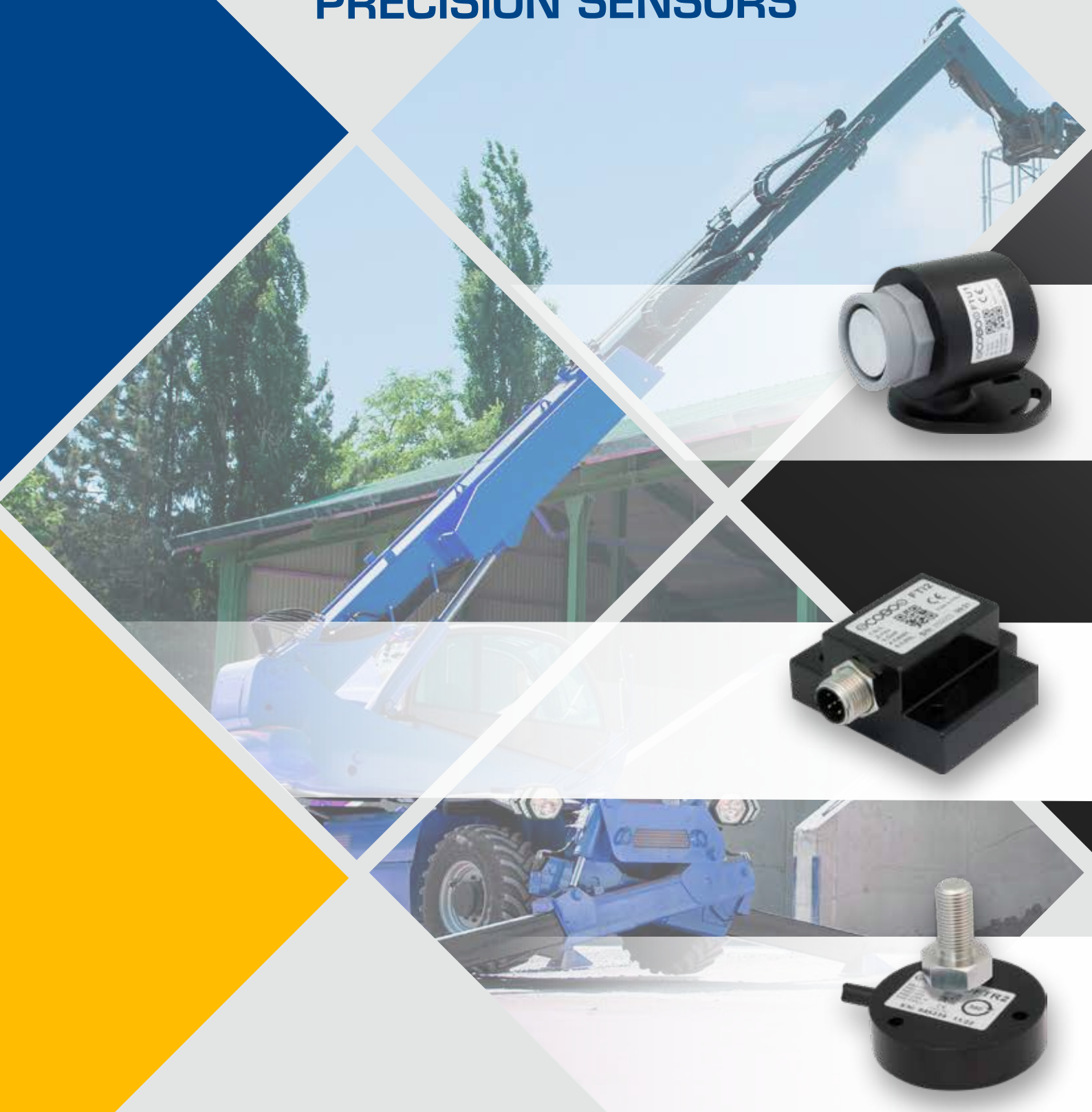


COBO

PRECISION SENSORS



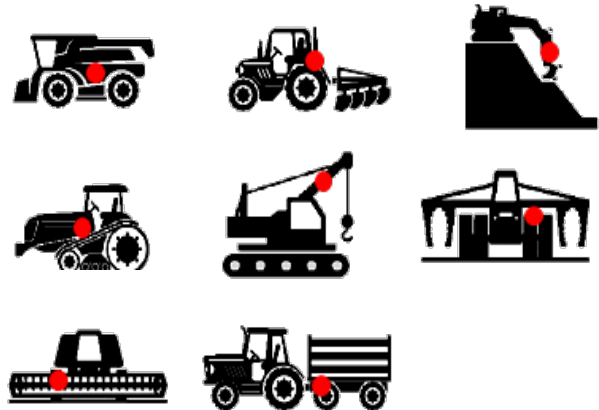
FTI2

DYNAMIC INCLINATION SENSOR

Easy-to-deploy 6-DoF IMU with enhanced digital filtering

FTI2 dynamic gyroscope inclinometer is an inertial product that provides precise roll and pitch angle measurement for moving/vibrating objects. Combining a classic acceleration sensor with an angular rate sensor enables accurate and fast measurement results even if the moving equipment is subject to strong accelerations. The measurement results of conventional tilt sensor is based on accelerometer or electrolyte principle will be affected by the additional axial acceleration and centripetal acceleration when in

dynamic use situations such as vehicle motion and ship swaying motion. Thus, the effective angle measurement data cannot be identified, and the accuracy is also not guaranteed. Differently the **FTI2** adopts advanced inertial navigation technology and it can accurately measure the dynamic roll and angle both horizontally or vertically and can be used reliably on mobile equipment such as construction machinery, cranes or agriculture machinery.

