

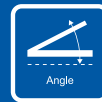


perfect in sensors.

# Product Overview Sensors



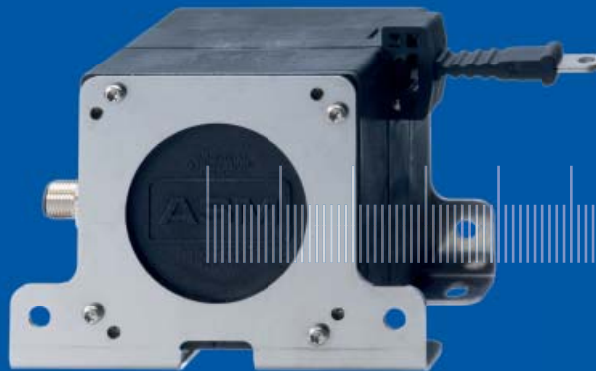
Displacement



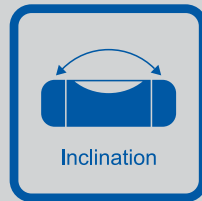
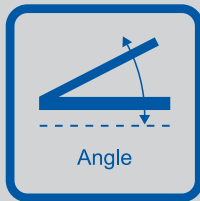
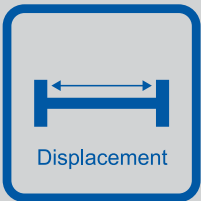
Angle



Inclination



# Robust sensor solutions for displacement, angle, and inclination.



### Tailored to your requirements

The specialists at ASM have been developing robust sensors for displacement, angle and inclination for over 40 years. Thanks to innovative sensor technologies, ASM sensors can cope with harsh environmental conditions such as moisture, dirt, intensive cleaning, extreme temperature fluctuations, shock and vibration.

### Robust components, long service life

Innovative sensor technologies are the basis of all ASM sensor product lines. Non-contact and wear-free measuring methods as well as robust mechanical components make ASM sensors robust against environmental influences and guarantee a long service life. Special solutions such as patented longitudinal water protection for the critical point of cable entry and hermetically sealed housings ensure functional reliability and measuring accuracy even under the most difficult operating conditions, e.g. in the field of mobile machines.

### Leading-edge with ASM-encoder technology

Market-available encoder technologies quickly reach their limits under harsh operating conditions. ASM has therefore developed the magnetic absolute encoder technology **posihall**<sup>®</sup>. The technology is so robust that the sensors even function when the housing is filled with water or oil. The true absolute technology also ensures that correct measurement results are displayed immediately after a power failure. The product lines **positape**<sup>®</sup> and **posiwire**<sup>®</sup> are equipped with this technology.

### ISO-certified quality management

ASM sensors have always been known for their outstanding quality. The DIN EN ISO 9001:2015 certified quality management and the use of state-of-the-art production technologies guarantee consistently high product quality.

## Product range



### Displacement

<b>posiwire</b> <sup>®</sup>	Cable Extension Position Sensors	p. 4
<b>positape</b> <sup>®</sup>	Tape Extension Position Sensors	p. 8
<b>posichron</b> <sup>®</sup>	Magnetostrictive Position Sensors	p. 12
<b>posimag</b> <sup>®</sup> <b>lin</b>	Magnetic Scale Position Sensors	p. 16



### Angle

<b>posimag</b> <sup>®</sup> <b>rot</b>	Magnetic Incremental Encoders	p. 16
<b>posiro</b> <sup>®</sup>	Magnetic Angle Sensors	p. 20
<b>posihall</b> <sup>®</sup>	Magnetic Multiturn Encoders	p. 26



### Inclination

<b>positilt</b> <sup>®</sup>	Inclination Sensors	p. 30
<b>positilt</b> <sup>®</sup> <b>PTK</b>	Gyro-compensated Inclination Sensors	p. 34

# posiwire®

## Cable Extension Position Sensors

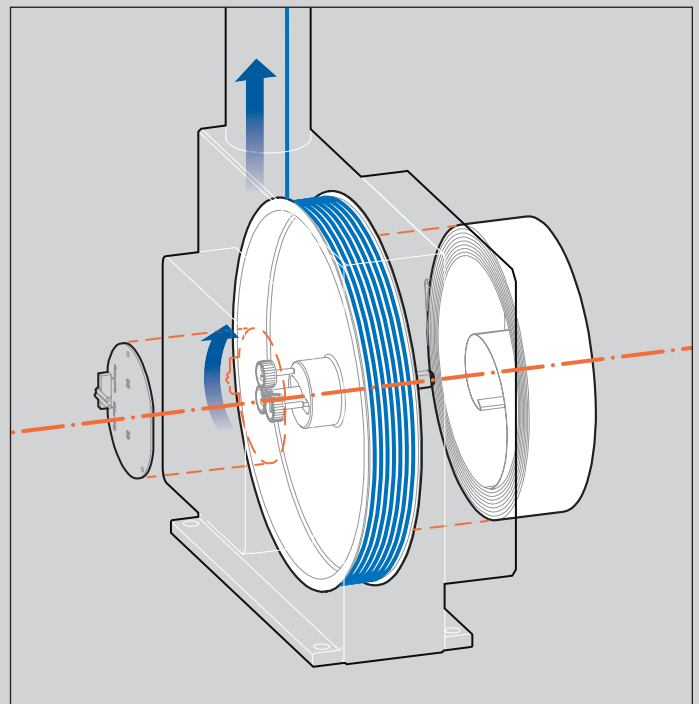


### The new generation of sensors. More robust than ever.

The new generation of posiwire® cable extension sensors with magnetic absolute encoders is significantly more robust than conventional cable sensors: The contactless, magnetic multihall encoder technology is wear-free and far superior to optical encoders and potentiometer solutions – particularly in challenging environmental conditions. The new generation of sensors is available with redundant encoder systems, and features models with optical encoders or potentiometers. The latest additions to the range include models with an integrated inclination sensor.

### The Technology

posiwire® cable extension sensors determine linear positions by unrolling a measuring cable. This process incorporates the magnetic absolute encoder system in the new posiwire® sensors which generates the readings of the cable drum rotation. The sensor electronics then convert the signal into conventional, industry-standard output types.



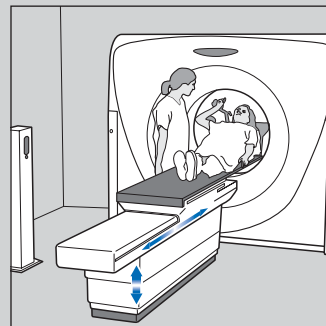
## The Advantages

- More robust than conventional cable sensors thanks to magnetic absolute encoders
- Degree of protection up to IP68/IP69
- Resistant to vibrations and shock
- Linearity up to 0.01%
- Measurement length up to 40,000 mm

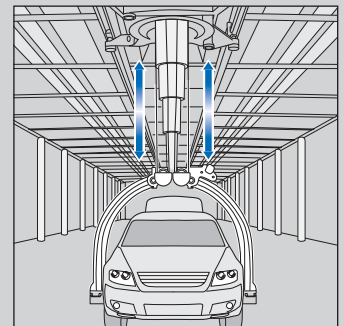
## NEW: Models with integrated inclination sensor

## Applications

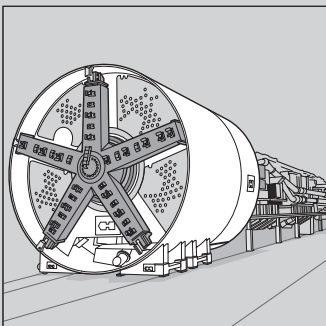
posiwire® cable extension sensors are used in applications that require the exact positioning of elements that move in a linear motion to be defined. posiwire® sensors are also suitable for use in challenging environments. These ensure reliable operation in many areas of automation, process technology, and in industry and research – for example, in handling systems, elevator technology, lifting, conveying, and storage technology, medical technology, and in wind power plants.



