

TILTIX INCLINOMETER



Precise Tilt Measurement

TILTIX INCLINOMETERS

Industrial Inclinometers



Static Inclinometer

POSITAL's inclinometers are equipped with dynamic MEMS (micro-electro-mechanical system) accelerometers that are used to measure inclination (tilt) by measuring gravitational force.

A 'micro mass' **A** is suspended in a flexible support structure **B**. Any movement will induce a displacement of the mass, resulting in a change of capacitance between the mass and the supporting structure. Changes of inclination are calculated from the changes in measured capacitance.

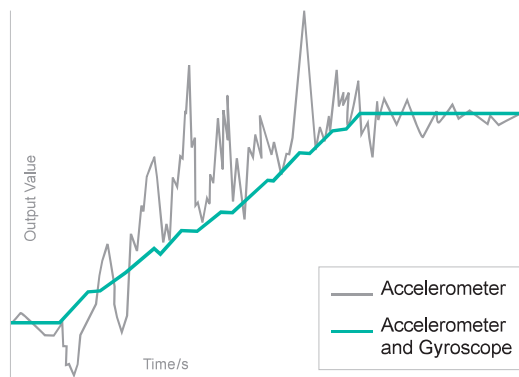
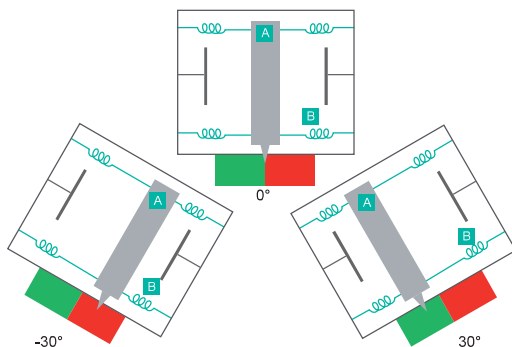
This proven method reaches accuracies of up to 0.1° over the measurement range of up to 360°. However, the measurement can be disturbed by external accelerations making the inclinometer capable of operating only in static applications.

Dynamic Inclinometer

POSITAL's acceleration compensated inclinometer use MEMS gyroscopes in addition to MEMS accelerometers. In contrast to accelerometers, gyroscopes are used to measure rotation rate. An algorithm combines signals of both sensors to identify external accelerations and ignore them. This feature dramatically reduces the influence of external accelerations, shocks and vibrations on the output signal.

The compensation of external acceleration forces is very critical for mobile machines and other applications that are constantly in dynamic movement.

POSITAL's dynamic inclinometer are featured with 3D sensors resulting in improved measurement range of the complete space (x-axis $\pm 180^\circ$ and y-axis $\pm 90^\circ$).



TILTIX INCLINOMETERS

Explosion Proof Certified Inclinerometers



Rugged and Reliable Certified Inclinometer

POSITAL has extended its TILTIX family of inclinometers (tilt sensors) to include explosion-proof models designed to operate safely in environments that contain potentially dangerous levels of explosive dust or gases. These devices have been certified in compliance with IECEx and ATEX directives and are suitable for use in mines, oil and gas facilities, agricultural applications, chemical plants, woodworking factories and milling operations.

Like other TILTIX inclinometers, the new models are available in single (0-360°) or dual-axis ($\pm 80^\circ$) versions and feature resolution as high as 0.01° and 0.1° accuracy. Available communications interfaces include DeviceNet, CANopen, Modbus RTU, SSI and analog output. Analog models can be programmed so that a predetermined range of mechanical motion is set span the full electrical output range. Rugged aluminum and 316 stainless steel housings are offered, with other materials available by special order.

