Inclinomètre durci - P603

Wide-angle high-resolution inclinometer | 0-16° to 0-160° | Analog output

- Wide-angle inclinometer, contactless inductive technology
- Factory-calibrated angular range from 0-16° to 0-160°
- Accuracy: linearity / hysteresis < ±0.25° up to 100°
- Infinite resolution – noise < 0.02% FSO
- Outputs: 0.5-4.5V, ±5V, 0.5-9.5V, ±10V, 4-20mA, 2 or 3-wire
- Stainless steel body, anodized aluminium flange
- IP67 protection
- 4-pin M12 IEC connector
- Operating temperature: -20°C to +85°C
- Response time: 250 ms typical at 20°C
- MTBF: 350,000 h at 40°C

Features

The Inclinotrack - P603 inclination sensor provides wide-angle, high-resolution and durable angle measurement for industrial and scientific applications.

Main features:

Contactless inductive technology: Based on an inductive principle and integrated ASIC electronics, the sensor measures absolute position without mechanical contact. The absence of rubbing parts eliminates wear and ensures exceptional service life and excellent reliability.

Custom wide-angle calibration: The angular range is factory-defined according to customer requirements, in 1° increments, from 0-16° to 0-160°. The output signal is linear and proportional to rotation, with a machined mechanical reference identifying the calibrated mid-point.

Industrial robustness: Stainless steel body and anodized aluminium flange, IP67 sealing, integrated EMC protection according to EN 61000-6-2 / EN 61000-6-3, and shock and vibration resistance: a compact and standalone solution for demanding industrial and scientific applications.

Applications

- Industrial machines and OEM equipment
- Mobile machinery and equipment
- Level and attitude control
- Scientific instrumentation
- Precision angular positioning
- Inclination monitoring

Specifications

Type	Wide-angle single-axis inclinometer / inclination sensor
Technology	Contactless inductive technology (ASIC), absolute position measurement
Angular range	Factory-calibrated from 0-16° (±8°) to 0-160° (±80°), in 1° increments
Linearity / hysteresis	< ±0.25° (combined error) up to 100°
Resolution	Infinite
Noise	< 0.02% FSO
Response time	250 ms typical at 20°C
Temperature coefficients	< ±0.01%/°C (gain) · < ±0.01% FS/°C (offset)
Damping ratio	0.2 : 1 (0.6 nominal at 25°C)

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Specifications

Environmental specifications

Operating temperature	-20°C to +85°C (all output options)
Storage temperature	-40°C to +125°C
Sealing	IP67
EMC performance	EN 61000-6-2, EN 61000-6-3
Vibration	IEC 68-2-6: 10 g
Shock	IEC 68-2-29: 40 g
MTBF	350,000 h at 40°C Gf

Materials & construction

Body	Stainless steel
Mounting flange	Anodized aluminium, 2 adjustment slots
Connection	4-pin M12 IEC connector (IEC 61076-2-101)
Maximum conductor section	0.75 mm²
Body diameter	35 mm
Flange diameter	60 mm
Body length	44 mm (standard) / 50 mm (buffered version)

Electrical specifications

Output options

The sensor is available with eight output options (codes A to H). The required supply voltage depends on the selected output option.

Option	Output	Supply Vs (tolerance)	Supply current	Load / compliance
A	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	10 mA nom. / 12 mA max.	≥ 5 kΩ
B	±5V	±15V nom. (±9 - 28V)	12 mA nom. / 15 mA max.	≥ 5 kΩ
C	0.5 - 9.5V	+24V nom. (13 - 28V)	12 mA nom. / 15 mA max.	≥ 5 kΩ
D	±10V	±15V nom. (±13.5 - 28V)	12 mA nom. / 15 mA max.	≥ 5 kΩ
E	4 - 20mA, 2-wire (current loop)	+24V nom. (18 - 28V)	26 mA max.	0 - 300 Ω max. @24V · RL max. = (Vs - 18) / 0.02
F	4 - 20mA, 3-wire Sink	+24V nom. (13 - 28V)	32 mA nom. / 35 mA max.	0 - 950 Ω max. @24V · RL max. = (Vs - 5) / 0.02
G	0.5 - 4.5V	+24V nom. (9 - 28V)	12 mA nom. / 15 mA max.	≥ 5 kΩ
H	4 - 20mA, 3-wire Source	+24V nom. (13 - 28V)	32 mA nom. / 35 mA max.	0 - 300 Ω max. · approx. 1.2 to 6V across 300 Ω