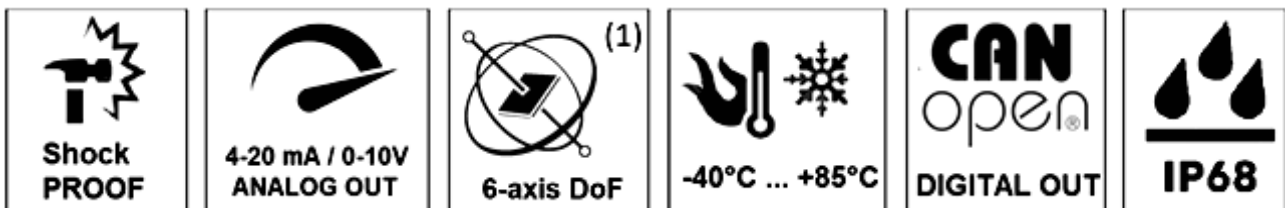


MAIN FEATURES

- State-of-the-art capacitive IMU technology.
- Tilt range: single-axis 360° or dual-axis $\pm 90^\circ$.
- IP68 protection class and wide temperature range.
- Long term stability.
- Internal cycle 2.5 ms.
- Resolution up to 0.01°.
- Compact, flat and robust housing.

APPLICATIONS

- Construction equipment.
- Agricultural machinery.
- Lifting technology.
- Automotive systems.
- Stability monitoring.
- Antenna stabilization.
- Crane/hoisting technology.



1. The FTI2 enables 6 axis motion detection based on raw data acquisition for acceleration (3 axis) and rotation rate (3 axis). High-precision data processing carried out @ 400 Hz using a sophisticated sensor fusion algorithm enables high performances in any conditions. Integrated sensor fusion filters help in orientation calculation by suppressing externally acting accelerations.

FTI3

REDUNDANT DYNAMIC INCLINATION SENSOR *Easy-to-deploy dynamic tilt sensor with enhanced digital filtering*

High precision advanced capacitive MEMs technology sensor with 6 DoF (Degrees of Freedom), for angle measurement at both single axis (0° to 360°) and double axis (up to ± 90°). Combining a classic acceleration sensor with an angular rate sensor enables accurate and fast measurement results even if the moving equipment is subject to strong accelerations and vibrations. The orientation of the sensor can be determined not only quasistatically but also in motion, as external accelerations can be reliably

compensated by the internal sensor fusion algorithm. FTI3 is provided with analog, CANopen output (CAN CiA DS301 and CAN CiA DS410) or SAE J1939. Top performance, high IP rating, resistance to shock and vibrations, together with excellent long-term stability, make FTI3 suitable for both mobile hydraulics applications and stability monitoring in civil engineering. FTI3 dynamic response can be easily programmed changing digital filters parameters.

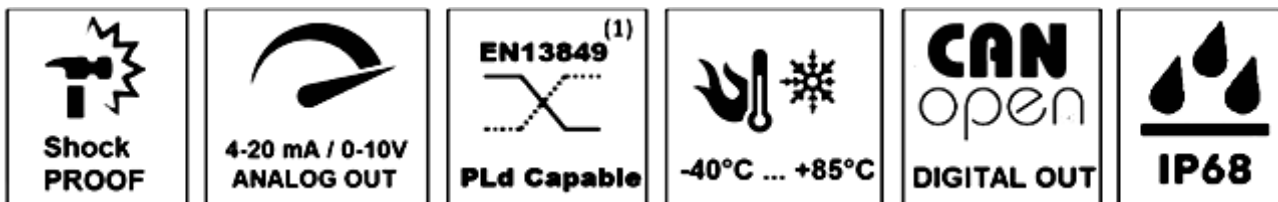


MAIN FEATURES

- State-of-the-art capacitive MEMs technology.
- Tilt range: single-axis 360° or dual-axis ± 5° to ± 90°.
- IP68 protection class and wide temperature range.
- Long term stability and very low thermal drift.
- Optional redundant output.
- Resolution up to 0.005°.
- Compact, flat and robust housing.

APPLICATIONS

- Construction equipment.
- Agricultural machinery.
- Crane and lifting technology.
- Automotive systems.
- Stability monitoring.
- Antenna stabilization.
- Telescopic forklift stability.