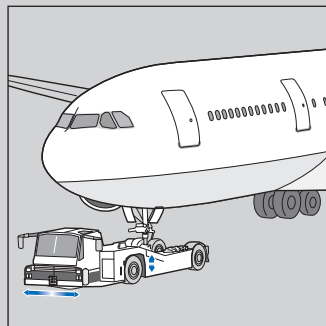
MRI scanning



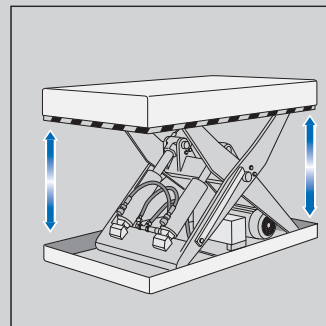
Overhead electric monorails



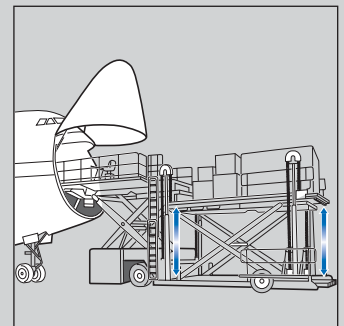
Tunneling machines



Aircraft tractors



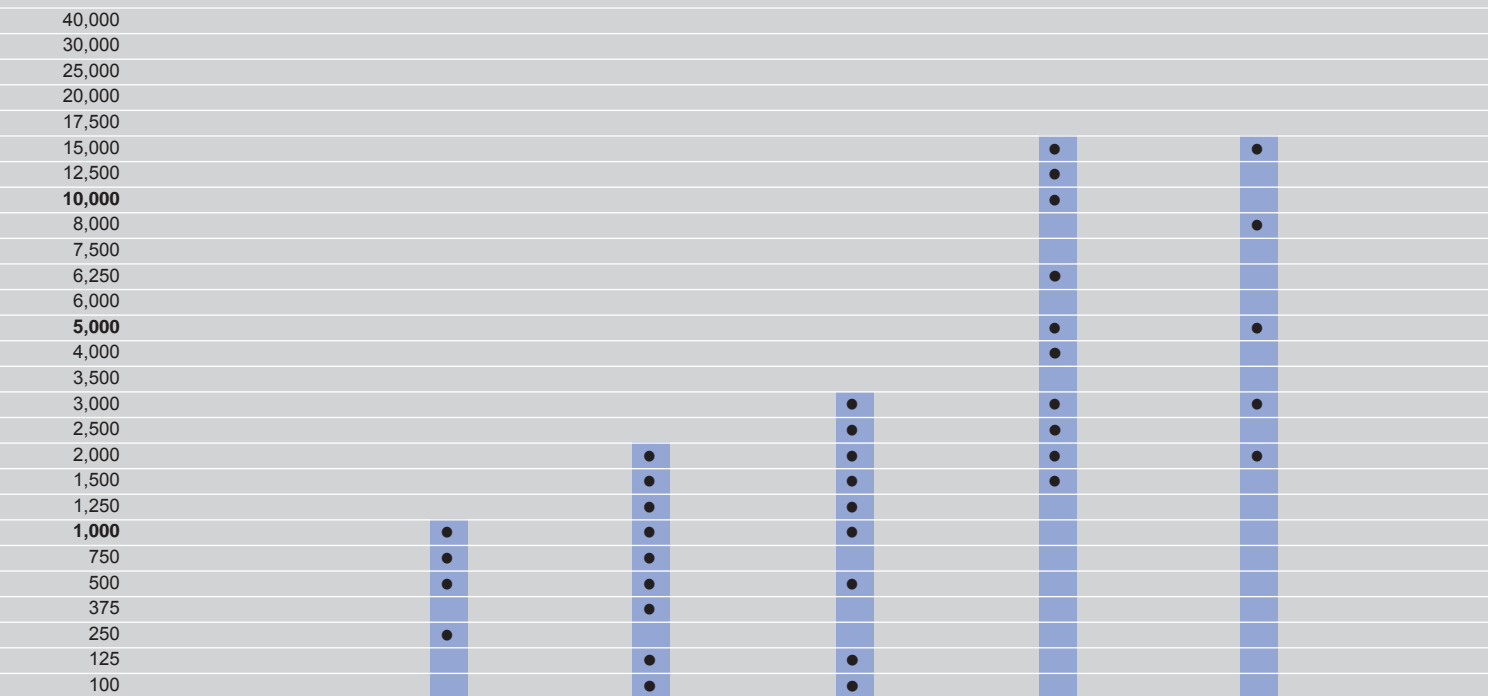
Scissor lifts



Cargo loaders



### Measurement length 0 to ... [mm]



### Precision potentiometer

Voltage divider 1 kΩ/10 kΩ	●	●	●	●	
Voltage, current	●	●	●	●	
Voltage, current programmable		●	●	●	

### Magnetic encoder

Voltage, current (U2, U8, I1)		●	●	●	
SSI, CANopen, SAE J1939		●	●	●	
Redundant version optional <sup>1)</sup>			●		

### Optical encoder

SSI, CANopen, SAE J1939		●	●		●
Profibus, Profinet, DeviceNet		●			●
Incremental (TTL, HTL, RS422)	●	●	●		●

<b>Linearity</b>	up to ±0.20%	up to ±0.05%	up to ±0.05%	up to ±0.05%	up to ±0.01%
<b>Degree of protection (optional)</b>	IP50	IP65	IP67 <sup>2)</sup>	IP64 (IP66)	IP64

**Integrated inclination sensor (optional)**

**Integrated brake (optional)**

**Explosion protection (Dust-Ex)**



<sup>1)</sup> = except for SSI

<sup>2)</sup> = connector version with a suitable connector

<sup>3)</sup> = Dust-Ex-proof marking: II 3D Ex tc IIIC T80°C Dc X

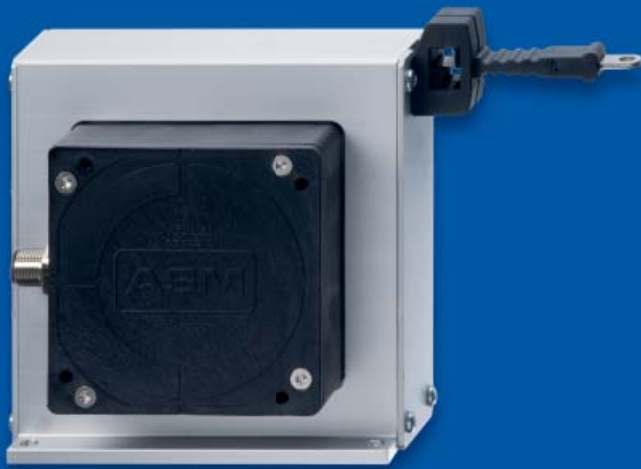


WS61      WS85      WS21      WS7.5      WS100M

					Measurement length 0 to ... [mm]
					40,000
					30,000
					25,000
					20,000
					17,500
					15,000
					12,500
					<b>10,000</b>
					8,000
					7,500
					6,250
					6,000
					<b>5,000</b>
					4,000
					3,500
					3,000
					2,500
					2,000
					1,500
					1,250
					<b>1,000</b>
					750
					500
					375
					250
					125
					100
					<b>Precision potentiometer</b>
					Voltage divider 1 kΩ/10 kΩ
					Voltage, current
					Voltage, current programmable
					<b>Magnetic encoder</b>
					Voltage, current (U2, U8, I1)
					SSI, CANopen, SAE J1939
					<b>Redundant version optional <sup>1)</sup></b>
					<b>Optical encoder</b>
					SSI, CANopen, SAE J1939
					Profibus, Profinet, DeviceNet
					Incremental (TTL, HTL, RS422)
up to ±0.05%	up to ±0.05%	up to ±0.05%	up to ±0.01%	up to ±0.05%	<b>Linearity</b>
IP67/IP69 <sup>2)</sup>	IP67/IP69 <sup>2)</sup>	IP67/IP69 <sup>2)</sup>	IP52	IP68/IP69	<b>Degree of protection (optional)</b>
					<b>Integrated inclination sensor (opt.)</b>
					<b>Integrated brake (optional)</b>
					<b>Explosion protection (Dust-Ex)</b>

# positape®

## Tape Extension Position Sensors



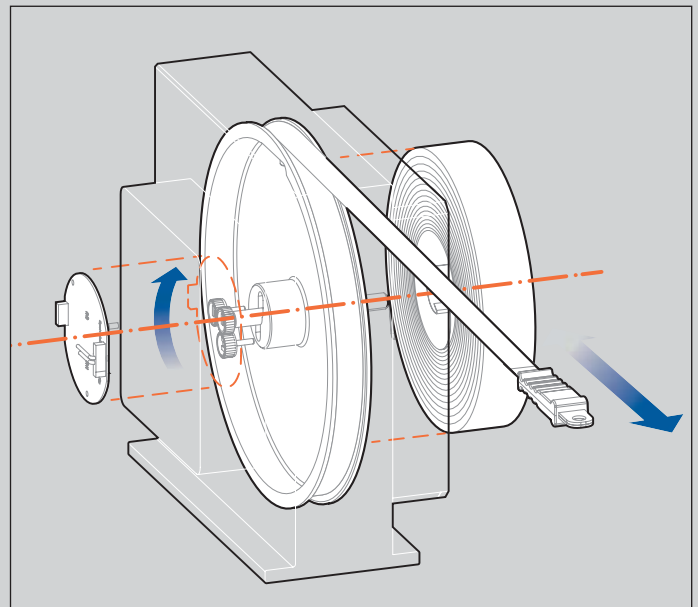
### Extremely robust. Also suitable for pulleys.

positape® tape extension sensors measure linear positions using a robust, high-tech, stainless-steel measurement tape with a virtually infinite service life. The measurement tape can be deflected several times – even in opposite directions – without significant wear. positape® sensors are fitted exclusively with the new, robust absolute encoder technology. This makes positape® tape extension sensors the superior choice of technology for a range of applications, such as those in challenging environments, in areas at risk of icing over, and those in which the installation conditions require the use of pulleys.

positape® models are now also available with an integrated inclination sensor.

## The Technology

positape® tape extension sensors are based on the similar principle as the posiwire® cable extension sensors. Instead of a cable extension, these rely on a high-tech, stainless-steel measurement tape that offers absolute position detection. Contactless, magnetic absolute encoders on the drum axle record the rotation. The interface electronics use this information to create conventional, industry-standard analog or digital output signals. The stainless-steel measurement tape can be redirected multiple times without suffering any notable wear.