The typical supply current is 12 mA (20 mA max.) for voltage output options. The loads indicated for 4-20 mA outputs include cable resistance.

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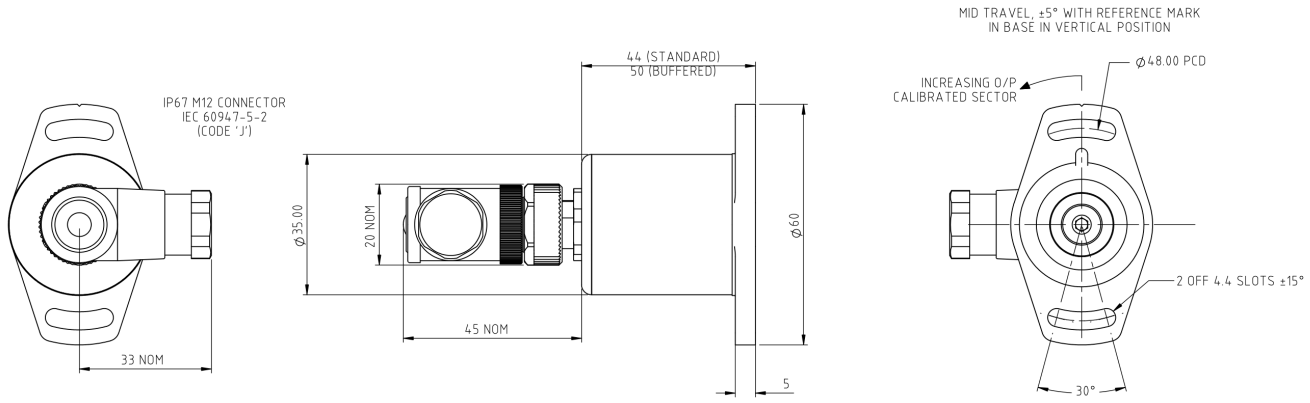
Dimensions



Mechanical drawing reference: P603-11 · Dimensions in mm. Body diameter 35 mm, flange diameter 60 mm, length 44 mm (standard) / 50 mm (buffered). Flange drilling pitch circle diameter Ø48 mm PCD, 2 slots 4.4 ±15°.

Configuration, options

Product coding

P603 . a b c d

P603	Wide-angle inclination sensor family
a – Range	Factory-calibrated angle, from 0-16° (±8°) to 0-160° (±80°), in 1° increments (e.g. 0-54°)
b – Output	Output code A to H (see table opposite)
c – Connection	J: 4-pin M12 IEC connector, nylon, IP67 Jxx: same, pre-wired, length “xx” in cm (e.g. J2000 = 20 m)
d – Z-code	Specific option (on request)

Example: P603 . 54 E J – 0-54° range, 4-20 mA 2-wire output, M12 connector.

Output codes

Code	Output
A	0.5 - 4.5V ratiometric
B	±5V
C	0.5 - 9.5V
D	±10V
E	4 - 20mA, 2-wire
F	4 - 20mA, 3-wire Sink
G	0.5 - 4.5V
H	4 - 20mA, 3-wire Source

3D models (STEP or IGS) available on request. Mechanical adaptations may be considered depending on installation requirements.

