TILTIX INCLINOMETER

Precise Tilt Measurement

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.

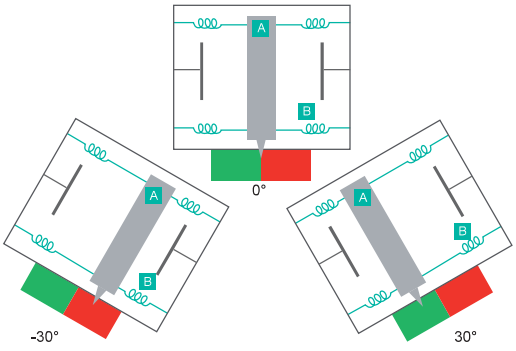
This proven method reaches accuracies of up to 0.1° over the measurement range of up to 360°. However, the measurement can be disturbed by external accelerations making the inclinometer capable of operating only in static applications.

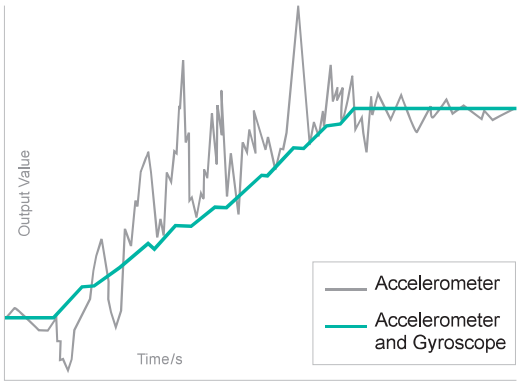
Dynamic Inclinometer

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 ±180° and y-axis ±90°).





Explosion Proof Certified Inclinometers

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 (± 80°) 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

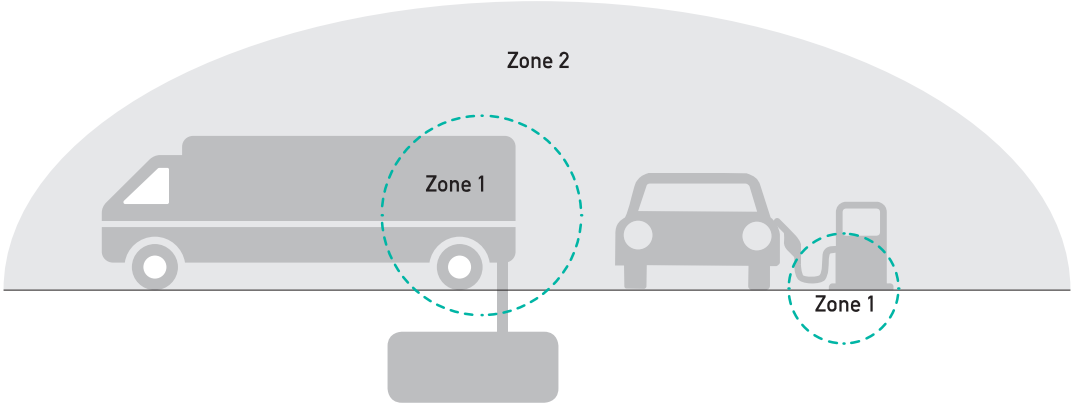
- **Group II (Above Ground Operations)**

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
- ±80° (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°



Product Overview – Analog Inclinometers

	CE	Max. Protecion Class	Comunication Interface	1 Axis 0 to 360°	2 Axis ±80°	Resolution	Accuracy	Die Cast Aluminum	Fibre-Reinforced	Supply Voltage in V	Cable	Connector	Terminal Block
	Programmable Analog Current + RS232 Rugged Housing	IP69K IP68	4 – 20 mA 0 – 20 mA	■	■	0.01°	0.1°	■		10–30	■	■	
	Programmable Analog Voltage + RS232 Rugged Housing	IP69K IP68	0.5 – 4.5 V 0 – 5 V 0 – 10 V	■	■	0.01°	0.1°	■		10–30	■	■	
	Programmable Analog Current + RS232 Compact Design	IP67	4 – 20 mA 0 – 20 mA	■	■	0.01°	0.1°		■	10–30	■	■	
	Programmable Analog Voltage + RS232 Compact Design	IP67	0.5 – 4.5 V 0 – 5 V 0 – 10 V	■	■	0.01°	0.1°		■	10–30	■	■	
	Analog Current Compact Design Cost Effective Design	IP67	4 – 20 mA 0 – 20 mA	■	■	0.01°	0.5°		■	10–30	■	■	
	Analog Voltage Compact Design Cost Effective Design	IP67	0.5 – 4.5 V 0 – 5 V 0 – 10 V	■	■	0.01°	0.5°		■	10–30	■	■	
	ATEX Certified Rugged Housing Compact Design	IP67	Voltage Current RS232	■	■	0.01°	0.1°		■	10–30	■	■	■

