



TRANSPORT

Delivering sensing and measurement solutions for transport applications

 **VARIOHM**
GROUP

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● Headquarter
UK (Towcester)

● Companies of
Variohm Group

ABOUT VARIOHM GROUP

Variohm Group is a collective of companies committed to delivering high-quality engineering solutions across a range of industries.

We combine our expertise to offer innovative sensing, switching, measurement and motion control solutions to our customers worldwide across sectors including renewable energy, healthcare, transportation and industrial.

Our businesses

Each company within the Group brings its own unique skills, knowledge and experience. This allows us to work as a partner to our customers, creating custom solutions that go beyond their expectations.

We have in-house engineering and manufacturing teams and a customer-centric approach. Our combination of specialist knowledge, experience and fresh thinking helps us quickly respond to our customers' needs. With an extensive portfolio of complementary products and services, we can provide expert guidance and deliver solutions tailored to each project.



● Distributor Network

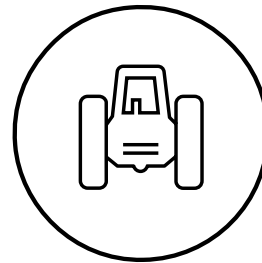
TRANSPORT SECTOR

Global sensor and measurement solutions

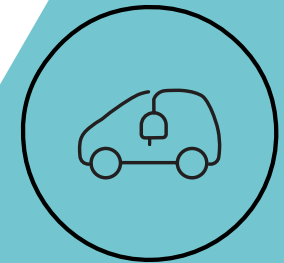
We design, manufacture and supply a wide range of high-quality components to enhance safety, efficiency and performance for transport applications. Our products focus on sensing, measuring and controlling critical parameters such as temperature, movement, pressure, force, position, load, weight and incline. From automotive and rail to aviation and marine, our advanced solutions withstand the rigorous demands of these environments.



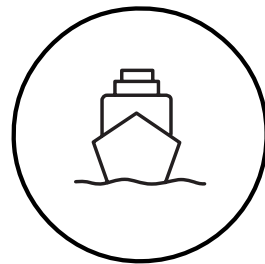
AEROSPACE



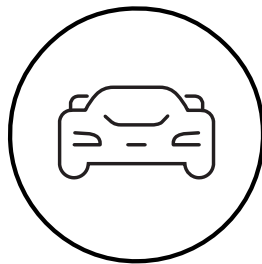
AGRICULTURE



AUTOMOTIVE EV



MARINE



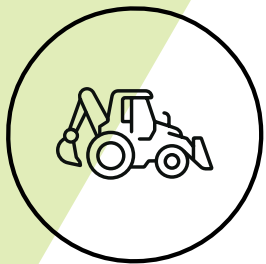
MOTORSPORT



RAIL



DEFENCE



**SPECIAL PURPOSE
VEHICLES**



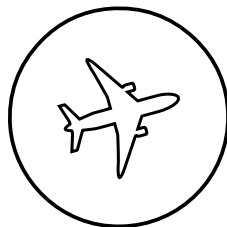
AEROSPACE

The components used in **aircraft and spacecraft** for navigation, control, monitoring, and safety must function in some of the harshest conditions imaginable. Accuracy, reliability, durability and compliance with strict regulatory standards are essential to ensure safety and legal conformity.

Variohm Group solutions include:

- ▶ Monitoring pressure in aircraft piston engines
- ▶ Yoke and stick systems in flight simulators
- ▶ Temperature monitoring in non-flight auxiliary power units
- ▶ Fire detection in main engines, electronics enclosures, fuselage
- ▶ Managing the temperature of bleed air in environmental control systems
- ▶ Testing motor starters
- ▶ Multi-axis force measurement in tyre test machines

We provide a greater range of solutions to the aerospace market, please speak to us about your sensing and measurement requirements.



Position feedback for flight recorder

Oil temperature

Airport land bridge positioning for entry to plane



Actuation of autopilot

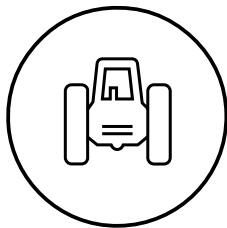
Watering crops via IoT controlled systems

Positioning of spray arms

The agriculture sector is constantly seeking new ways to enhance productivity and reduce resource waste while maintaining or improving quality. By deploying sensor technology and advanced measurement solutions, we help farmers monitor and manage their crops and livestock with greater precision.