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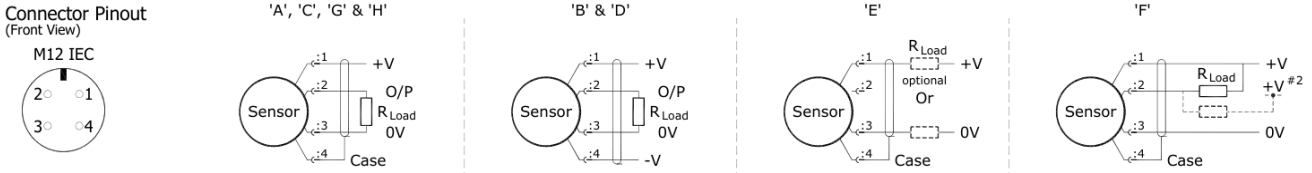
Wiring

M12 IEC connector pinout and wiring diagrams



Pin	Function	Comment
1	+V (supply)	According to output option
2	Output (O/P)	Measurement signal
3	0V	Signal reference / ground
4	Case – or –Ve for options B & D	According to output option

Maximum conductor section: 0.75 mm². The M12 IEC connector does not rotate: the field-wireable connector body can be positioned in one of four orientations for cable routing. The connector orientation is not guaranteed and must not be used as a mechanical reference.

Protection against wiring errors

Options	Protection level
A	Not protected against reverse polarity or overvoltage. Risk is minimal if the supply current is limited to less than 50 mA.
B & D	Supply lines protected by diode. The output must not exceed ±12V.
C & G	Supply lines protected by diode. The output must not go outside the 0 to 12V range.
E, F & H	Protected against any wiring error within the nominal voltage range.

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Installation & use

Mounting and orientation guide

1. Mechanical mounting. The sensor is mounted by its flange (interface P603-11) onto the mounting block. Each sensor must be mounted on a vertical face: in a 2-axis configuration, the two sensors are installed on two perpendicular faces of the block (axis X and axis Y). Present the sensor and engage the screws in the flange slots without fully tightening.

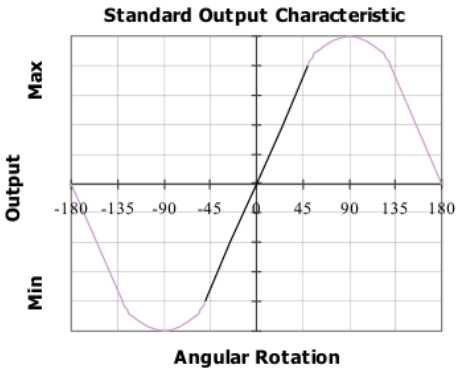
2. Mid-point adjustment. The mid-point of the calibrated range corresponds to half of the full scale; the flange is then vertical. A machined mechanical reference identifies this mid-point (±5° around the mark). Adjustment is performed by rotating the sensor within the flange slots, then tightening it.

3. Measurement direction. Within the calibrated range, the output signal increases when the sensor is rotated counter-clockwise, as viewed from the flange face. This direction must be checked during commissioning and, if required, an inverted curve option may be used.

4. Use. The sensor has complete freedom of rotation and provides two linear sectors spaced 180° apart, over which the response is linear. The calibrated range is factory-defined according to requirements (here ±15° per axis for mast inclination monitoring).

5. Connection. Connection is made through a 4-pin M12 IEC connector. The connector does not rotate; its orientation must not be used as a mechanical reference. The field-wireable connector body can be positioned in one of four orientations to facilitate cable routing. Cable bending radii must be respected and the cable must be secured to avoid stress on the connector.

Mechanical reference and signal increase direction within the calibrated sector



Standard output curve: signal vs angular rotation

Commissioning procedure and zero adjustment

Step	Operation	Check / criterion
1	Check wiring according to the ordered output option (pins 1 to 4) and supply polarity.	Vs voltage compliant with the output options table, page 2.
2	Place the block in its reference position (mast vertical / structure at 0°).	Physical reference established and stable.
3	Power up and allow the sensor to stabilize.	Stable signal; response time approx. 250 ms at 20°C.
4	Adjust the mid-point by rotating the sensor in the flange slots.	Output = mid-scale (e.g. 12 mA for 4-20 mA output; 2.5 V for 0.5-4.5V).
5	Tighten the flange screws to torque without moving the sensor.	Output unchanged after tightening.
6	Check the direction of variation by slightly tilting the structure.	Signal increasing in the expected direction (otherwise use inverted option).
7	Repeat steps 2 to 6 for the second sensor (perpendicular axis).	Both axes read mid-scale in the reference position.