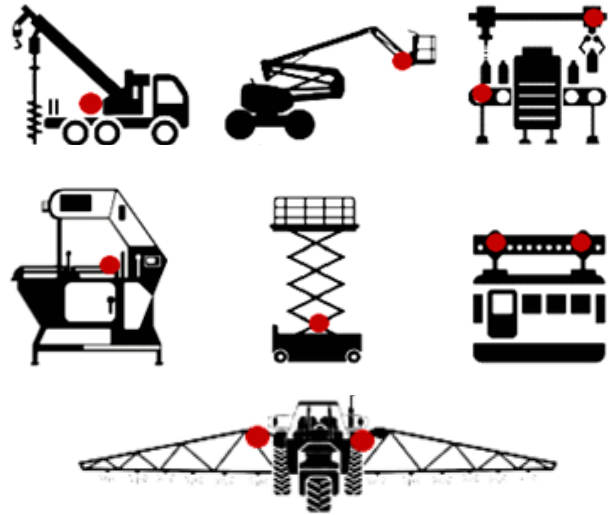
1. The FTI3 in full redundant configuration enables 6 axis motion detection based on raw data acquisition for acceleration (3 axis) and rotation rate (3 axis). High-precision data processing carried out @ 400 Hz a sophisticated sensor fusion algorithm enables high performances in any conditions. Integrated sensor fusion filters help in orientation calculation by suppressing externally acting accelerations.

FTL1

IP68 CONTACTLESS POSITION SENSOR SINGLE OR REDUNDANT *Wear- and maintenance-free unit with CANopen and analog output*

Position transducer with HALL non-contacting measurement principle on printed circuit board basis, for direct, accurate measurement of travel in display or feedback applications. The actuating rod can be supported on single side or on both ends by slide bearings, allowing high lateral forces on the tip of the rod. The robustness and the compact housing design make the **FTL1** a reliable solution for industrial and mobile hydraulic environment.

The output of the linear sensor is a voltage or a digital CANopen or **J1939** standard. **FTL1** offers measurement ranges up to 50 mm. High IP protection level, resistance to shock and vibration, and high electromagnetic compatibility make these products suitable for many applications. A full-redundant configurations with diagnostic functions are also available.

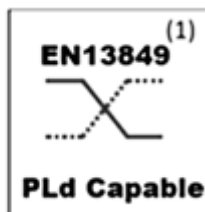


MAIN FEATURES

- State-of-the-art Hall technology.
- Range: up to 50mm.
- IP68 protection class and wide temperature range.
- Long term stability and very low thermal drift.
- Optional redundant output.
- Suitable for safety-relevant applications EN13849.

APPLICATIONS

- Construction equipment.
- Agricultural machinery.
- Wheel vector sensor
- Metal working machines
- Foil packaging machines
- Railroad engineering



1. Redundant output: FMEA/FMEDA analysis and safety manual together with PFH, DC and MTTFd parameters available upon request, but subject to signature of an NDA agreement.

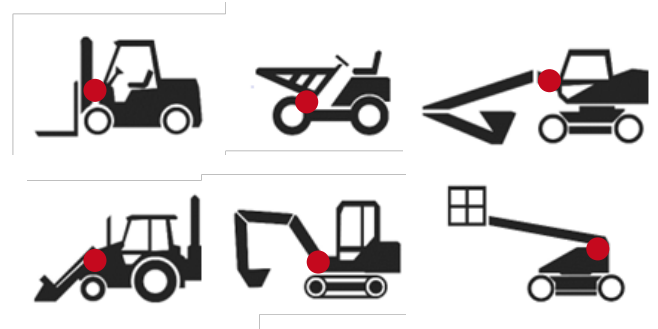
FTL2

IP68 CONTACTLESS LINEAR POSITION SENSOR

Wear and maintenance free unit with CANopen and J1939 output

The FTL2 device is based on magnetic non-contacting measurement principle on printed circuit board basis, for direct, accurate measurement of position displacement. The absence of electrical contact on the cursor eliminates wearing and guarantees almost unlimited life. FTL2 sensor has a modular structure for simple installation inside oil-pressure cylinders.

Its unique design, plus a wide range of cursor configurations, ensures easy installation and total compatibility with cylinder manufacturer specifications. Working temperature from -40 to +105°C, working pressures up to 350 bar, high resistance to vibration (25 g) and shock (100g) give the sensor the indispensable strength needed for heavy-duty use (for example: mobile hydraulics).



MAIN FEATURES

- State-of-the-art Hall technology.
- Range: up to 136mm (other lengths on request).
- IP68 protection class and wide temperature range.
- Long term stability and very low thermal drift.
- Working pressure up to 350 Bar

APPLICATIONS

- Construction equipment.
- Agricultural and forestry machine.
- Metal working machines.
- Automotive systems.
- Railroad engineering



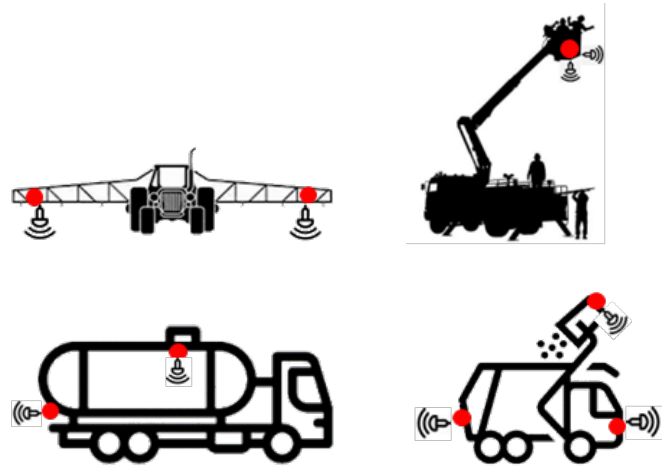
FTU1

MIDDLE-RANGE ULTRASONIC DISTANCE SENSOR

Wear- and maintenance-free unit with CANopen, analog and switching output

Last generation of the ultrasonic sensor series FTU1 enables the user to cover middle ranges with high resolution and linearity. The FTU1 ultrasonic systems are characterized by their reliability and outstanding versatility. Ultrasonic sensors can be used to solve even the most complex tasks involving object detection or level measurement with high precision, because their measuring method works reliably under almost all conditions. No other measuring method can be successfully put to use on such a wide scale and in so many different applications.