Variohm Group solutions include:

- ▶ Monitoring water pressure in IoT crop watering systems
- ▶ Hands-free activation of automated guided tracking
- ▶ Automated three-way gate operation on livestock crates
- ▶ Monitoring hay bale weight
- ▶ Keypad controls for managing slurry handling and application
- ▶ Controlling blade height on commercial lawn mowers
- ▶ Torque measurements on drive and gear elements for round balers
- ▶ Displacement measurements on hydraulic solenoid valves on combine harvesters



We provide a greater range of solutions to the agriculture market, please speak to us about your sensing and measurement requirements.

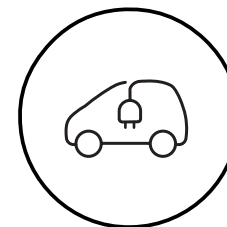
AUTOMOTIVE INC EV

Our **automotive solutions** have evolved in response to the growing popularity of electric vehicles and the increasing focus on sustainability. This shift has had a direct impact on the sensor, measurement and motion control technology we offer, which remains central to the performance and efficiency of modern vehicles.

Variohm Group solutions include:

- Confirmation of correct operation of seat belts, door latches and engine hoods
- Monitoring of pressure in hydrogen fuel systems
- Placement of the EV charging nozzle in holster
- Safe and efficient charging of EVs
- 4-wheel steering systems for autonomous electric buses
- Temperature monitoring solutions for EVs
- Preventing exposure to high voltage when accessing the transfer case service panel for maintenance or repair
- Torque sensors to measure the haptic response of vehicle controls
- Load cells for testing friction, latching, and insertion forces in charging plugs and sockets

We provide a greater range of solutions to the automotive inc EV market, please speak to us about your sensing and measurement requirements.






Temperature surveillance against overheat

Electronic brake system pressure control

Charging nozzle presence detection



Cabin position detection on medium tactical vehicles

Robust digital keypads for

Door hatch feedback

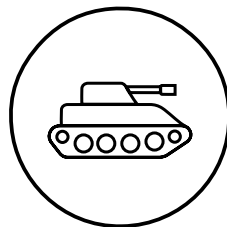
control of function

Military equipment must comply with strict regulations that prioritise safety and security while keeping up with technological advances. Our solutions enable manufacturers to do this, while also meeting the challenges of operating in harsh environments.

Variohm Group solutions include:

- ▶ Cab tilt-down detection on tactical vehicles
- ▶ Azimuth drive for tracking equipment
- ▶ Gantry positioning system for missile guidance simulation
- ▶ Life raft ejection system on naval ships
- ▶ Ensuring proper transmission operation
- ▶ Active suspension systems
- ▶ Air filtration systems
- ▶ Measuring actuating forces on pedals

We provide a greater range of solutions to the defence market, please speak to us about your sensing and measurement requirements.



MARINE

Every component in a **marine** propulsion or fuel system must be able to withstand harsh and variable conditions without compromising performance. We engineer our solutions to excel in corrosive saltwater, high humidity, shock, vibration, and extreme temperatures.

Variohm Group solutions include:

- ▶ Position feedback for shallow water dredging machines
- ▶ Pressure monitoring of hydrogen gas on vessels
- ▶ On-board cargo pump vibration measurement
- ▶ Analogue position feedback to control equipment on ships
- ▶ Motor throttle position
- ▶ Optimising keel position for stability, performance and handling
- ▶ Position sensing for rudder control and steering systems
- ▶ Testing the coil resistance specification in motors