## The Advantages

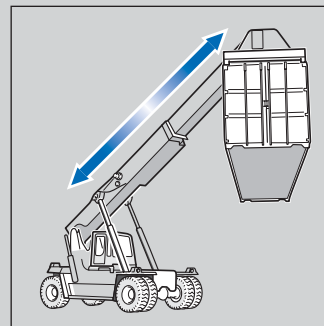
- Exceptionally long service life of the measurement tape
- Multiple deflections possible – including in opposite directions
- Robust, magnetic absolute encoder technology
- Degree of protection up to IP68/69
- Measurement length up to 20,000 mm

## NEW: Models with integrated inclination sensor

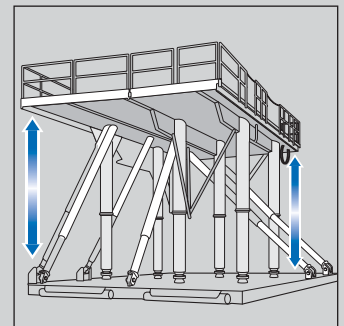
## Applications

positape® tape extension sensors are especially suitable for applications involving pulleys and for use in challenging environmental conditions, such as those involving mobile machines.

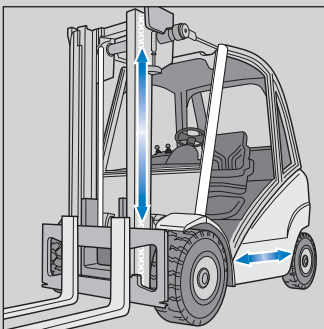
positape® can even be used in applications that require a particle-free environment for reasons of hygiene – for example in the food or pharmaceutical industry.



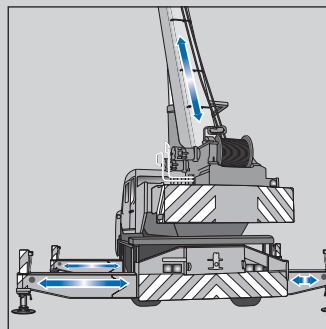
Container stackers



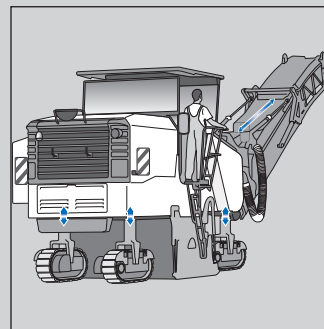
Lifting platforms



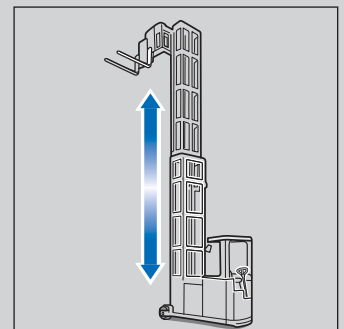
Forklift trucks



Mobile cranes



Cold milling



High-rack forklift trucks



WB10ZG



WB12



WB61

**Measurement length 0 to ... [mm]**

- 20,000
- 17,500
- 15,000
- 12,500
- 10,000
- 8,000
- 7,500
- 6,000
- 5,000
- 4,000
- 3,500
- 3,000
- 2,500
- 2,000
- 1,500
- 1,250
- 1,000
- 750
- 500
- 375
- 250

**Magnetic absolute encoder**

●

●

●

**Analog outputs**

Voltage 0.5 ... 10 V

●

●

●

Voltage 0.5 ... 4.5 V

●

●

●

Current 4 ... 20 mA

●

●

●

programmable (PMU)

●

●

●

Redundant version optional

●

●

**Digital outputs**

SSI

●

●

●

CANopen

●

●

●

SAE J1939

●

●

●

Redundant version optional<sup>1)</sup>

●

●

**Linearity**

Standard

±0.10 %

±0.10 %

±0.10 %

Optional  
(for measurement lengths ≥ 1000 mm)

±0.05 %

±0.05 %

±0.05 %

**Degree of protection**

Standard

IP65

IP67<sup>2)</sup>

IP67<sup>2)</sup>

Optional

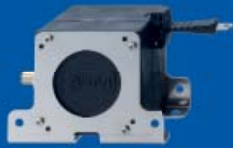
IP67/IP69<sup>2)</sup>

IP67/IP69<sup>2)</sup>

**Integrated inclination sensor (opt.)**

●

<sup>1)</sup> = CAN / CANopen only    <sup>2)</sup> = connector version with a suitable connector



WB85



WB21



WB100M

			Measurement length 0 to ... [mm]
			20,000
			17,500
			15,000
			12,500
			10,000
			8,000
			7,500
			6,000
			5,000
			4,000
			3,500
			3,000
			2,500
			2,000
			1,500
			1,250
			1,000
			750
			500
			375
			250
			<b>Magnetic absolute encoder</b>
			<b>Analog outputs</b>
			Voltage 0.5 ... 10 V
			Voltage 0.5 ... 4.5 V
			Current 4 ... 20 mA
			programmable (PMU)
			<b>Redundant version optional</b>
			<b>Digital outputs</b>
			SSI
			CANopen
			SAE J1939
			<b>Redundant version optional <sup>1)</sup></b>
			<b>Linearity</b>
			Standard
			Optional (for measurement lengths $\geq 1000$ mm)
			<b>Degree of protection</b>
			Standard
			Optional
			<b>Integrated inclination sensor (opt.)</b>

# posichron®

Magnetostrictive Position Sensors

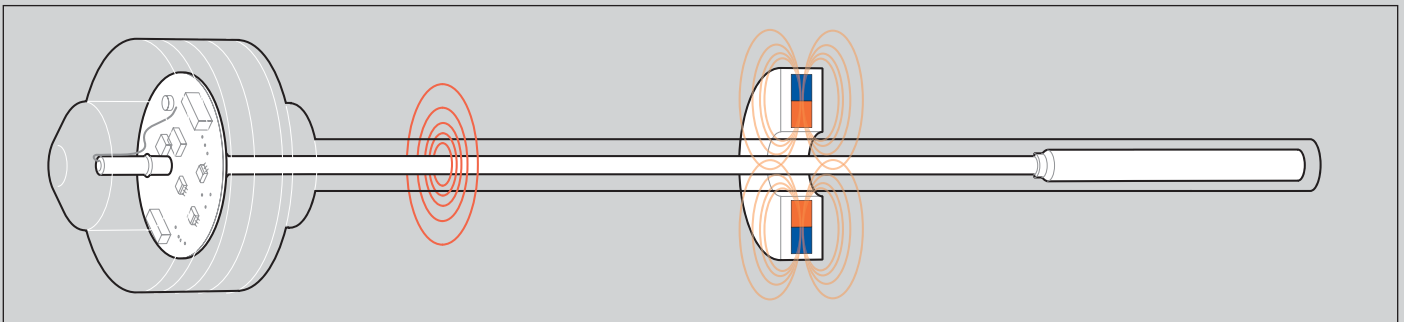


## Contactless. Flexible installation.

posichron® sensors offer absolute, contactless, and wear-free measurement of linear positions. The posichron® measurement system is extremely robust and offers a high level of shock resistance up to 50 g. This makes posichron® also suitable for applications that other measurement principles simply cannot handle. The sensors are available in various designs, making them suitable for use in a wide range of installation conditions (including rod, profile, ultra-flat profile, and submersible designs). The specially customized and patented PCFP25 flat profile is the perfect choice for side booms on cranes.

## The Technology

posichron® sensors rely on the time-of-flight principle for determining positions. This involves the sensor sending an electromagnetic impulse through a magnetostrictive waveguide, which is reflected as a mechanical-elastic density wave by a movable position magnet. The position magnet can be accurately located using the time it takes for this wave to reach the sensor head. As the measurement takes place contactlessly, it is both wear and maintenance free. What's more, posichron® sensors also offer a 'true-absolute' measurement principle.



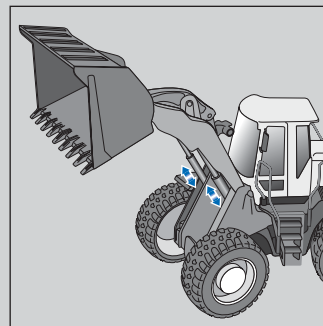
## The Advantages

- Wear and maintenance free
- High level of shock resistance up to 50 g (100 shocks)
- Guiding distance of up to 19 mm (depending on magnet/profile)
- Degree of protection up to IP68/IP69
- Linearity up to 0.02% of the measurement length
- Measurement length up to 5,750 mm

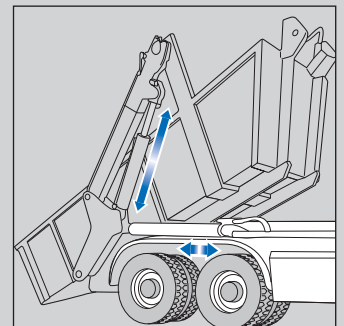
## Applications

posichron® position sensors are suitable for use in a wide range of applications, such as hydraulic cylinders and presses, level measurements, mobile machines, injection molding machines, road vehicle tests, tunneling machines, and wind power plants.

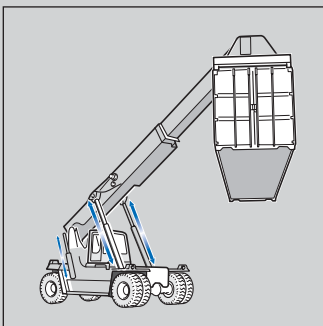
The specially developed ultra-flat posichron® PCFP25 profile is particularly ideal for use in side booms on cranes. And as for permanently underwater applications, the PCR32 profile is the perfect choice.



