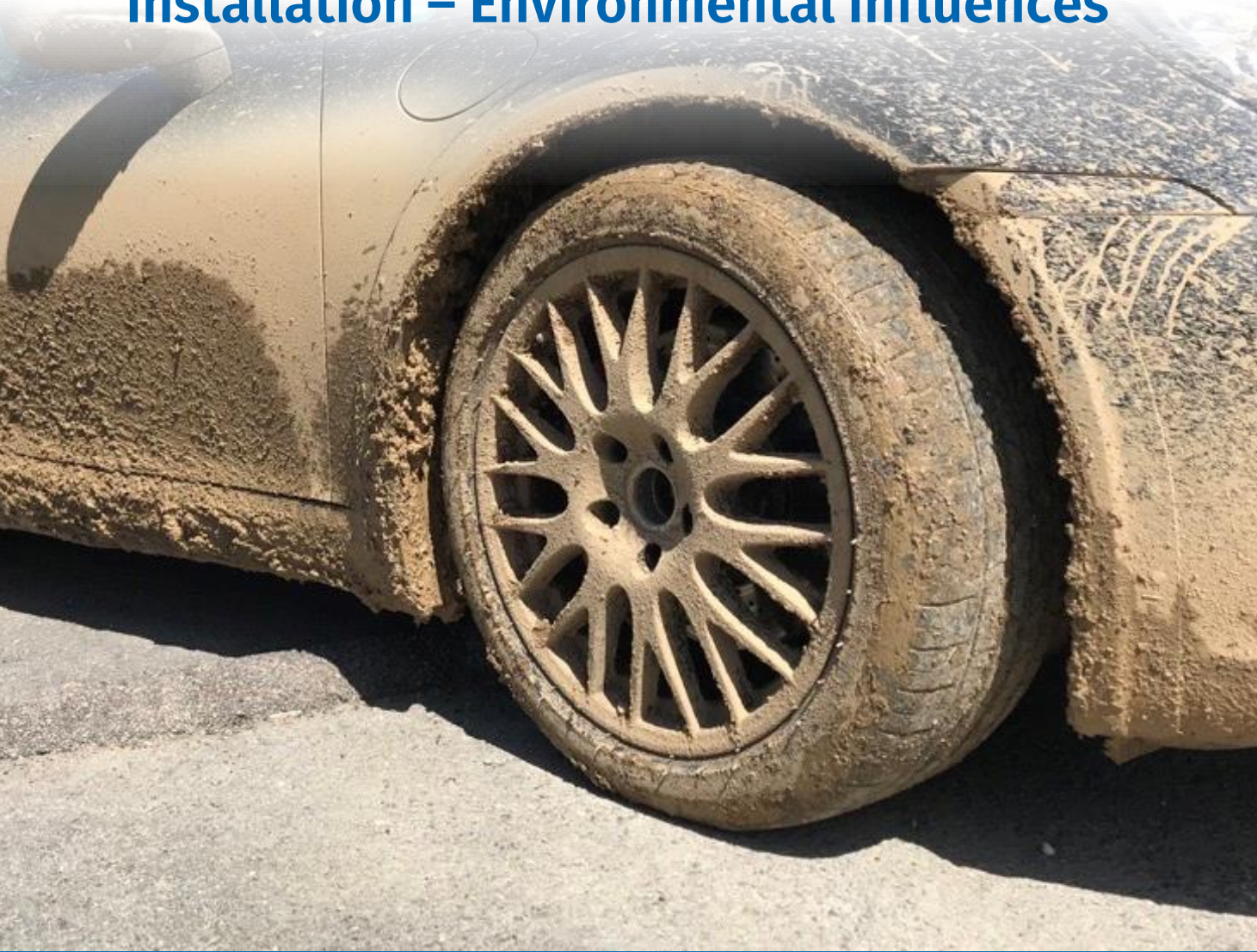
Installation – Environmental Influences



Installation – Environmental Influences



Installation – Environmental Influences



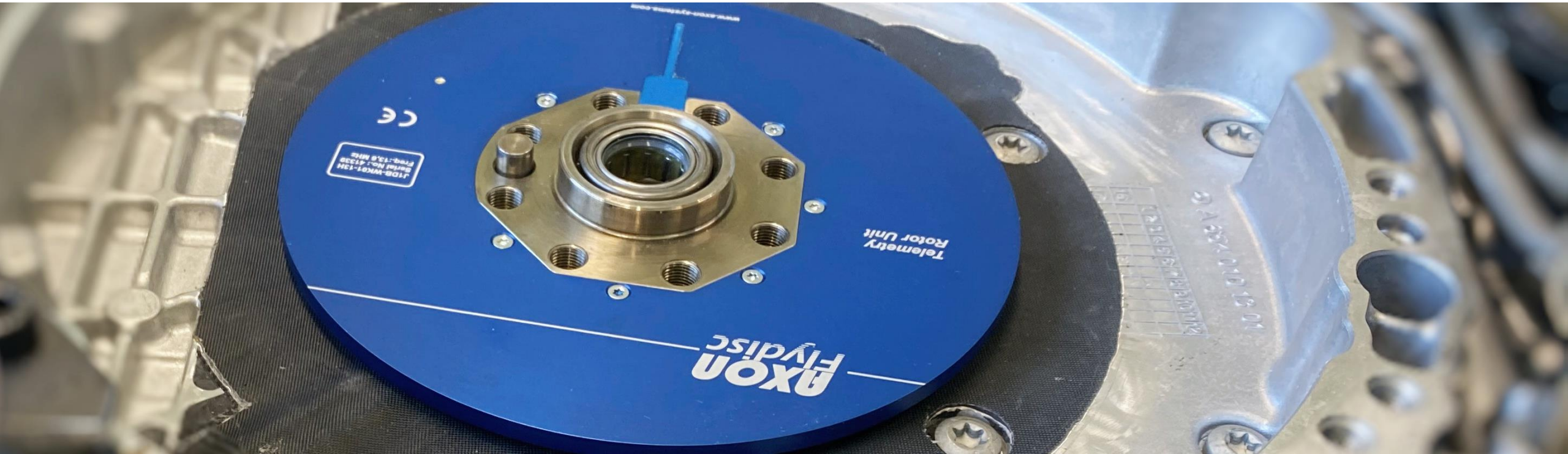
Installation – Application