The devices are extremely robust, making them suitable for even the toughest conditions. The measurement values are transmitted in real-time to the control unit using CANopen protocol or switching output (NPN, PNP or Push-Pull) or analog output. Due to its robust and wear-free production, the FTU1 with protection class IP67 is optimally suited for use under extremely difficult conditions and at temperatures of -40° to +85° Celsius.



MAIN FEATURES

- State-of-the-art ultrasonic technology.
- Sensor head bidirectional and fully 360° rotatable.
- IP67 protection class and wide temperature range.
- Long term stability.
- CANopen and digital output.
- Quick mounting bracket.
- Programmable.

APPLICATIONS

- Construction equipment.
- Agricultural machinery.
- Lifting technology
- Automotive systems
- Liquid level monitoring
- Anti-collision.
- Woodworking and furniture.



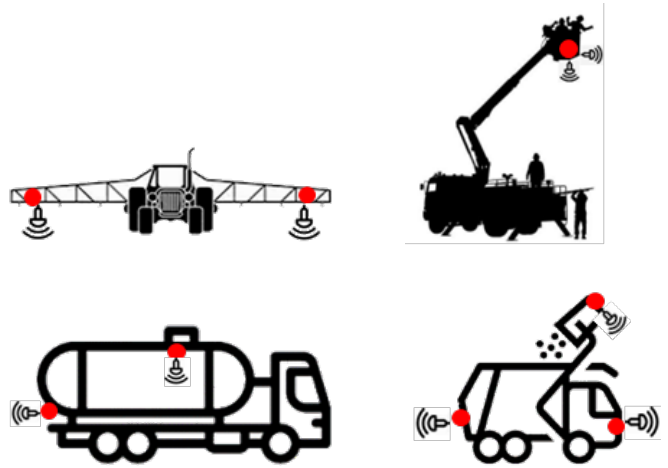
FTU2

LONG-RANGE ULTRASONIC DISTANCE SENSOR

Wear- and maintenance-free unit with CANopen, analog and switching output

Last generation of the ultrasonic sensor series FTU2 enables the user to cover long ranges with high resolution and linearity. The FTU2 ultrasonic systems are characterized by their reliability and outstanding versatility. Ultrasonic sensors can be used to solve even the most complex tasks involving object detection or level measurement with high precision, because their measuring method works reliably under almost all conditions. No other measuring method can be successfully put to use on such a wide scale and in so many different applications.

The devices are extremely robust, making them suitable for even the toughest conditions. The measurement values are transmitted in real-time to the control unit using CANopen protocol or switching output (NPN, PNP or Push-Pull) or analog output. Due to its robust and wear-free production, the FTU2 with protection class IP67 is optimally suited for use under extremely difficult conditions and at temperatures of -40° to +85° Celsius.



MAIN FEATURES

- State-of-the-art ultrasonic technology.
- Sensor head bidirectional and fully 360° rotatable.
- IP67 protection class and wide temperature range.
- Long term stability.
- CANopen and digital output.
- Quick mounting bracket.
- Programmable.

APPLICATIONS

- Construction equipment.
- Agricultural machinery.
- Lifting technology
- Automotive systems
- Liquid level monitoring
- Anti-collision.
- Woodworking and furniture.



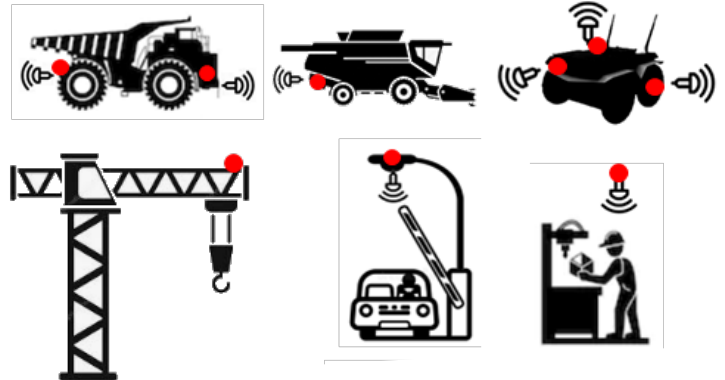
FTM2

SPEED, DIRECTION, DISTANCE and ANGLE RADAR SENSOR

Wear- and maintenance-free unit with CANopen and NC/NO switching output

The state-of-the-art FTM2 sensor is a fully digital and low cost Doppler radar that can measure speed, direction, distance and angle of moving objects in front of the sensor. The compact and versatile structure makes it very easy to use in any stand-alone application. The sensor includes a 3x4 patch antenna radar front-end with an asymmetrical beam and a powerful signal processing unit with four configurable digital switches and digital output for signal detection information.

A built-in tracking filter makes the sensor output even easier to use. The FTM2 sensor contains everything that is necessary to build a simple, yet reliable movement, speed, distance and angle detector. Due to its robust and wear-free production, the FTM2 with protection class IP67 is optimally suited for use under extremely difficult conditions and at temperatures of -20° to +85° Celsius.