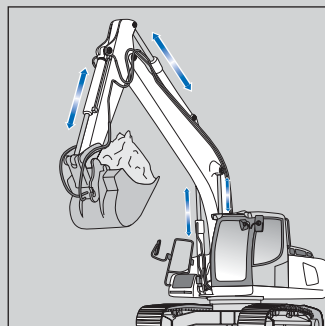
Wheel loaders



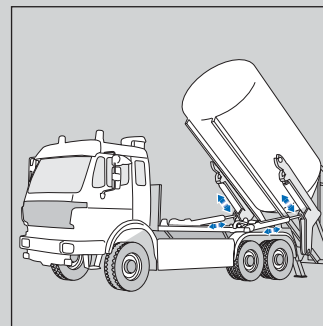
Skip loaders



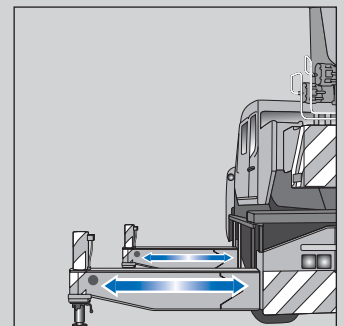
Container stackers



Hydraulic excavators



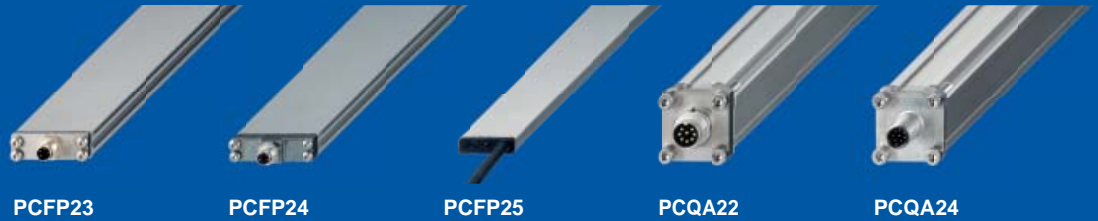
Commercial vehicles



Side booms

# posichron®

## Magnetostrictive Position Sensors



	PCFP23	PCFP24	PCFP25	PCQA22	PCQA24
<b>Applications</b>	Tight mounting spaces, e.g. mobile crane outriggers			Standard industrial applications, also for guided magnets	
<b>Profile cross-section</b>	36 x 12 mm 	43 x 12 mm 	28 x 8 mm 	35.5 x 38.3 mm 	35.5 x 37.25 mm 
<b>Measurement length</b>	100 ... 5,750 mm				
<b>Analog outputs<sup>1)</sup></b>	0.5 ... 10 V				
	0.5 ... 4.5 V				
	4 ... 20 mA				
<b>Digital outputs, absolute</b>	SSI				
	CANopen				
	SAE J1939				
<b>Degree of protection</b>	Standard				
	Optional				

<sup>1)</sup> = 1 or 2 position magnets; position and velocity; programmable (PMU)

<sup>2)</sup> = connector version with a suitable connector



PCRP21



PCST24








PCST25



PCST27



PCRP32

	Applications in hydraulic cylinders, level indicators		Underwater	Applications	
Ø 25 mm	Ø 10 mm	Ø 10 mm	Ø 10 mm	Ø 28 mm	<b>Profile cross-section</b>
					
					<b>Measurement length</b>
•	•	•	•	•	100 ... 5,750 mm
					<b>Analog outputs<sup>1)</sup></b>
•	•	•	•	•	0.5 ... 10 V
•	•	•	•	•	0.5 ... 4.5 V
•	•	•	•	•	4 ... 20 mA
					<b>Digital outputs, absolute</b>
•	•	•	•	•	SSI
•	•	•	•	•	CANopen
•	•	•	•	•	SAE J1939
					<b>Degree of protection</b>
IP64	IP67 <sup>2)</sup>	IP67	IP68/IP69	IP68/IP69	Standard
–	IP67/IP69 <sup>2)</sup>	IP67/IP69	–	–	Optional

# posimag<sup>®</sup> lin

Magnetic Scale Position Sensors

# posimag<sup>®</sup> rot

Magnetic Incremental Encoders



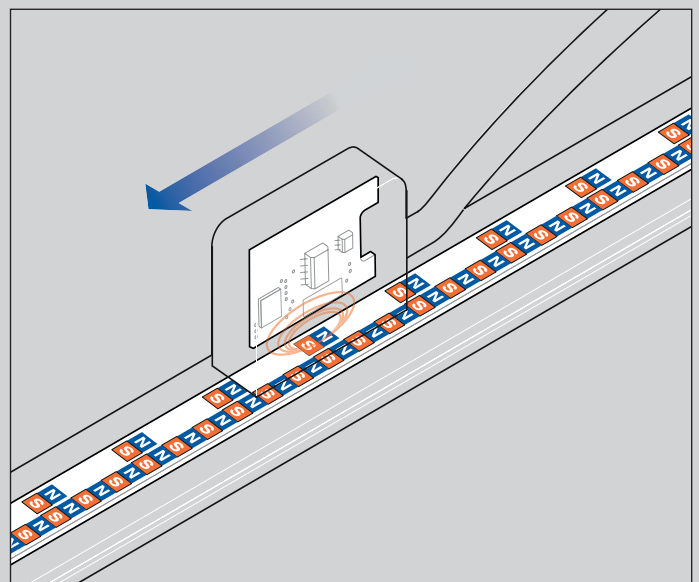
## Contactless. High resolution.

posimag<sup>®</sup> is a contactless, high-resolution measurement system for measurement lengths of up to 30 meters (posimag<sup>®</sup> lin) or angular positions of 0 to 360° (posimag<sup>®</sup> rot). posimag<sup>®</sup> sensors are robust, resistant to contamination, and entirely wear-free, making them even suitable for use in challenging environmental conditions.

## The Technology

posimag<sup>®</sup> sensors measure linear or rotary positions by means of a high-precision magnetic measurement principle. This involves the sensor head being moved along a measurement scale that is magnetized at regular intervals. This allows the measuring head to determine the position with resolutions of up to 1 micron.

The measuring principle is both contactless and wear-free, and different models are available both with and without sensor head guidance to suit a wide range of installation conditions.



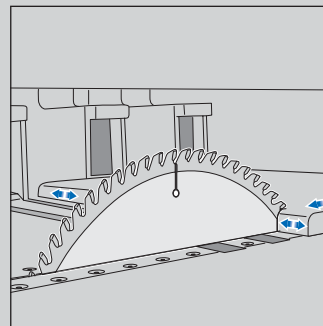


## The Advantages

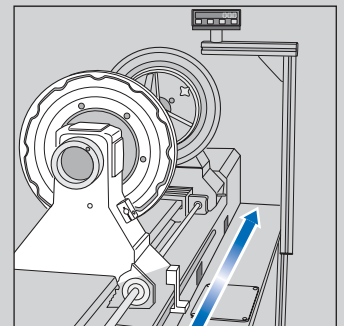
- Contactless and wear-free
- Resistant to contamination
- Shielded metal housing
- Simple installation and adjustment
- Degree of protection IP67
- Measurement length up to 30,000 mm (posimag® lin)
- Measurement range from 0 to 360° (posimag® rot)

## Applications

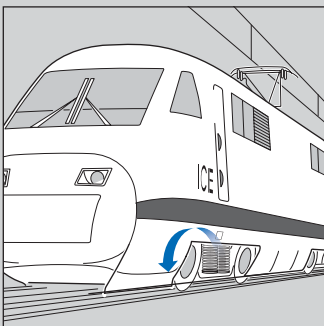
posimag® sensors are suitable for taking linear or rotative position measurements in industrial applications for machine, plant and precision engineering – particularly those calling for a robust, wear-free solution, such as handling systems.



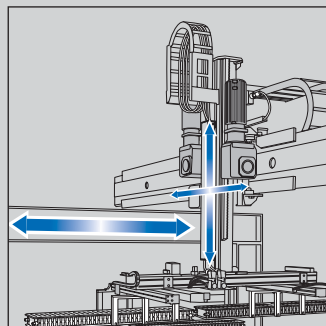
Panel saws



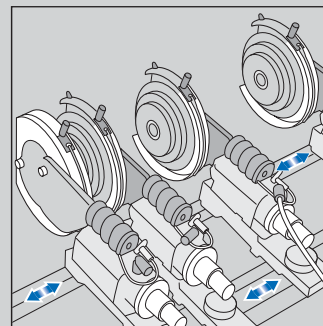
Special lathes



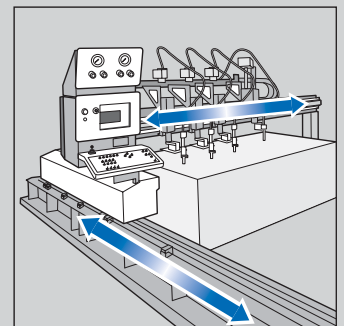
ICE chassis



Handling systems



Roller cutters



Thermal cutting machines



**PMIS3/PMIB3**



**PMIS3/PMIB3/PMFP**

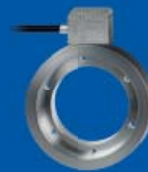


**PMIS3/PMIB3/PMHP/PMGW3**

<b>Mounting method</b>	Direct adhesive magnetic measuring tape. Unguided sensor head.		Flat profile. Can be stacked by 3 m units up to 30 m length. Unguided sensor head.		High profile with integral linear guidance for applications without own linear guidance by system. guided sensor head	
<b>Measurement length</b>	0 ... 30,000 mm		0 ... 30,000 mm		0 ... 30,000 mm	
Magnetic period	2 mm	5 mm	2 mm	5 mm	2 mm	5 mm
Resolution	up to 1 µm	up to 2.5 µm	up to 1 µm	up to 2.5 µm	up to 1 µm	up to 2.5 µm
<b>Digital outputs, incremental</b>						
HTL	●	●	●	●	●	●
TTL	●	●	●	●	●	●
TTL24V	●	●	●	●	●	●
<b>Linearity (standard)</b>	15 µm ±40 µm/m	30 µm ±40 µm/m	15 µm ±40 µm/m	30 µm ±40 µm/m	15 µm ±40 µm/m	30 µm ±40 µm/m
<b>Degree of protection (sensor head)</b>	IP67	IP67	IP67	IP67	IP67	IP67