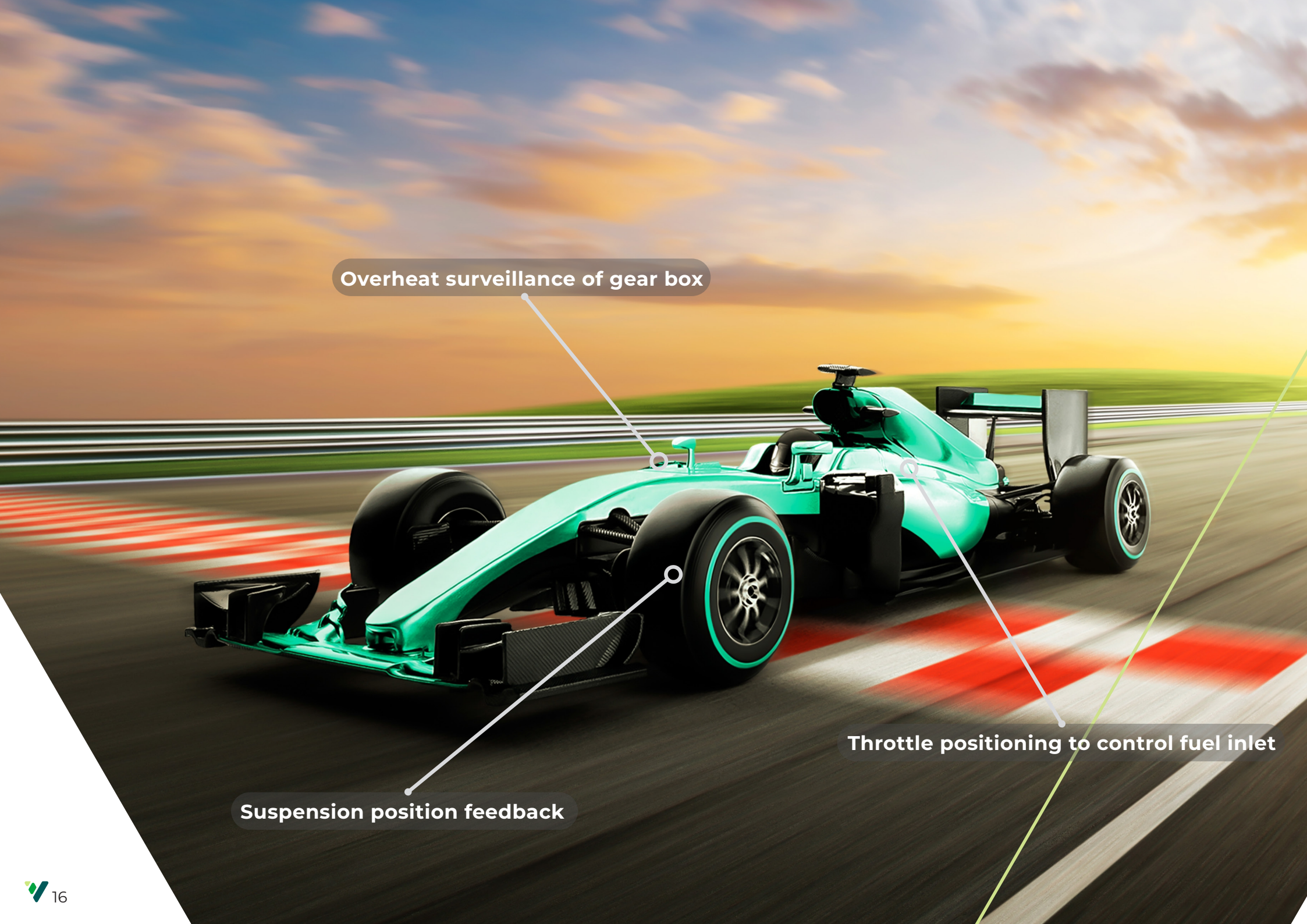
We provide a greater range of solutions to the marine market, please speak to us about your sensing and measurement requirements.



Ship land bridge positioning

Shallow water dredging

System pressure and valve controls



Overheat surveillance of gear box

Suspension position feedback

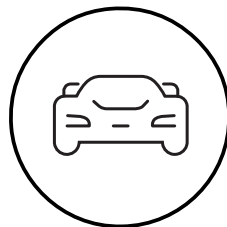
Throttle positioning to control fuel inlet

To meet the demand for critical data for performance monitoring, driver feedback, fuel efficiency and aerodynamics, our **motorsport solutions** have evolved to enable teams to fine-tune strategies while meeting regulatory and safety requirements.