MAIN FEATURES

- 24 GHz radar motion detector.
- Detection distance up to 30 m.
- IP67 protection class and wide temperature range.
- High immunity against interferences.
- FFT signal processing with CANopen output.
- Quick mounting bracket.
- Detection range programmable.

APPLICATIONS

- Collision avoidance in MH.
- Protecting dangerous zone.
- Security equipment.
- Traffic control systems.
- Object speed detection.
- Parking management systems.
- Industrial drone.



FTR2

WEAR-FREE SINGLE AND REDUNDANT ROTARY SENSOR

No actuator shaft solutions in 3D Hall Technology

The FTR2 Series Hall-effect Rotary Position Sensors provide non-contact sensing in harsh transportation and industrial applications at a competitive cost. The absence of the actuator shaft removes the wear and tear on the bearings caused by radial forces. The output of the rotary sensor is a voltage, a current or a digital CANopen standard.

FTR2 offers measurement ranges up to 360° with possibility to program analogue versions of $\pm 5^\circ$ steps. High IP protection level, resistance to shock and vibration, and high electromagnetic compatibility make these products suitable for many applications. A full-redundant configurations are also available.

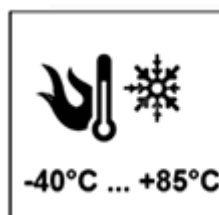
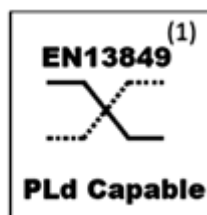


MAIN FEATURES

- State-of-the-art Hall technology.
- Range: up to 360° in programmable steps.
- IP68 protection class and wide temperature range.
- Long term stability and very low thermal drift.
- Optional redundant output.
- Suitable for safety-relevant applications EN13849.
- Compact, flat and robust housing.

APPLICATIONS

- Textile machinery.
- Packaging machinery.
- Sheet metal and wire machinery.
- Automotive systems.
- Medical engineering.
- Construction machinery.
- Agricultural and forestry machine.



1. **Redundant output:** FMEA/FMEDA analysis and safety manual together with PFH, DC and MTTFd parameters available upon request, but subject to signature of an NDA agreement.

FTR3

CONTACTLESS ROTARY SENSOR WITH SHAFT

Calibrated small form factor solutions in 3D Hall Technology

The FTR3 Series Hall-effect Rotary Position Sensors provide non-contact sensing in harsh transportation and industrial applications at a competitive cost. The actuator shaft is coupled with the main body through bearings but kept mechanically isolated from the electronics, improving robustness. The output of the rotary sensor is a voltage, a current or a digital CANopen standard.

FTR3 offers measurement ranges up to 360° with possibility to program analogue versions of $\pm 5^\circ$ steps. High IP protection level, resistance to shock and vibration, and high electromagnetic compatibility make these products suitable for many applications. A full-redundant configurations are also available.

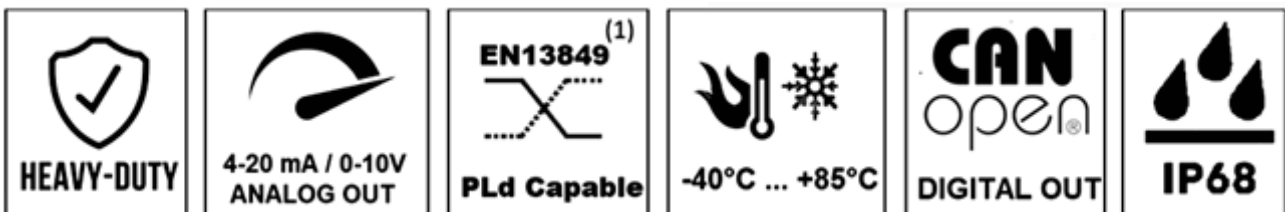


MAIN FEATURES

- State-of-the-art Hall technology.
- Range: up to 360° in programmable steps.
- IP68 protection class and wide temperature range.
- Long term stability and very low thermal drift.
- Optional redundant output.
- Suitable for safety-relevant applications EN13849.
- Compact and robust housing.

APPLICATIONS

- Textile machinery.
- Packaging machinery.
- Sheet metal and wire machinery.
- Automotive systems.
- Medical engineering.
- Construction machinery.
- Agricultural and forestry machine.



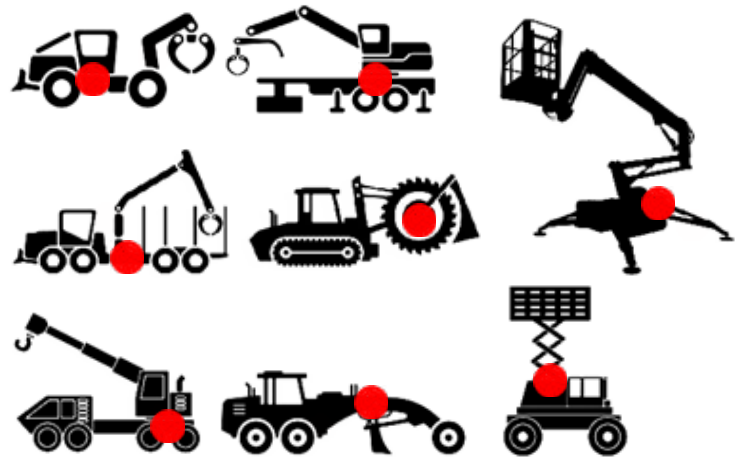
1. **Redundant output:** FMEA/FMEDA analysis and safety manual together with PFH, DC and MTTFd parameters available upon request, but subject to signature of an NDA agreement.