Indicative mid-scale values according to output option: 0.5-4.5V → 2.5V · ±5V → 0V · 0.5-9.5V → 5V · ±10V → 0V · 4-20mA → 12 mA. For full mechanical details, refer to drawing P603-11.

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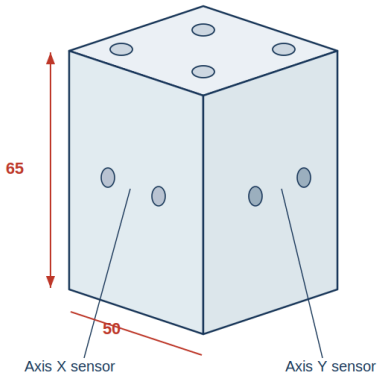
Mounting block (CP06-10)

Dual-sensor biaxial block – defined product

The CP06-10 mounting block, in 316L stainless steel, provides fixation for the two P603 sensors on two perpendicular faces (2-axis measurement) and the mechanical interface with the structure. It is a fully defined product (Positek drawing CP06-10): both the sensor interfaces (M4 tappings) and the structure fixing (M8 or counterbored holes) are dimensioned and require no customer definition.

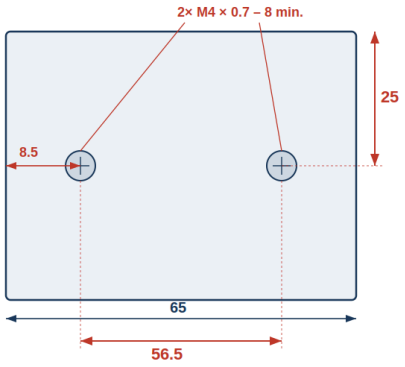
Overview – CP06-10 biaxial block

2 P603 sensors on 2 perpendicular faces (X / Y axes)



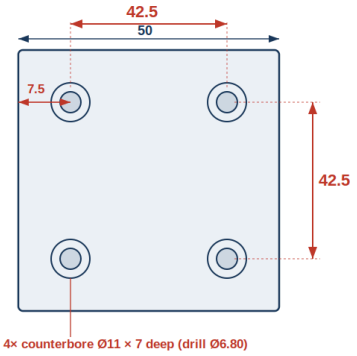
Sensor face (M4 tappings)

Fixed dimensions – P603 sensor interface



Structure fixing face

4× M8 or 4× counterbore Ø11 / Ø6.80



Block & sensor interface

Description	Value
Overall dimensions (L × W × H)	65 × 50 × 50 mm
Material	Stainless steel 316L
Sensor faces	2 perpendicular faces (90°)
Sensor tappings	2× M4 × 0.7, 8 mm min. full thread
Tapping spacing	56.5 mm · 25 mm · 8.5 mm from edge
Perpendicularity	0.05 (datums A · B)

Sensor interface dimensions guarantee the orthogonality of the 2-axis measurement.

Structure fixing

Description	Value
Tapped fixing	4× M8 × 1.25, 12 mm min. full thread
Through fixing (alt.)	4× counterbore Ø11 × 7 deep, drill Ø6.80
Fixing hole spacing	42.5 mm square · 7.5 mm from edge
Edge break	max. 1.0 × 45° on all sharp edges
Tolerances & finish	Positek standard UD47-46 (current issue)

Two fixing options on the same face: tapped (M8) or through-holes with counterbore for cap screws.

Application note: stainless steel 316L is compatible with offshore / saline environments. The two sensor faces are machined perpendicular to each other to preserve the orthogonality of the 2-axis measurement. Reference: Positek drawing CP06-10, Rev. A.

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