Related Industries



Find What You Need

Configure Your POSITAL Encoder Online

PRODUCT FINDER

Product Selection Guide – Analog Inclinometers

1	2		3				4		5					6	7			8	
A	X	X	–	X	X	X	–	X	–	X	X	X	X	–	X	X	X	–	X	X

1 Technology

C	MEMS, Accuracy 0.1°
D	MEMS, Accuracy 0.5°

2 Certificate

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

3 Measurement Range

010	±10°
020	±20°
040	±40°
060	±60°
080	±80°
090	90°
120	120°
180	180°
270	270°
360	360°

4 Number of Axis

1	Single Axis
2	Dual Axis

5 Communication Interface

SV00	Voltage 0.5 to 4.5 V + RS232
SV10	Voltage 0 to 5 V + RS232
SV20	Voltage 0 to 10 V + RS232
SV40	Voltage 0.5 to 9.5 V + RS232
SC00	Current 4 to 20 mA + RS232
AV00	Voltage 0.5 to 4.5 V
AV10	Voltage 0 to 5 V
AV20	Voltage 0 to 10 V
AV40	Voltage 0.5 to 9.5 V
AC00	Current 4 to 20 mA

6 Mounting

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

7 Housing Material

E2	Fibre-Reinforced Plastic
K2	Aluminum

8 Connection Type

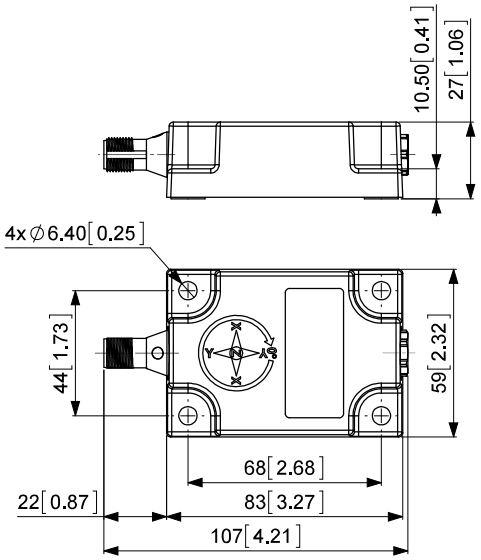
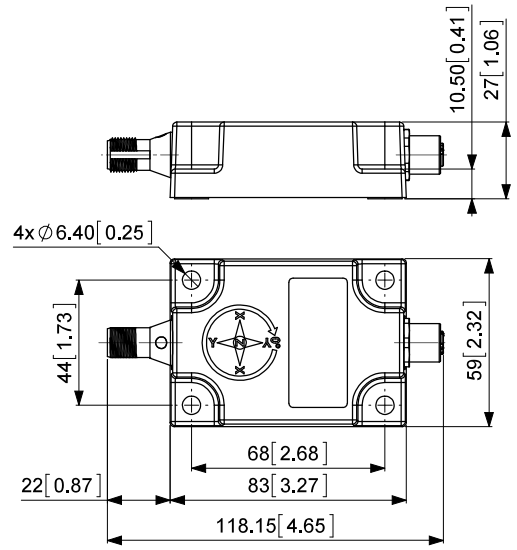
CW	Cable: 1m
2W	Cable: 2 m
5W	Cable: 5 m
AW	Cable: 10 m
PM	Connector: M12

Versatile Digital Displays

- On-site Position or Speed Measurement
- Connect to Encoders, Inclinometers or Linear Sensors
- Analog, SSI or Incremental Input
- Digital or Analog Output
- Easy Integration to More Complex Control Systems