Certified to the Following Atex Ratings

> Group I (Mining)

Ex I M2 Ex e mb I Mb

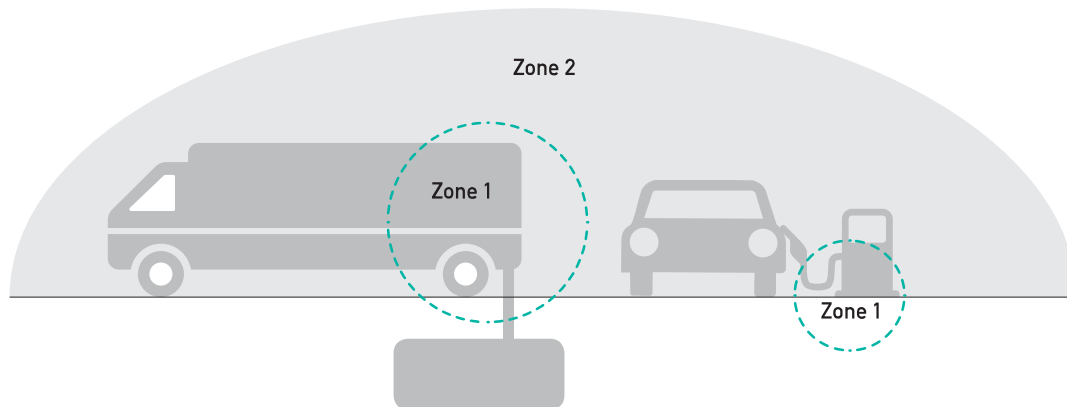
> Group II (Above Ground Operations)

EX II 2G Ex e mb IIc TX Gb (explosive gases)

EX II 2D Ex tb IIIB T80°C Db (flammable dust)








Advantages

- > ATEX and IECEx Certified
- > Zone 1/21 Mining or Oil and Gas
- > High Vibration and Shock Resistance
- > $\pm 80^\circ$ (Dual Axis) or 360° (Single Axis)
- > CANopen, DeviceNet, Analog, SSI, SAE J1939 and ModbusRTU
- > Rugged Aluminum and 316 Stainless Steel Housings
- > Usage in Gas (2G) and Dust (2D) Hazardous Locations
- > Accuracy 0.1° and resolution 0.044°



TILTIX INCLINOMETERS

Product Overview – Digital Inclinerometers

CE		Max. Protection Class	Communication Interface	1 Axis 0 to 360°	2 Axis ±80°	Resolution	Accuracy	Die Cast Aluminum Fibre-Reinforced	Supply Voltage in V	Cable	Connector	Terminal Block
	> Dynamic Applications	IP69K	CANopen	■	■	0.01°	0.3°	■	10–30	■	■	
	> Fieldbus Interface	IP68	SAE J1939									
	> Rugged Housing											
	> Static Applications	IP69K	CANopen	■	■	0.01°	0.1°	■	10–30	■	■	
	> Fieldbus Interface	IP68	DeviceNet									
	> Rugged Housing		SAE J1939									
	> Static Applications	IP67	CANopen	■	■	0.01°	0.1°	■	10–30	■	■	
	> Fieldbus Interface		DeviceNet									
	> Compact Design		ModbusRTU									
	> Static Applications	IP69K	CANopen	■	■	0.01°	0.1°	■	10–30	■	■	
	> Fieldbus Interface	IP68	DeviceNet									
	> Compact Design		ModbusRTU									
	> Static Applications	IP69K	SSI	■		0.04°	0.1°	■	5–30	■	■	
	> Serial Interface	IP68	RS232									
	> Rugged Housing											
	> Static Applications	IP67	SSI	■		0.04°	0.1°	■	5–30	■	■	
	> Serial Interface		RS232									
	> Compact Design											
	> ATEX Certified	IP67	CANopen	■	■	0.04°	0.1°	■	10–30	■	■	
	> All Available Interfaces		SAE J1939									
	> Rugged Housing		RS232									

> Related Industries



> Find What You Need

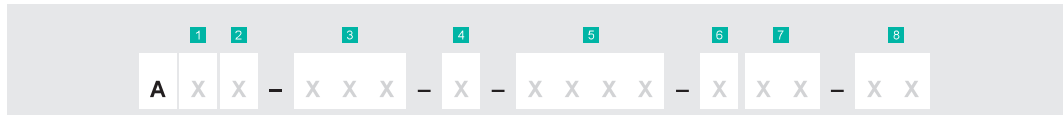


Configure Your POSITAL Encoder Online

**PRODUCT
FINDER**

TILTIX INCLINOMETERS

Product Selection Guide – Digital InclInometers



1 Technology

- C Accuracy Static 0.1°
- K Accuracy Static 0.3°, Dynamic 0.5°

2 Certificate

- S CE
- M ATEX Zone 1 & 21 (Mining)
- E ATEX Zone 1 & 21 (Oil+Gas)