Variom Group solutions include:

- ▶ Handbrake position feedback
- ▶ Data on ride height
- ▶ Feedback to drivers and engineers during gear changes
- ▶ Driver-in-the-loop simulators
- ▶ Suspension control data to enhance tuning and setup
- ▶ Pressure and temperature monitoring of components
- ▶ Inlet valve throttle position sensing

We provide a greater range of solutions to the motorsport market, please speak to us about your sensing and measurement requirements.



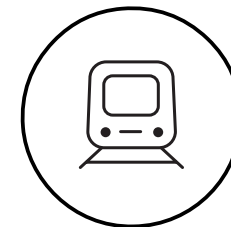
RAIL

Improving safety, efficiency and reliability is at the heart of the **rail industry**. Our components for passenger and freight train rolling stock and rail infrastructure monitor, measure and control various parameters and systems to optimise performance.

Variohm Group solutions include:

- ▶ Electro-mechanical points switching systems
- ▶ Monitoring of battery cooling systems
- ▶ Measurement of cargo weight on freight train wagons
- ▶ Safety, control and monitoring of rail carriage doors
- ▶ Improving the dynamic contact between trains and overhead cables
- ▶ Monitoring of train track distortion
- ▶ Engine temperature monitoring
- ▶ Indicating overtemperature conditions in components and systems
- ▶ Brake force measurement on test benches
- ▶ Contact resistance measurements between axles and wheelsets

We provide a greater range of solutions to the rail market, please speak to us about your sensing and measurement requirements.





Pneumatic cylinder pressure for door opening

Linear position testing during manufacturing

Weight control for load



Position feedback on fork lift position

Function actuation for driver

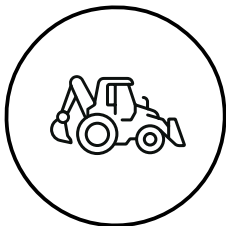
Door interlock on battery doors

SPECIAL PURPOSE VEHICLES

Special purpose vehicles are designed for heavy-duty work in demanding and harsh environments. The component parts must deliver consistent performance and withstand dust, moisture, corrosive substances, intense vibrations and shocks. Precise control of key parameters and accurate data feedback is essential to allow operators to make informed decisions.

Variohm Group solutions include:

- ▶ Throttle control on mobile vehicles
- ▶ Suspension ride height on dumper trucks
- ▶ Temperature measurement on engine test benches
- ▶ Pressure monitoring on suction excavators
- ▶ Outrigger position and load indication
- ▶ Load weight measurement
- ▶ Semitrailer load measurement testing
- ▶ Steering sensor torque/angle testing



We provide a greater range of solutions to the special purpose vehicles market, please speak to us about your sensing and measurement requirements.

VARIOHM GROUP SERVICES



In-House Engineering - Our engineering team develop solutions to complex sensing and switching challenges. Rigorous testing and compliance with applicable industry standards means we can create and refine custom solutions, taking them from concept to full implementation.



New Product Development - We are a strategic partner for many of our customers, acting as an extension to their in-house engineering team. Whether it's detailed product designs, prototypes or finished components, we offer a complete new product development solution that helps our customers maintain their competitive edge.



Product Customisation - Working together with our customers ensures we understand what they need and allows us to create customised solutions that are a perfect fit for their application.



On-Site Manufacturing - We have manufacturing facilities in the UK, Hungary and the USA which gives us control over production. Strict quality controls and the flexibility to adjust products and production timescales means we reduce waste and build long-term relationships with our customers.



Industry-Leading Supply Partners - By working with trusted suppliers who meet strict standards, we can consistently offer top-quality products and services that are often leading the way in innovation. Our close and collaborative partnerships enable us to create the best solution for your needs.