Drive shaft installation and calibration service



AXON Flydisc

Data transmission in a gap between engine and gearbox



High-end Customized Transducers

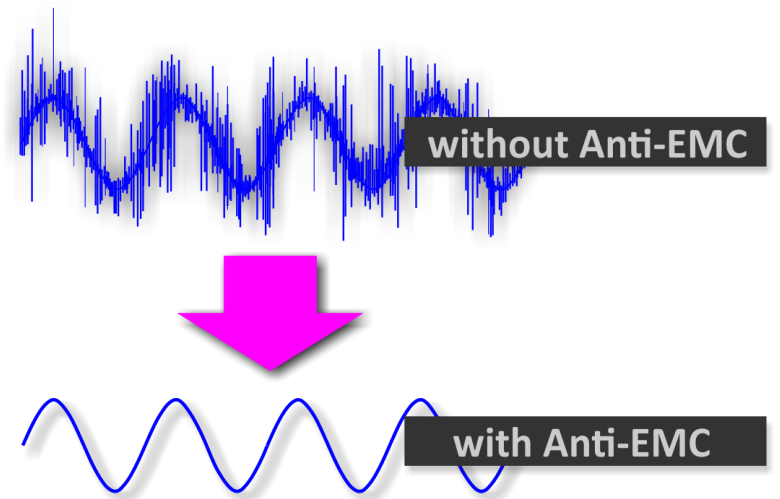
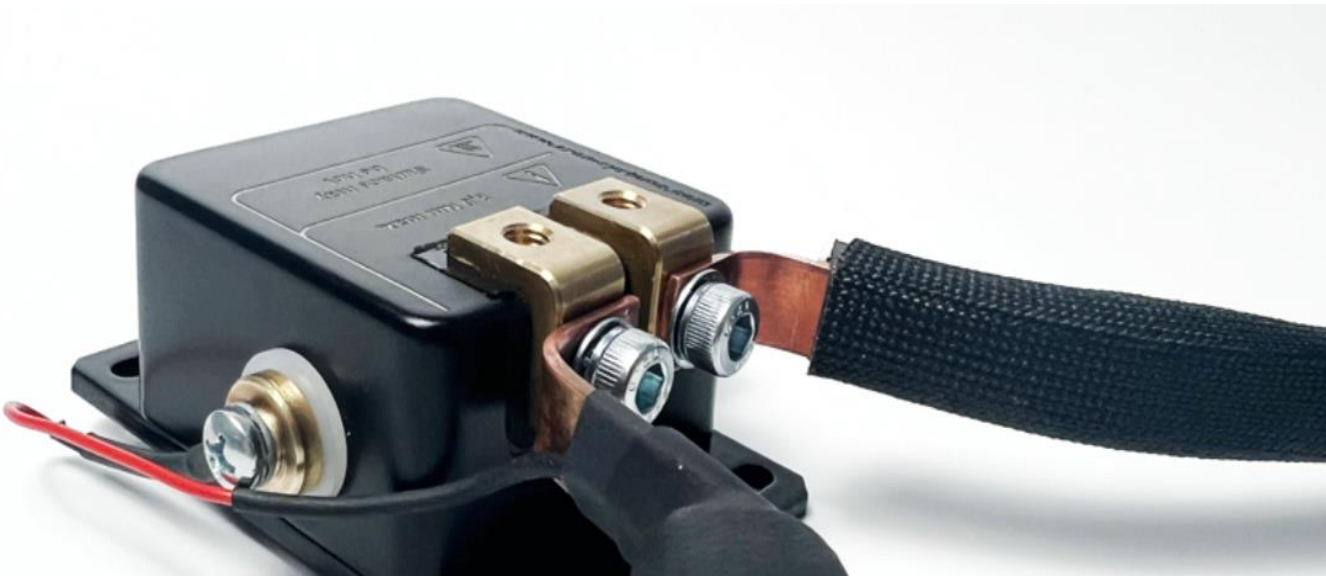