3 Measurement Range

- 080 ±80°
- 090 ±90°
- 360 360°

4 Number of Axis

- 1 Single Axis
- 2 Dual Axis

5 Communication Interface

- SV00 RS232 (ACS)
- S101 SSI Binary (ACS)
- S301 SSI Gray (ACS)
- CA01 CANopen (ACS, AKS)
- C901 J1939 (ACS, AKS)
- M100 Modbus RTU (ACS)
- D101 DeviceNet (ACS)

6 Mounting

- H Horizontal (Dual Axis)
- V Vertical (Single Axis)

7 Housing Material

- E2 Fibre-Reinforced Plastic
- K2 Aluminum
- W2 Stainless Steel (ATEX)

8 Connection Type

- CW Cable: 1m
- 2W Cable: 2 m
- 5W Cable: 5 m
- AW Cable: 10 m
- PM Connector: M12
- PL Connector: 2 x M12 Male with Status LED
- PN Connector: 1 x M12 Male & 1 x M12 Female



> Rugged Connectors and Cables

- Reliable Electrical Connections
- M12 & M23 Data, Bus and Signal Connectors
- Straight and Angled Versions
- Variety of Cable Material and Lengths
- Shielded for Protection Against Noise and Interference

> Learn More



TILTIX INCLINOMETERS

Technical Drawings

	7 8 Type Key	Housing Material	Connection Type	Protection Class
	K2-PM	Al	M12 Connector	IP68/IP69K
	K2-PN	Al	Male M12 & Female M12 Connector	IP68/IP69K

All dimension in mm [inch]; Al: Aluminum; 303: Stainless Steel V2A (1.4305, 303); 316 L: Stainless Steel V4A (1.4404, 316 L)

TILTIX INCLINOMETERS

Technical Drawings

	Type Key	Housing Material	Connection Type	Protection Class
<p>Technical drawings of the Tiltix inclinometer. The side view shows a cylindrical device with a cable connector on the left and a mounting bracket on the right. Dimensions include a diameter of 10.50 mm [0.41] and a height of 27 mm [1.06]. The top view shows a rectangular housing with a central display area and four mounting holes. Dimensions include a width of 102.90 mm [4.05], a height of 59 mm [2.32], and a distance of 44 mm [1.73] from the top edge to the center of the mounting holes. The distance between the mounting holes is 68 mm [2.68], and the distance from the left edge to the center of the mounting holes is 18 mm [0.71]. The distance from the left edge to the center of the display area is 83 mm [3.27]. The cable connector has a diameter of 4x Ø6.40 mm [0.25].</p>	K2-CW	Al	1 m Cable	IP68/IP69K
	K2-2W	Al	2 m Cable	IP68/IP69K
	K2-5W	Al	5 m Cable	IP68/IP69K
	K2-AW	Al	10 m Cable	IP68/IP69K

All dimension in mm [inch]; Al: Aluminum; 303: Stainless Steel V2A (1.4305, 303); 316 L: Stainless Steel V4A (1.4404, 316 L)

TILTIX INCLINOMETERS

Technical Drawings

	7 8 Type Key	Housing Material	Connection Type	Protection Class
	E2-PM	Plastic	M12 Connector	IP67
	E2-CW E2-2W E2-5W E2-AW	Plastic	1 m Cable 2 m Cable 5 m Cable 10 m Cable	IP67 IP67 IP67 IP67

All dimension in mm [inch]; Al: Aluminum; 303: Stainless Steel V2A (1.4305, 303); 316 L: Stainless Steel V4A (1.4404, 316 L)

TILTIX INCLINOMETERS

Technical Drawings

	Type Key	Housing Material	Connection Type	Protection Class
	K2-CW	Al	Cable Gland	IP67
	W2-CW	316 L	Cable Gland	IP67

All dimension in mm [inch]; Al: Aluminum; 303: Stainless Steel V2A (1.4305, 303); 316 L: Stainless Steel V4A (1.4404, 316 L)