Accreditations - Businesses within Variohm Group hold a wide range of accreditations including ISO14001, ISO9001, ISO45001, ISO13485 and ISO 17025. These certifications demonstrate our commitment to operating at the highest standards across all facets of our business.



 | **BURSTER**

 | **CPI**

 | **EUROSENSOR**

 | **HEASON**

 | **HERGA**

 | **IXTHUS**

 | **LIMITOR**

 | **MAGNASPHERE**

 | **PHOENIX**
A M E R I C A

 | **POSITEK**

TRANSPORT SENSORS



LINEAR POTENTIOMETER

- ▶ High-performance and industrial versions
- ▶ Small, robust and long life
- ▶ Shock and vibration resistant
- ▶ Voltage divider principle
- ▶ Sealing up to IP67



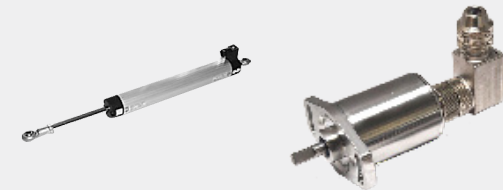
ROTARY HALL EFFECT SENSORS

- ▶ 0 to 360° position sensing
- ▶ Temperature operation from -40...125 °C
- ▶ Programmable angles from 30...360°
- ▶ IP67/IP68 protection



MAGNETIC ENCODERS

- ▶ High and low resolution modules
- ▶ Excellent speed, direction and relative position feedback
- ▶ Operating temperature -40...+125 °C
- ▶ Operating range 4 - 24 V



LINEAR/ROTARY INDUCTIVE SENSORS

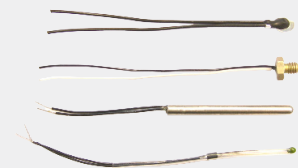
- ▶ Non-contacting inductive technology
- ▶ Angle set to customer's requirement
- ▶ Compact, durable and reliable
- ▶ High accuracy and stability
- ▶ Sealing to IP67/IP69K as required

TRANSPORT SENSORS



SPEED SENSORS

- ▶ Digital output signal
- ▶ Gear Tooth sensing capability
- ▶ Operates from -40...125 °C
- ▶ Zero speed operation
- ▶ High speed (15kHz) operation



TEMPERATURE PROBES

- ▶ Temperature ranges from -96...350 °C
- ▶ RTD or NTC based probes
- ▶ Screw type, ring terminal, tubular probes
- ▶ Custom housings & connectors
- ▶ High voltage and Hydrogen compatible versions



COMBINED PRESSURE- / TEMPERATURE TRANSDUCERS

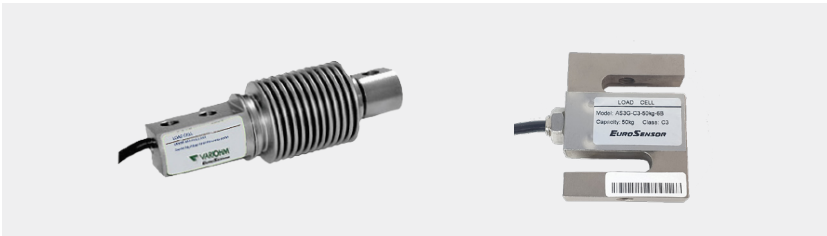
- ▶ 0-0.6 bar up to 1000 bar measurement range
- ▶ Temperature range -55...150 °C
- ▶ Analogue output signal
- ▶ PT1000 or analogue output
- ▶ Integrated or exposed temperature probe



TEMPERATURE TRANSDUCERS

- ▶ Temperature range -40...150 °C
- ▶ Analogue output signals
- ▶ Wide range of process connections
- ▶ Wide range of connector options
- ▶ Hydrogen compatible version available

TRANSPORT SENSORS



LOAD CELLS

- ▶ Precise compression/tension measuring
- ▶ High overload versions available
- ▶ Excellent price/performance ratio
- ▶ Hermetically sealed IP68 versions



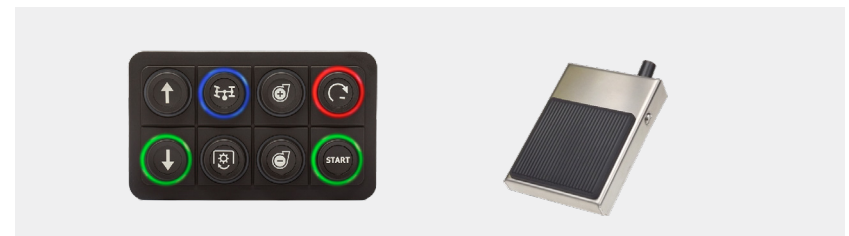
PRESSURE SWITCHES

- ▶ Ultra-sensitive patented dual-diaphragm/dual contact
- ▶ Switch range 0.25 - 124.59 mbar
- ▶ Extended temperature range
- ▶ Fitted with an AMP superseal connector