PMIS4/PMIR7(N)



PMIS4/PMIR5

<b>Mounting method</b>	Slide-on assembly, patented	Screw mounting
<b>Mounting diameter</b>	20, 27, 35, 50 mm	83, 133, 233 mm
<b>Measurement range</b>		
0°... 360°	•	•
<b>Digital outputs, incremental</b>		
HTL	•	•
TTL	•	•
TTL24V	•	•
<b>Linearity (standard)</b>	±0.1°	±0.1°
<b>Degree of protection</b>	IP67	IP67

# posirot®

Magnetic Angle Sensors



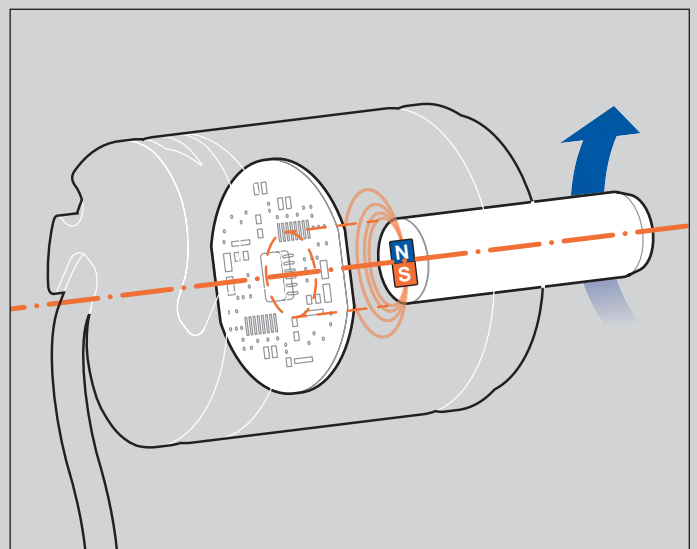
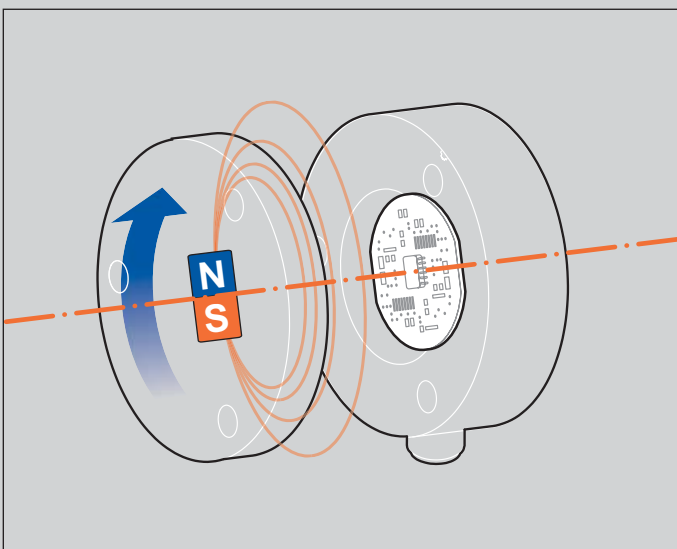
## Magnetic. Flexible. Suitable for outdoor use.

posirot® angle sensors detect angular positions of rotating elements with absolute precision by means of a magnetic measurement principle. They are resistant to shock, vibrations, and contamination, which makes them suitable for use in harsh outdoor environments.

Laser-welded, hermetically sealed, stainless-steel housing units guarantee a long service life even in challenging environmental conditions (PRAS6), in hygiene applications (PRAS7), and in permanently submerged applications (PRAS4). posirot® angle sensors featuring degree of protection IP60 are suitable for demanding indoor applications.

## The Technology

posirot® angle sensors rely on multihall technology to take contactless and wear-free rotation measurements. This involves a magnetic measuring element being secured to the rotating component so that the change in magnetic field during rotation can be measured by a multihall sensor. The sensor and magnet can either be integrated into a single housing or installed separately. The magnetic measurement method makes the sensor resistant to mechanical loads and contamination.

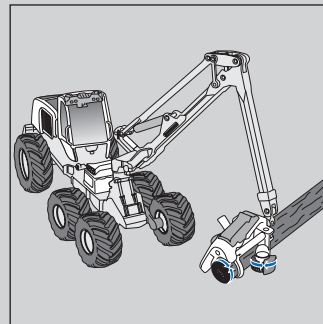


## The Advantages

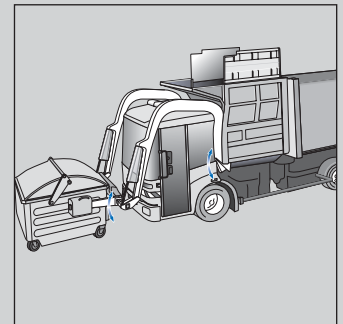
- Measurement range from 0° to 360°
- Contactless or with a 10 mm shaft
- Shock, vibration, and dirt resistance
- Laser-welded, hermetically sealed housing
- Degree of protection up to IP68/IP69

## Applications

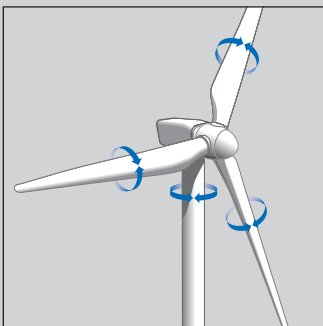
Depending on their design, posirot® angle sensors are suitable for indoor applications while their robust housing means they can be used in harsh environmental conditions such as those associated with mobile machines, ships, cranes, excavators, wind power plants, and large-scale medical equipment.



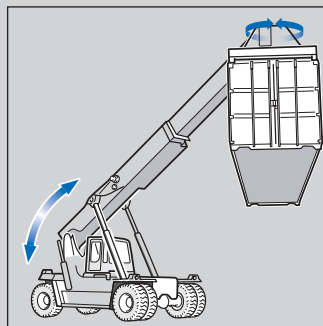
Wood harvesters



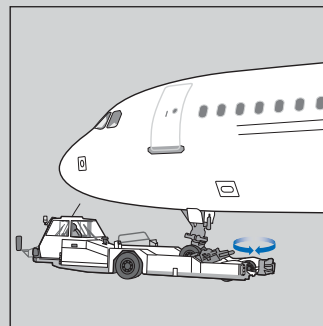
Municipal commercial vehicles



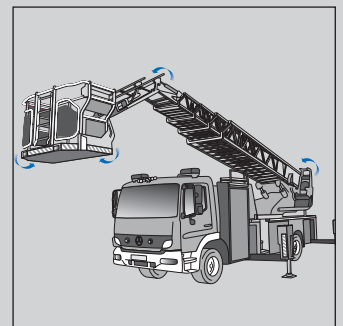
Wind power plants



Industrial trucks



Aircraft tractors



Vehicles with aerial ladders



	PRAS20	PRAS20R	PRAS21	PRAS26
<b>Applications</b>	Indoor applications			
<b>Measurement range</b>	0°... 360°			
	•	•	•	•
<b>Analog outputs</b>				
Voltage 0.5 ... 10 V	•			•
Voltage 0.5 ... 4.5 V	•	•	•	•
Current 4 ... 20 mA	•			•
<b>Redundant version</b>		•		
<b>Linearity (standard)</b>	±0.5%	±0.5%	±0.5%	±0.5%
<b>Degree of protection</b>	IP60	IP60	IP60	IP60



	PRAS27	PRDS27	PRAS1	PRDS1	PRAS2	PRDS2	PRAS3	PRDS3
<b>Applications</b>	Standard industrial applications							
<b>Measurement range</b>	A	D	A	D	A	D	A	D
0°... 360°	•	•	•	•	•	•	•	•
<b>Analog outputs</b>								
Voltage 0.5 ... 10 V	•		•		•		•	
Voltage 0.5 ... 4.5 V	•		•		•		•	
Current 4 ... 20 mA	•		•		•		•	
Redundant version optional	•				•		•	
<b>Digital outputs, absolute</b>								
SSI - RSSI5V, RSSI24V				•		•		•
CANopen		•				•		•
SAE J1939		•				•		•
Redundant version optional <sup>1)</sup>		•				•		•
<b>Digital outputs, incremental</b>								
RS422				•		•		•
HTL				•		•		•
<b>Linearity (standard)</b>	±0.5%	±1°	±0.3%	±1°	±0.3%	±1°	±0.3%	±1°
<b>Degree of protection</b>								
Standard	IP67		–		IP67		IP67	
Optional	–		IP67/IP69 <sup>2)</sup>		IP67/IP69 <sup>2)</sup>		IP67/IP69 <sup>2)</sup>	