FTR4

WEAR-FREE MULTITURN MAGNETIC ROTARY SENSOR *No actuator shaft solutions in state-of-the-art TMR technology.*

The FTR4 series is a high-resolution rotary position sensor for absolute angle measurement over a full 16-turns (analog) or 65535-turns (CANopen) range. This new position sensor is equipped with a revolutionary integrated ultra-low power TMR angle sensor. For increased signal quality at lower rotational speed, a tailored dynamic filter system reduces transition noise. The angular position is given as analog output or according to CANopen Application Layer and Communication Profile, CiA Draft Standard 301,

Version 4.1 and according to Device Profile for Encoders CiA Draft Standard Proposal 406. In the multiturn version, the number of revolutions is recorded in a counter. The position value is saved on shutting off the supply voltage. High IP protection level, resistance to shock and vibration, and high electromagnetic compatibility make the FTR4 sensor suitable for many applications. A full-redundant configurations are also available.

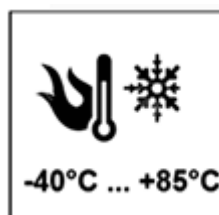
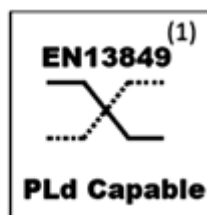


MAIN FEATURES

- State-of-the-art TMR technology.
- Range: up to 28 bits in multiturn configuration.
- Wide temperature range.
- Long term stability and very low thermal drift.
- Optional redundant output.
- Suitable for safety-relevant applications EN13849.
- Compact, flat and robust PCB level device.

APPLICATIONS

- Textile machinery.
- Packaging machinery.
- Sheet metal and wire machinery.
- Automotive systems.
- Medical engineering.
- Construction machinery.
- Agricultural and forestry machine.



1. Redundant output: FMEA/FMEDA analysis and safety manual together with PFH, DC and MTTFd parameters available upon request, but subject to signature of an NDA agreement.

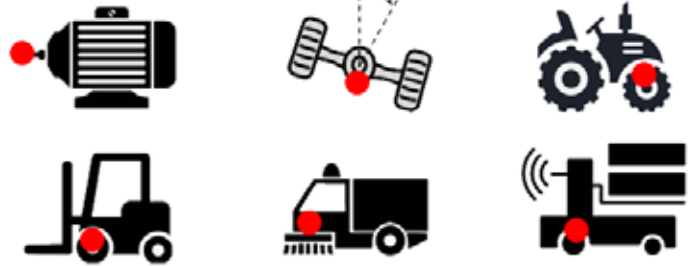
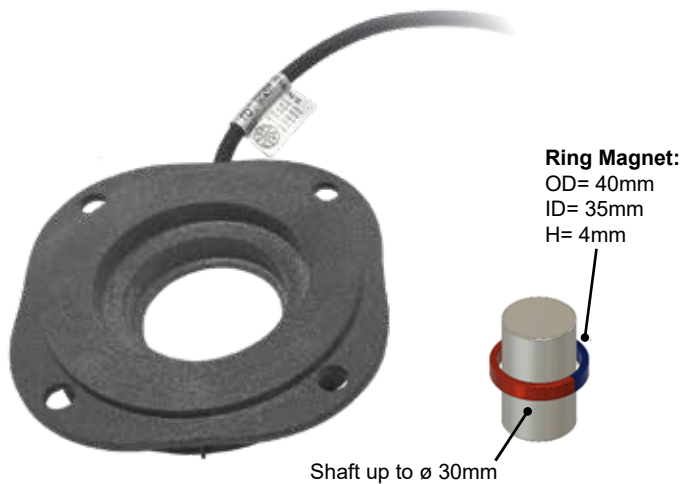
FTS1

“THROUGH-SHAFT” MAGNETIC ANGLE ENCODER

Wear- and maintenance-free unit with SIN/COS, ABZ and UVW output

The FTS1 sensor is a compact solution for “through-shaft” angular position sensing. The FTS1 senses the angular position of a ring permanent magnet placed on a rotating shaft. The magnetic ring must be diametrically polarized. The FTS1 uses a patented combination of state-of-the-art Hall sensor technology and sophisticated digital signal processing algorithms to detect and compute the magnetic flux density distribution at the surface of the silicon. The sine and cosine voltage outputs from the sensor array vary with magnet position.

The relative changes of the angle position are output through incremental A QUAD B encoder, U,V,W or analog SIN/COS signals with 12 bit resolution. The resolution of incremental output is 1024 counts per turn. With its compact size the FTS1 angular magnetic encoder is especially suitable for different applications, including motor motion control, flow measurement, robotics, camera positioning, front panel switches, workshop equipment, mobility aids etc.