- ▶ Detailed planning with AXON in-house CAD construction
- ▶ Separable telemetry device for 12-channel temperature measurement on a brake testing stand for rail vehicles
- ▶ Rugged and maintenance free

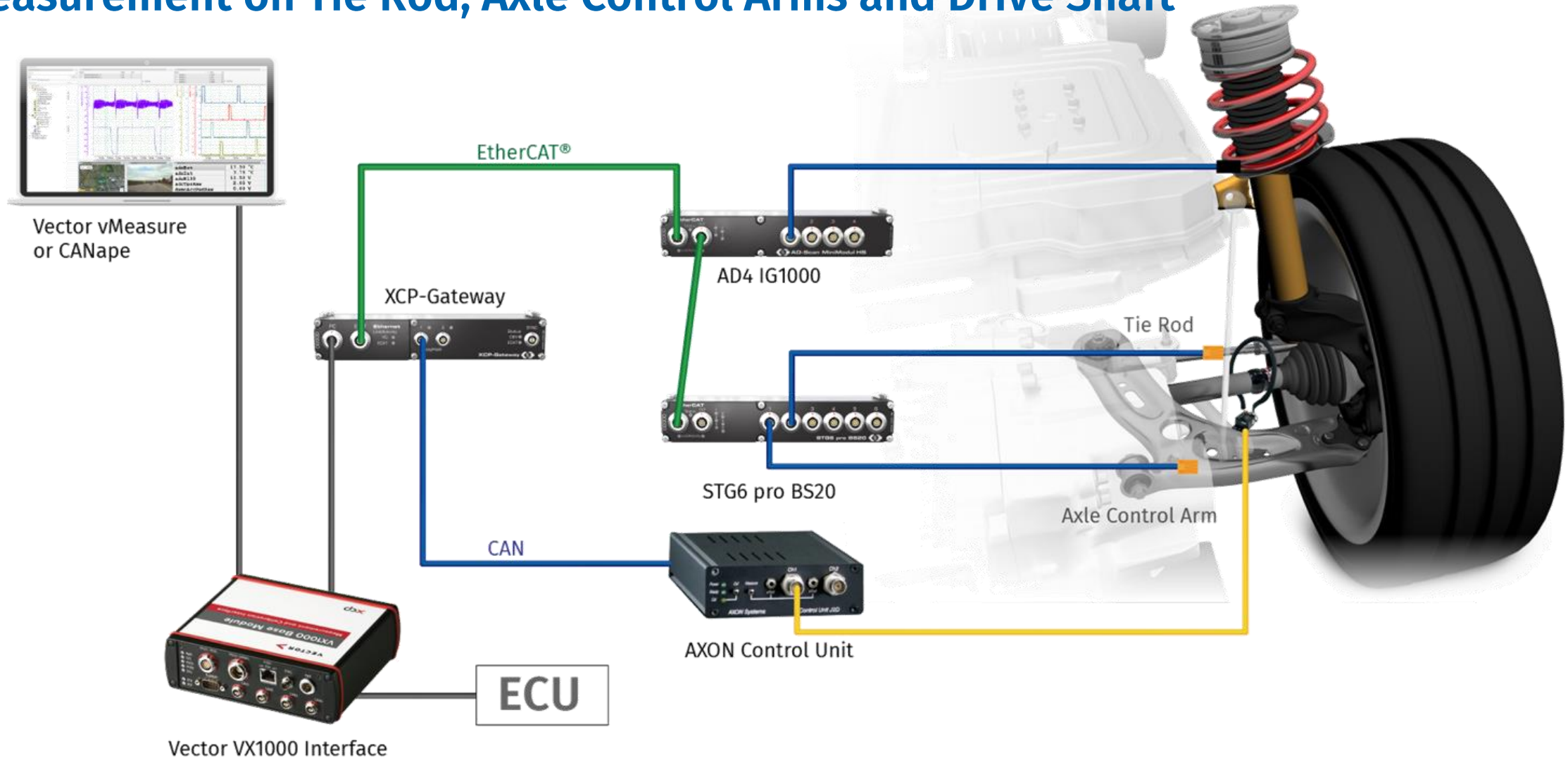
EMC-noise-cancelling

Much more than just a filter

- ▶ Anti-EMC: Active noise cancelling for your measurement
- ▶ Active suppression of strong EMC interference fields directly at the receiving antenna
- ▶ Ideal for use in electric vehicles or on test stands with frequency converters



Measurement on Tie Rod, Axle Control Arms and Drive Shaft



About CSM

CSM has been setting technological standards for decentralized measurement technology in vehicle development for over 35 years. Our CAN bus and