A = Analog output,  
D = Digital output  
<sup>1)</sup> = CAN / CANopen only  
<sup>2)</sup> = with IP69 connector



PRAS7

PRDS7

PRAS4

	PRAS29	PRDS29	PRAS6	PRDS6	PRAS7	PRDS7	PRAS4
<b>Applications</b>	Heavy-duty applications				Heavy-duty applications, hygienic applications		Underwater
<b>Measurement range</b>	A	D	A	D	A	D	A
0°... 360°	•	•	•	•	•	•	•
<b>Analog outputs</b>							
Voltage 0.5 ... 10 V	•		•		•		•
Voltage 0.5 ... 4.5 V	•		•		•		•
Current 4 ... 20 mA	•		•		•		•
<b>Redundant version optional</b>	•		•		•		
<b>Digital outputs, absolute</b>							
SSI - RSSI5V, RSSI24V				•		•	
CANopen		•		•		•	
SAE J1939		•		•		•	
<b>Redundant version optional <sup>1)</sup></b>		•		•		•	
<b>Digital outputs, incremental</b>							
RS422				•		•	
HTL				•		•	
<b>Linearity (standard)</b>	±0.5%	±1°	±0.3%	±1°	±0.3%	±1°	±0.3%
<b>Degree of protection</b>	IP67		IP67/IP69 <sup>2)</sup>		IP67/IP69 <sup>2)</sup>		IP68 (10 bar), continuous use

A = Analog output,

D = Digital output

<sup>1)</sup> = CAN / CANopen only

<sup>2)</sup> = with IP69 connector



posiro<sup>®</sup>t EX  
Magnetic Angle Sensors  
Explosion protected



PRAS2EX



PRAS3EX



PRAS5EX

<b>Applications</b>	Explosion protected applications		
<b>Measurement range</b>			
0°... 360°	•	•	•
<b>Analog outputs</b>			
Voltage 0.5 ... 10 V	•	•	•
Voltage 0.5 ... 4.5 V	•	•	•
Current 4 ... 20 mA	•	•	•
<b>Linearity (standard)</b>	±0.3%	±0.3%	±0.3%
<b>Degree of protection</b>	IP65	IP65	IP65
<b>Dust-Ex-proof marking (dust)</b>	Ex II 3D Ex tc IIIC T80°C Dc X		

# posihall®

Magnetic Multiturn Encoders

Robust alternative to  
optical encoders

## True-absolute. Extremely robust.

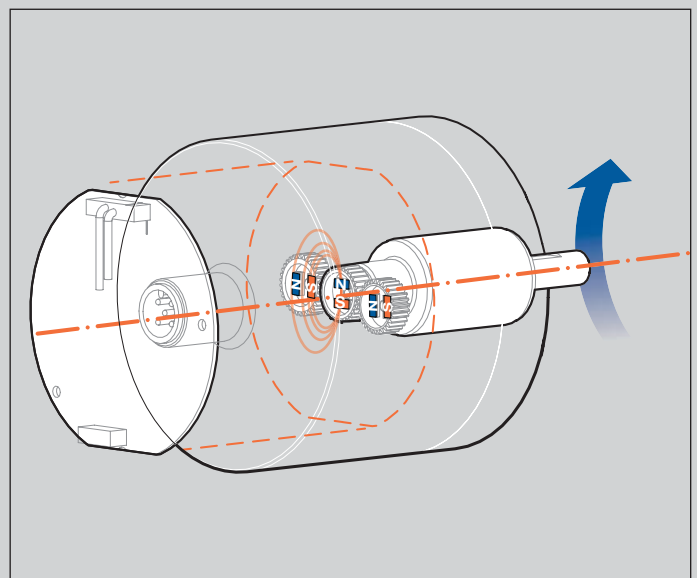
posihall® magnetic multiturn encoders are the robust alternative to optical encoders that often fall short in harsh conditions. posihall® sensors measure angular positions over multiple revolutions with the help of a 'true-absolute' magnetic measurement principle. They are capable of maintaining failure-free, accurate functionality in the event of high vibrations, shocks, and temperatures between  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) and  $+85^{\circ}\text{C}$  ( $+185^{\circ}\text{F}$ ). The robust housing complete with specially encapsulated electronics makes these sensors resistant to extreme environmental conditions and therefore the ideal solution for heavy-duty applications.

posihall® sensors are also available with redundant outputs for safety-related applications.



## The Technology

posihall® sensors offer contactless, wear-free measurement of rotary angles using multiple mechanically coupled multihall sensors. These work together to measure up to 255 revolutions for a true-absolute position. This means that a correct measurement can always be displayed regardless of external interference – for example, after a power failure.

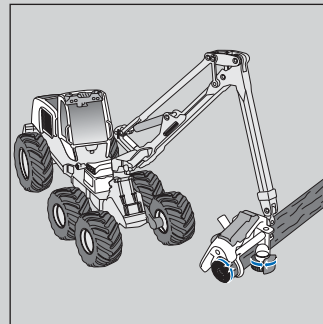


## The Advantages

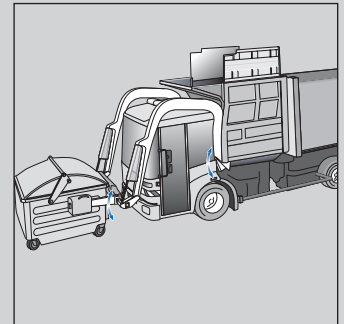
- True-absolute measurement principle
- Measurement range  
31 x 360° (PH36)  
255 x 360° (PH58 and PH68)
- Shock, vibration, and dirt resistance
- Integral shielding against magnetic fields
- Single-turn linearity of 0.3%
- Degree of protection up to IP69

## Applications

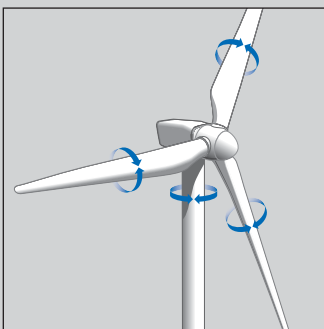
posihall® multiturn encoders are suitable for applications such as those found in mobile machines, packaging machines, food processing machines, offshore applications, and solar and wind power plants.



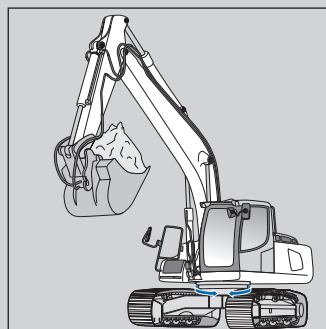
Wood harvesters



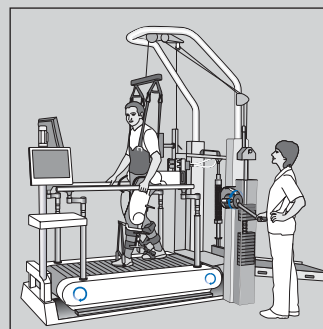
Municipal commercial vehicles



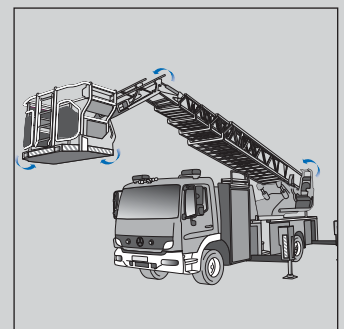
Wind power plants



Hydraulic excavators



Therapeutic treadmill



Vehicles with aerial ladders



PH36



PH58



PH68

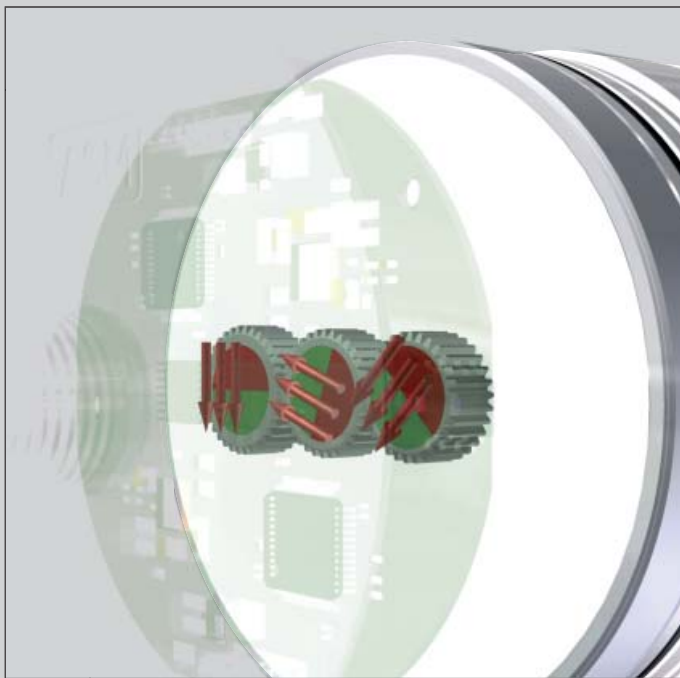
Measurement range	up to 31 x 360°	up to 255 x 360°	up to 255 x 360°
<b>Analog outputs</b>			
Voltage 0.5 ... 10 V	●	●	●
Voltage 0.5 ... 4.5 V, U <sub>B</sub> = 5V	●	●	●
Voltage 0.5 ... 4.5 V, U <sub>B</sub> = 8 ... 36 V	●	●	●
Current 4 ... 20 mA	●	●	●
<b>Redundant version optional</b>		● <sup>1)</sup>	● <sup>2)</sup>
<b>Digital outputs, absolute</b>			
SSI	●		
CANopen	●	●	●
SAE J1939	●	●	●
<b>Redundant version optional <sup>3)</sup></b>		● <sup>1)</sup>	● <sup>2)</sup>
<b>Degree of protection</b>			
Shaft	IP67	IP67	IP67
Housing	IP67/IP69 <sup>4)</sup>	IP67/IP69 <sup>4)</sup>	IP67/IP69 <sup>4)</sup>

<sup>1)</sup> = with one output

<sup>2)</sup> = optional with two separate outputs

<sup>3)</sup> = CAN / CANopen only

<sup>4)</sup> = with IP69 mating connector



## posihall® - true-absolute

posihall® sensors offer a true-absolute measurement of rotary angles. This means that direct measurements can be taken in the range above 360°, without incrementation or signal storage. As a result, correct measurements are still available even after a supply voltage failure.