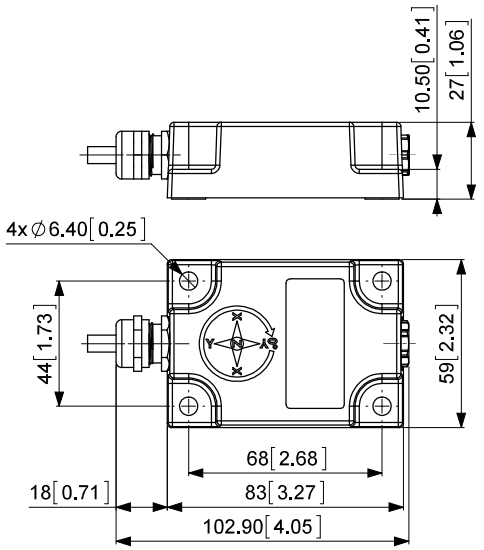
Learn More

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)

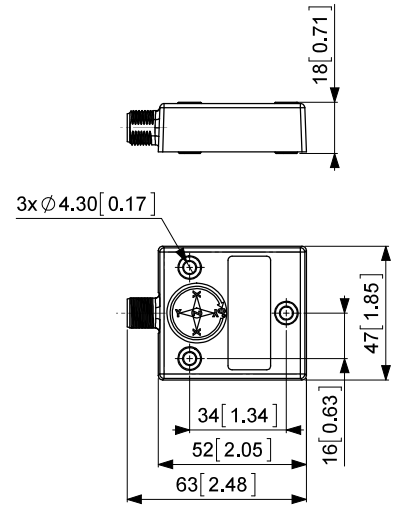
Technical Drawings

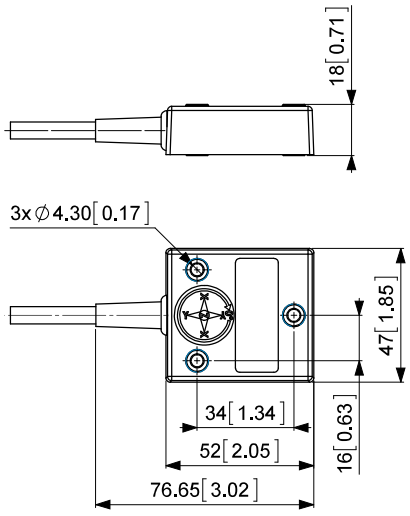


7 8 Type Key	Housing Material	Connection Type	Protection Class
K2-CW	Al	1 m Cable	IP68/IP69K
K2-2W	Al	2 m Cable	IP68/IP69K
K2-5W	Al	5 m Cable	IP68/IP69K
K2-AW	Al	10 m Cable	IP68/IP69K

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

Technical Drawings

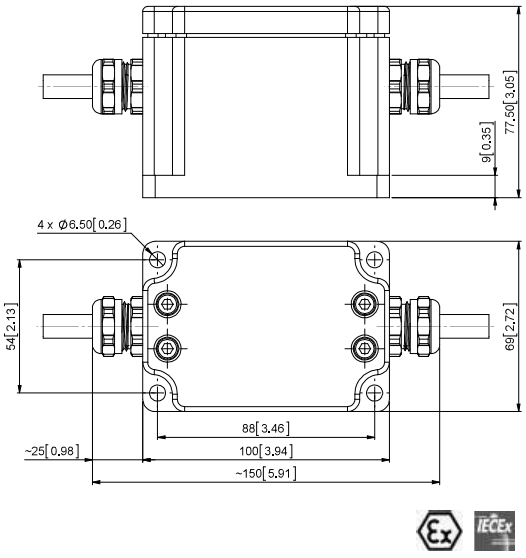




7 8 Type Key	Housing Material	Connection Type	Protection Class
E2-PM	Plastic	M12 Connector	IP67
E2-CW	Plastic	1 m Cable	IP67
E2-2W	Plastic	2 m Cable	IP67
E2-5W	Plastic	5 m Cable	IP67
E2-AW	Plastic	10 m Cable	IP67

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

Technical Drawings



7 8 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)