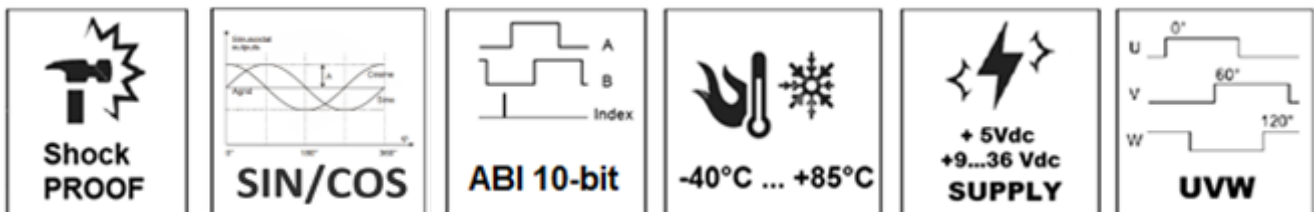


MAIN FEATURES

- Contactless angular position sensor.
- Ideal for harsh environment.
- Complete system in one solution.
- High immunity against interferences.
- 10-bit absolute encoder.
- +5 V or 9...36 Vdc.

APPLICATIONS

- AC,DC and AC brushless motors.
- Agricultural machinery.
- AGV.
- Material handling.
- Electric vehicles.
- Automotive.



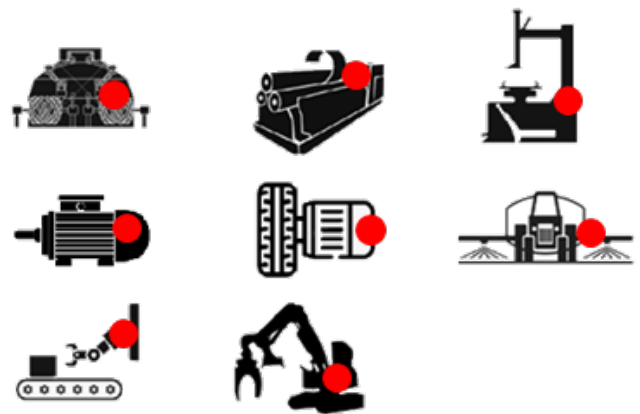
FTS3

EMBEDDED HIGH-SPEED ROTARY ENCODER WITH A QUAD B INCREMENTAL OUTPUT OR ANALOG SIN/COS

Contactless and maintenance-free unit with SIN/COS, ABZ and UVW output

The FTS3 sensor is a compact solution for angular position sensing. The FTS3 senses the angular position of a ring permanent magnet placed on a rotating shaft. The magnetic ring must be diametrically polarized. The FTS3 uses a combination of state-of-the-art Hall sensor technology and sophisticated digital signal processing algorithms to detect and compute the magnetic flux density distribution at the surface of the silicon. The sine and cosine voltage outputs from the sensor array vary with magnet position.

The relative changes of the angle position are output through incremental A QUAD B encoder or analog SIN/COS signals with 12 bit resolution. With its compact size the FTS3 angular magnetic encoder is especially suitable for different applications, including motor motion control, flow measurement, robotics, camera positioning, front panel switches, workshop equipment, mobility aids etc.



MAIN FEATURES

- State-of-the-art Hall technology.
- Range: 360° continuous.
- Wide temperature range.
- Long term stability and very low thermal drift.
- Excellent resistance to shocks/vibrations.
- Two-part design.
- Compact and flat.

APPLICATIONS

- Textile machinery.
- Packaging machinery.
- Sheet metal and wire machinery.
- Automotive systems.
- Medical engineering.
- BLDC motors.
- Agricultural and forestry machine.

<p>Shock PROOF</p>	<p>PWM ANALOG</p>	<p>ABI 8 bit</p>	<p>-40...+105°C</p>	<p>+5Vdc +9...36 Vdc SUPPLY</p>	<p>SIN/COS</p>
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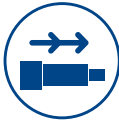
LINEAR POSITION
END OF STROKE SENSORS