BALL & PLUNGER SWITCHES

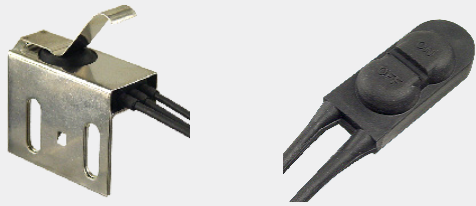
- ▶ Plated steel, brass, or stainless steel
- ▶ SPST momentary, NO and NC available
- ▶ Temperature resistance range -40...200 °C
- ▶ Environmental resistance: acids, alkalies, salt spray, sand, dust, and fungus
- ▶ Military and industrial grade



HMI / FOOT SWITCHES

- ▶ CAN and RS485 keypad addresses
- ▶ LED state & status configurable
- ▶ Customisable inserts/icons
- ▶ Plastic and metal housing
- ▶ USB option + customised cables & plugs on request

TRANSPORT SENSORS



WATERPROOF SWITCHES

- ▶ Normally open, closed, SPDT
- ▶ Truly waterproof IP68
- ▶ Stainless steel mounting limit switches
- ▶ Switch panels
- ▶ Military and industrial grade



MAGNETS

- ▶ Cost effective design
- ▶ High resistance to demagnetisation
- ▶ Tough environmental endurance
- ▶ Very resistant to chipping
- ▶ Wide range of pole counts



PRESSURE TRANSDUCERS

- ▶ 0-20 mbar up to 5000 bar measurement range
- ▶ Analogue and digital output signals, incl. low energy
- ▶ Wide range of process connections
- ▶ Wide range of electrical connections
- ▶ For use with Hydrogen EC79 and EC406 approved



COMPRESSION LOAD CELLS

- ▶ 0-60kg up to 200t
- ▶ Accuracy class C3, C4 and C5
- ▶ Stainless-steel construction

TRANSPORT SENSORS



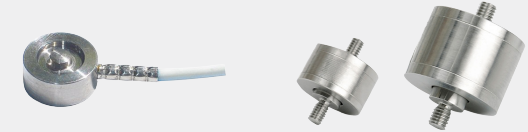
TORQUE SENSORS

- ▶ 0,01–5000 Nm measurement range
- ▶ Rotating and non-rotating sensors
- ▶ Relative non-linearity $\leq \pm 0,05$ % F.S.



SENSOR ELECTRONICS

- ▶ High-precision indicators and amplifiers for sensors and norm signals
- ▶ Fieldbus, digital and analog output
- ▶ Cabinet or inline housing (IP65)



MINIATURE AND PRECISION LOAD CELLS

- ▶ Wide range of measuring ranges up to 1 MN
- ▶ Highest accuracy up to a relative non-linearity of 0,035 % F.S.
- ▶ Wide range of types: tension, compression, miniature, bending beam, multi-component



MEASUREMENT AND TEST DEVICES

- ▶ X/Y monitoring of industrial processes
- ▶ High-speed resistance measurement
- ▶ Battery measuring modules

TRANSPORT SENSORS



CALIBRATION DEVICES FOR MECHANICAL VALUES

- ▶ Supported sensors: Strain gauge, normalized signal ± 5 V, ± 10 V, potentiometric sensors
- ▶ Storage of up to 16 measurement programs
- ▶ Data logger for up to 30,000 measurements



CALIBRATION INSTRUMENTS FOR RTD AND RESISTANCE

- ▶ Resistance range: 10 m Ω ... 1.2 M Ω (accuracy from ± 0.003 % +3 m Ω)
- ▶ Pt100...Pt1000 and Ni100...Pt1000 (accuracy from ± 0.02 °C)
- ▶ Temperature coefficient: from <1 ppm/K



CALIBRATION SOURCES FOR TEST BAY AND LAB

- ▶ DC voltage ± 100 nV ... ± 100 V
- ▶ DC current ± 100 nA ... ± 50 mA
- ▶ 12 thermocouple type (accuracy from ± 0.1 K)



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