This is achieved due to the gear coupling of several multihall sensors that work together according to the nonius principle. Their signals are offset against each other and reveal the total number of revolutions, which makes for a possible measuring angle of up to 255 revolutions.



## For heavy-duty applications

The magnetic measurement method and robust mechanical components make posihall® sensors far superior to sensitive optical encoders in harsh environments. They are capable of functioning reliably and accurately when subjected to shocks and vibrations, and within a temperature range between -40°C and +85°C – even if water or oil manage to penetrate the housing.

# positilt®

Inclination Sensors

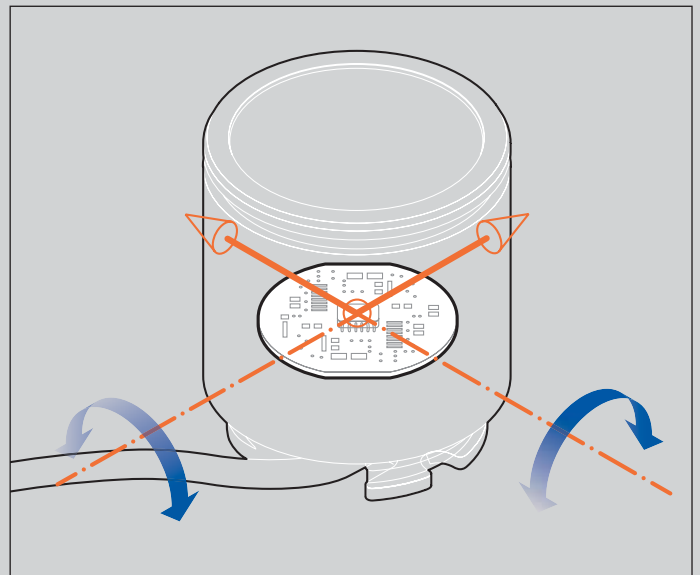


## Micromechanical. Wear-free.

positilt® inclination sensors offer contactless, wear-free, and absolute measurement of tilt angles ranging from 0 to  $\pm 180$  degrees. The use of MEMS technology makes these sensors particularly resistant to shock, vibrations, and contamination. As a result, positilt® inclination sensors are ideal for use in outdoor applications. Various designs are available to reflect the wide range of potential applications.

## The Technology

positilt® inclination sensors rely on micro-electromechanical systems (MEMS) to measure the angle of tilt. They utilize spring-mass systems that determine the deflection of small test masses and thereby measure the inclination of the system. The interface electronics use this information to create conventional, industry-standard analog or digital output types.

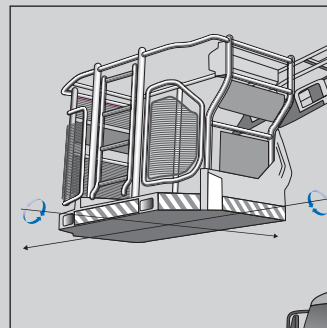


## The Advantages

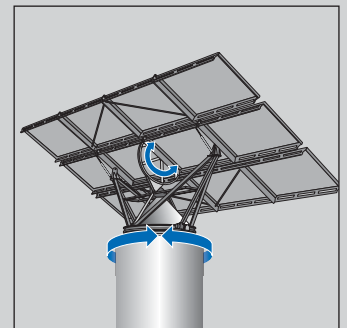
- Wear-free
- Measurement range  $\pm 180^\circ$
- Degree of protection up to IP68/IP69
- Impact resistant
- MEMS technology
- Single or dual axis measurement

## Applications

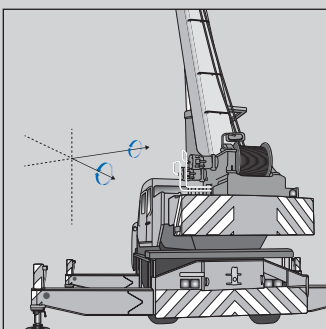
positilt® inclination sensors are the ideal solution for determining the angle of tilt in environments such as solar power plants, commercial vehicles, and the transport sector, not to mention in industrial applications that call for highly accurate measurement, monitoring, and constant adjustment of the tilt position. The range also includes hermetically sealed housing units for use in heavy-duty or hygienic applications.



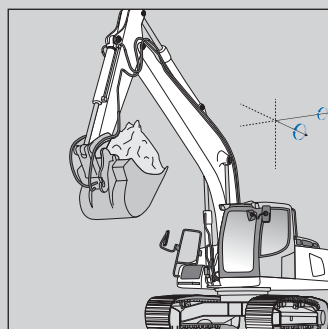
Vehicles with aerial ladders



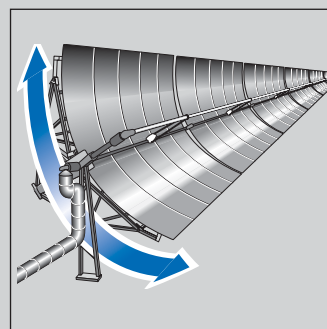
Solar modules



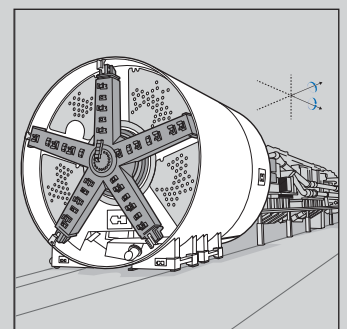
Mobile cranes



Excavators



Solar panels



Tunneling machines



	PTAM27	PTDM27	PTAM2	PTDM2
<b>Applications</b>	General industrial applications		Compact sensor for robust industrial applications	
<b>Measurement range</b>	<b>A</b>	<b>D</b>	<b>A</b>	<b>D</b>
1 axis ±180°	•	•	•	•
2 axes ±60°		•	•	•
2 axes ±180°	•			
<b>Analog outputs, absolute</b>				
Voltage 0.5 ... 10 V	•		•	
Voltage 0.5 ... 4.5 V	•		•	
Current 4 ... 20 mA	•		•	
<b>Digital outputs, absolute</b>				
CANopen		•		•
SAE J1939		•		•
<b>Linearity (standard)</b>		±0.5°		±0.5°
<b>Degree of protection</b>				
Housing with cable		IP67		IP67
Housing with connector		-		IP67/IP69 <sup>1)</sup>

A = Analog output,

D = Digital output

<sup>1)</sup> = with IP69 connector





PTAM5		PTDM5		PTAM6		PTDM6		PTAM7		PTDM7		
Heavy-duty industrial applications		Heavy-duty industrial applications		Heavy-duty industrial applications		Heavy-duty applications (incl. hygienic applications)		Heavy-duty applications (incl. hygienic applications)		Heavy-duty applications (incl. hygienic applications)		Applications
A	D	A	D	A	D	A	D	A	D	A	D	Measurement range
•	•	•	•	•	•	•	•	•	•	•	•	1 axis ±180°
•	•	•	•	•	•	•	•	•	•	•	•	2 axes ±60°
												2 axes ±180°
												<b>Analog outputs, absolute</b>
•		•		•		•		•		•		Voltage 0.5 ... 10 V
•		•		•		•		•		•		Voltage 0.5 ... 4.5 V
•		•		•		•		•		•		Current 4 ... 20 mA
												<b>Digital outputs, absolute</b>
	•		•		•		•		•		•	CANopen
	•		•		•		•		•		•	SAE J1939
	±0.5°		±0.5°		±0.5°		±0.5°		±0.5°		±0.5°	<b>Linearity (standard)</b>
	IP67		IP67		IP67		IP67		IP67/IP69		IP67/IP69	<b>Degree of protection</b>
	IP67/IP69 <sup>1)</sup>		IP67/IP69 <sup>1)</sup>		IP67/IP69 <sup>1)</sup>		IP67/IP69 <sup>1)</sup>		IP67/IP69 <sup>1)</sup>		IP67/IP69 <sup>1)</sup>	Housing with cable
												Housing with connector

# positilt® PTK

Gyro-compensated Inclination Sensors

New technology



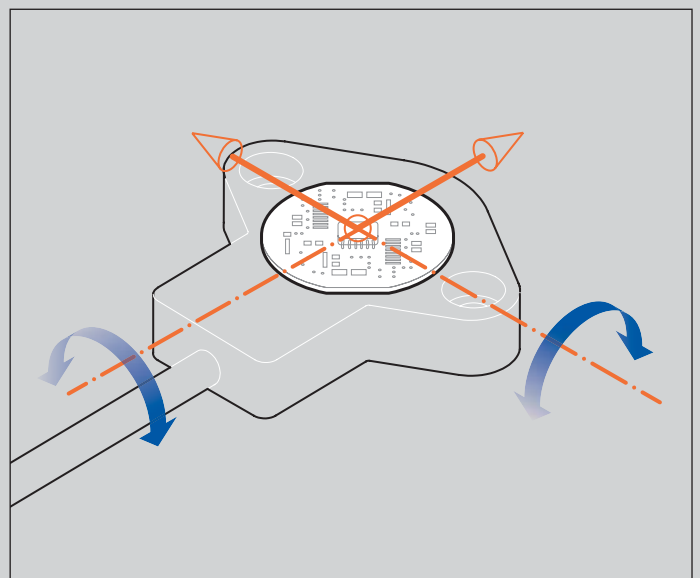
## Dynamic. Instantaneous.