ROTARY SENSORS



LENGTH SENSORS



ROTARY SENSORS

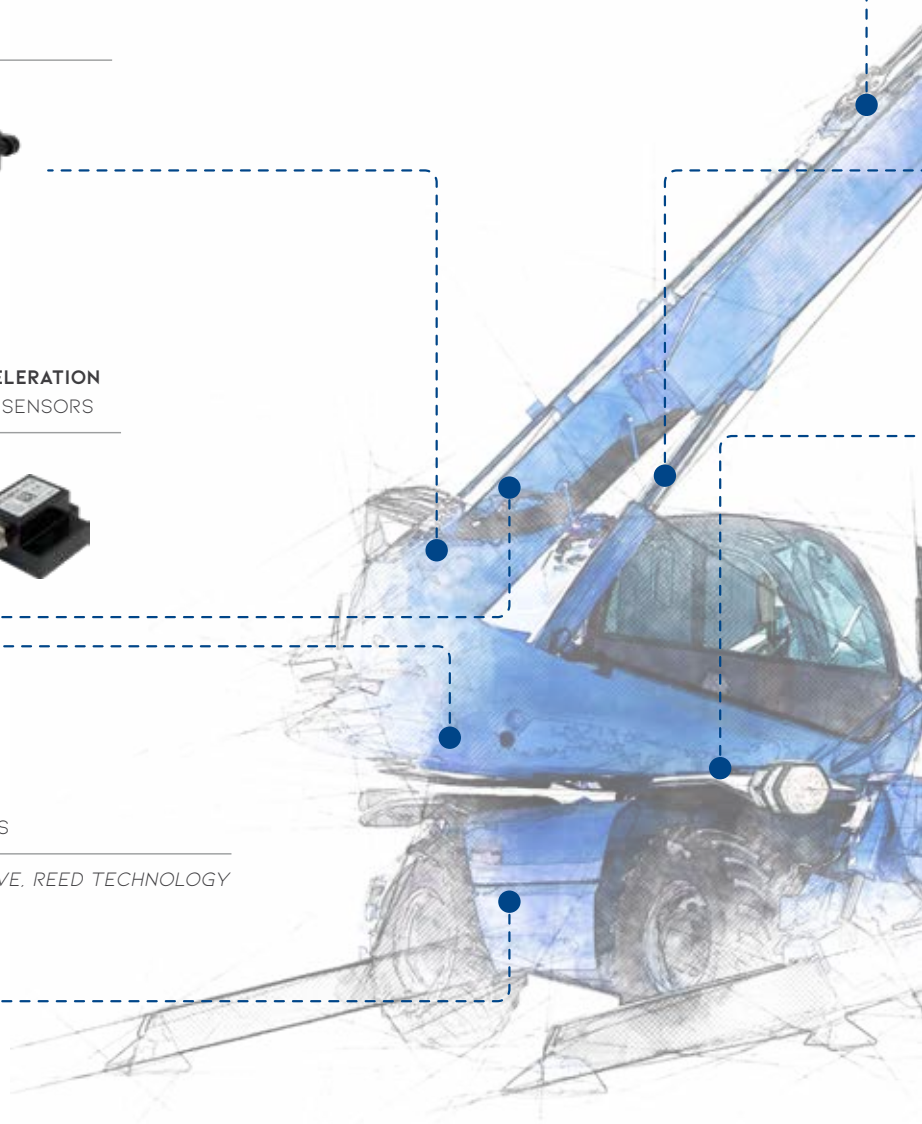


INCLINATION & ACCELERATION
INERTIAL PLATFORM SENSORS



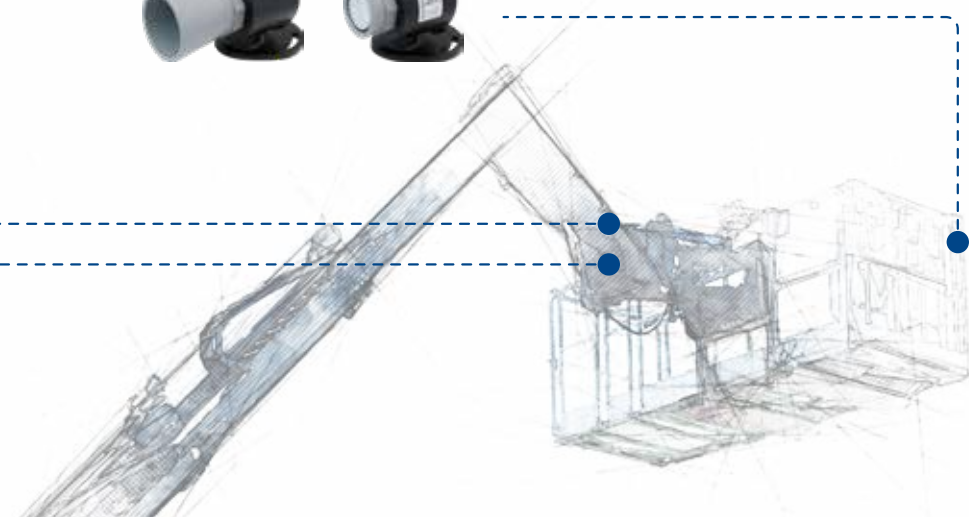
FUEL LEVEL SENSORS

RESISTIVE, CAPACITIVE, REED TECHNOLOGY

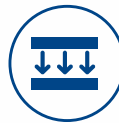


**OBSTACLE DETECTION
ANTICOLLISION SENSORS**

ULTRASONIC TECHNOLOGY



PRESSURE SENSORS



MULTITURN ROTARY SENSORS

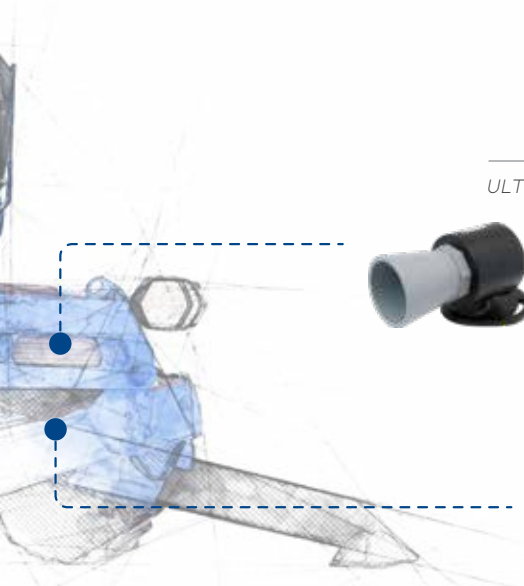


**OBSTACLE DETECTION
ANTICOLLISION SENSORS**

ULTRASONIC & RADAR TECHNOLOGY



LINEAR POSITION SENSORS



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