EtherCAT® measurement devices support worldwide renowned vehicle manufacturers, suppliers and service providers in their developments.

Continuous innovation and long-term satisfied customers are our guarantee for success. Together with our partner Vector Informatik, we have developed an easily scalable and powerful E-Mobility Measurement System for hybrid and electric vehicles and are constantly expanding the areas of application. With our high-voltage safe measurement systems designed for fast and synchronous measurements and power analyses, we actively accompany the change to **E-Mobility**.

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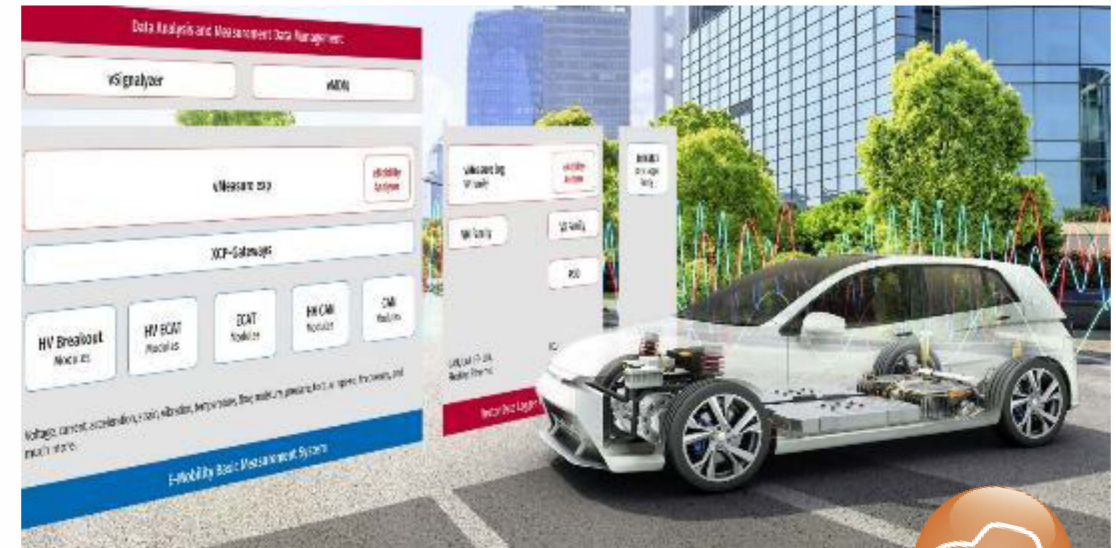
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