Normal inclination sensors deliver incorrect measurement results in a dynamic application. positilt® PTK inclination sensors feature gyro-compensated MEMS technology that allows them to compensate for shocks, vibrations, and acceleration. The sensors are capable of delivering accurate measurements in real time in these challenging conditions.

positilt® PTK sensors are available in two different, hermetically sealed, stainless-steel housing units: An ultra-compact unit (PTK29) and a unit with space for redundant electronics (PTK6/PTK7). Both housing types are hermetically sealed, making them suitable for challenging environmental conditions.

## The Technology

positilt® PTK sensors rely on micro-electromechanical systems (MEMS) to measure the angle of tilt. They incorporate spring-mass systems that determine the deflection of small test masses and thereby measure the inclination of the system. Outside influences such as shocks, vibrations, and acceleration are eliminated through the use of gyro-compensated technology. The interface electronics use this information to create conventional, industry-standard analog or digital output types.

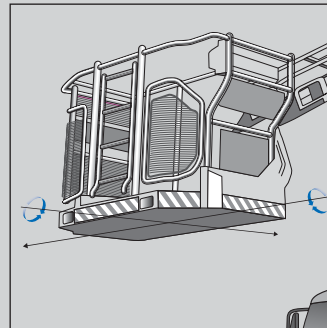


## The Advantages

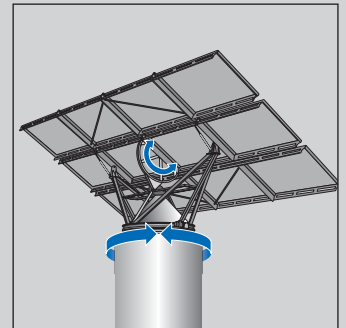
- Correct measurement results even in the event of shock, vibrations, and acceleration
- Measurement range of  $\pm 180^\circ$  (1 axis) to  $\pm 60^\circ$  (2 axes)
- Instantaneous signal output
- Static linearity up to  $0.05^\circ$
- Hermetically sealed, stainless-steel housing
- Degree of protection up to IP67/IP69 or IP68

## Applications

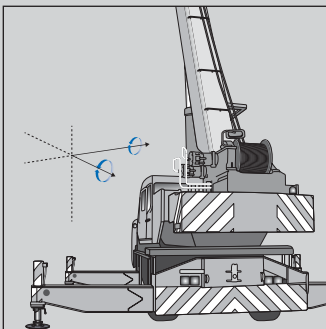
positilt® PTK inclination sensors are the ideal solution for applications involving movement, such as those found in mobile machines where movement, impact, and vibrations can impair the sensor accuracy. For applications involving harsh environmental conditions, positilt® PTK sensors are available in robust, hermetically sealed, stainless-steel housing units.



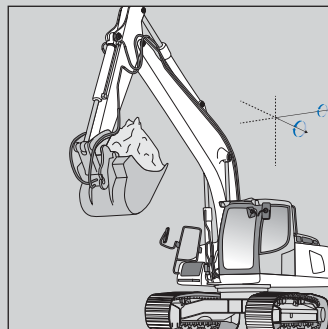
Vehicles with aerial ladders



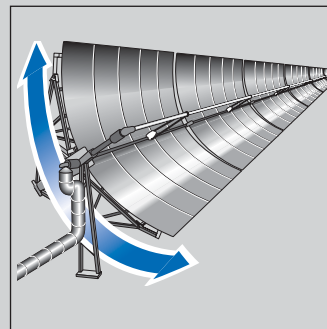
Solar modules



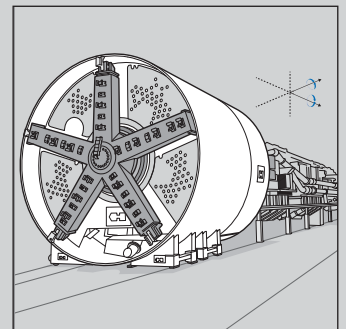
Mobile cranes



Excavators



Solar panels



Tunneling machines



PTK29



PTK2

Applications	General industrial applications, mobile working machines	General industrial applications, mobile working machines
<b>Measurement range</b>		
1 Axis $\pm 180^\circ$	•	•
2 Axes $\pm 60^\circ$	•	•
<b>Analog outputs, absolute</b>		
Voltage 0.5...10 V	•	•
Voltage 0.5...4.5 V	•	•
Current 4 ... 20 mA	•	•
<b>Redundant version optional</b>		
<b>Digital outputs, absolute</b>		
CANopen	•	•
SAE J1939	•	•
<b>Redundant version optional</b>		
Linearity, digital	up to $0.05^\circ$ <sup>2)</sup>	up to $0.05^\circ$ <sup>2)</sup>
Linearity, analog	up to $0.1^\circ$ <sup>2)</sup>	up to $0.1^\circ$ <sup>2)</sup>
Degree pf protection, standard	IP67	IP67/IP69 <sup>1)</sup>

<sup>1)</sup> = with IP69 connector

<sup>2)</sup> = depends on measuring range



PTK4



PTK6



PTK7

Underwater

Heavy-duty industrial applications

Suitable for hygienic applications

**Applications**

**Meeasurement range**

• • • 1 axis  $\pm 180^\circ$

• • • 2 axes  $\pm 60^\circ$

**Analog outputs, absolute**

• • • Voltage 0.5...10 V

• • • Voltage 0.5...4.5 V

• • • Current 4 ... 20 mA

• • • **Redundant version optional**

**Digital outputs, absolute**

• • • CANopen

• • • SAE J1939
















• • • **Redundant version optional**

up to  $0.05^\circ$  <sup>2)</sup> up to  $0.05^\circ$  <sup>2)</sup> up to  $0.05^\circ$  <sup>2)</sup> Linearity, digital

up to  $0.1^\circ$  <sup>2)</sup> up to  $0.1^\circ$  <sup>2)</sup> up to  $0.1^\circ$  <sup>2)</sup> Linearity, analog

IP68 (10 bar), continuous use IP67/IP69 <sup>1)</sup> IP67/IP69 <sup>1)</sup> Degree pf protection, standard

## Overview Protection Classes according to DIN EN 60529

1 <sup>st</sup> numeral	Protection against solid foreign objects	2 <sup>nd</sup> numeral	Protection against ingress of water
IP 0 ..	Not protected	IP .. 0	Not protected
IP 1 ..	 Solid foreign objects diameter $\geq 50$ mm	IP .. 1	 Falling water drops
IP 2 ..	 Solid foreign objects diameter $\geq 12.5$ mm	IP .. 2	 Falling water drops vertical / 15°
IP 3 ..	 Solid foreign objects diameter $\geq 2,5$ mm	IP .. 3	 Spraying water
IP 4 ..	 Solid foreign objects diameter $\geq 1$ mm	IP .. 4	 Splashing water
IP 5 ..	 Dust-protected	IP .. 5	 Water jets
IP 6 ..	 Dust-tight	IP .. 6	 Powerful water jets
		IP .. 7	 Temporary immersion Depth and duration must be specified!
		IP .. 8	 Continuous immersion Depth and duration must be specified!
		IP .. 9	 Powerful high temperature water jets

**Any questions? Just let us know!**



If you're looking for a sensor solution for your application, have questions relating to a specific product, or would like more detailed product information, then you can visit our website, give us a call, or even send us an email. We will be happy to talk things through and help you find the perfect sensor solution to suit your needs.

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## Contact details

### Europe:

Tel. +49 8123 986-0

Email [info@asm-sensor.com](mailto:info@asm-sensor.com)

### USA:

Tel. +1 630 832-3202

Email [info@asmsensors.com](mailto:info@asmsensors.com)





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[www.asm-sensor.com](http://www.asm-sensor.com)



**Headquarters:**

**ASM Automation Sensorik  
Messtechnik GmbH**

Am Bleichbach 18 - 24  
85452 Moosinning

**Germany**

Tel. +49 8123 986-0  
Fax +49 8123 986-500  
[info@asm-sensor.com](mailto:info@asm-sensor.com)

**ASM Sensors, Inc.**

650 W. Grand Ave., Unit 205  
Elmhurst, IL 60126

**USA**

Tel. +1 630 832-3202  
Fax +1 630 832-3204  
[info@asmsensors.com](mailto:info@asmsensors.com)

**ASM Sales Office UK**

Tanyard House, High Street  
Measham, Derbs DE12 7HR

**United Kingdom**

Tel. +44 845 1222-123  
Fax +44 845 1222-124  
[info@asm-sensor.com](mailto:info@asm-sensor.com)

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