



STATIC INCLINOMETER SENSOR WITH DOUBLE HORIZONTAL AXES OR SINGLE VERTICAL

Available with double axes X – Y for the detection of the tilt vs. the horizontal plane, or a single axis Z for the detection vs. the vertical plane; based on a triaxial MEMS technology gyroscope compensated. Excellent linearity all over the temperature range, high level of reliability. Suitable for harsh environment, with high shocks and vibrations.



- **Triaxial MEMS technology**
- **High reliability**
- **High shocks and vibrations resistant**
- **Compact dimensions**
- **Configurable measuring range**
- **Analogue and digital output**
- **Gyroscope compensated**
- **Dual channel version**

Main features

- Measuring range: $\pm 1^\circ \dots \pm 80^\circ$, double axes X/Y horizontal versions; $0-360^\circ$ single axis Z vertical version
- Protection degree IP 67/69K
- Operating temperature $-40+85 \text{ DegC}$
- Resolution up to 0.01°
- Redundant output version
- SIL2 – PLd, EN 61508, EN 13849-1 Certified (pending)
- PBT housing – high resistance to mechanical shocks and high temperatures
- Connection: M12 integrated connector or cable outlet. Special connector / cable (Deutsch / AMP...) on request.

Application fields

- **Agriculture machines and equipments**
- **Construction machinery and equipment**
(Excavators, loaders, paving machines etc.)
- **Handling machines**
(stationary cranes, truck mounted cranes, forklift, aerial platform etc.)
- **Forestry equipments**
(harvesting heads, mobile saw etc.)
- **Equipments and trucks for garbage recycling**



INCLINOMETRIC AND ANGULAR SENSOR, 7A SERIES

Electrical specifications

Power supply: 9-36 Vdc 5 Vdc +/- 10% (ratiometric only)

Typical consumption: 30 mA

Dielectric strenght: 500 Vdc (machine ground to power supply ground) R > 10M Ohm – 60 sec.

Overvoltage protection: yes

Polarity protection: yes

Analogue output: 0,5-4,5 Vdc ratiometric, 0,5-4,5 Vdc, 4-20mA

Digital output: CANopen, CAN SAE J1939

Linearity: 0,5% full scale

Output resolution: 0,01°

Environmental and mechanical specifications

Operating temperature: -40 +85 °C

HR%: up to 90% – no condensation (EN60068-2-30)

MTTFd: (EN 13849) > 100 years

Protection degree: IP67/69K (EN 60529)

Temperature drift: 0,01°/°C (tipycal)

Shock: IEC 60068-2-27 – 100g (11ms) single shock, 50g (11 ms) 1000 shocks per axis

Vibrations: IEC 60028-2-6 - 20 g (r.m.s) (10...2.000Hz) resonance points excluded

Electrical connection: M12 integrated connector / cable / cable plus connector

EMC – Features:

EMC: EU Directive 2014/30/EU CE marking

Generic standards: EN 61000-6-2

Agriculture and Forestry machinery: EN 14982

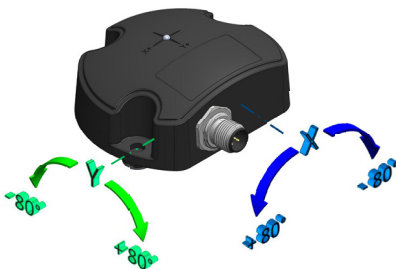
Construction machinery: EN 13309

Transient pulses: ISO 7637-2 pulse 5b - voltage 56Vdc

DIRECTIONAL AXES

DOUBLE HORIZONTAL AXES

Tilt angle X/Y

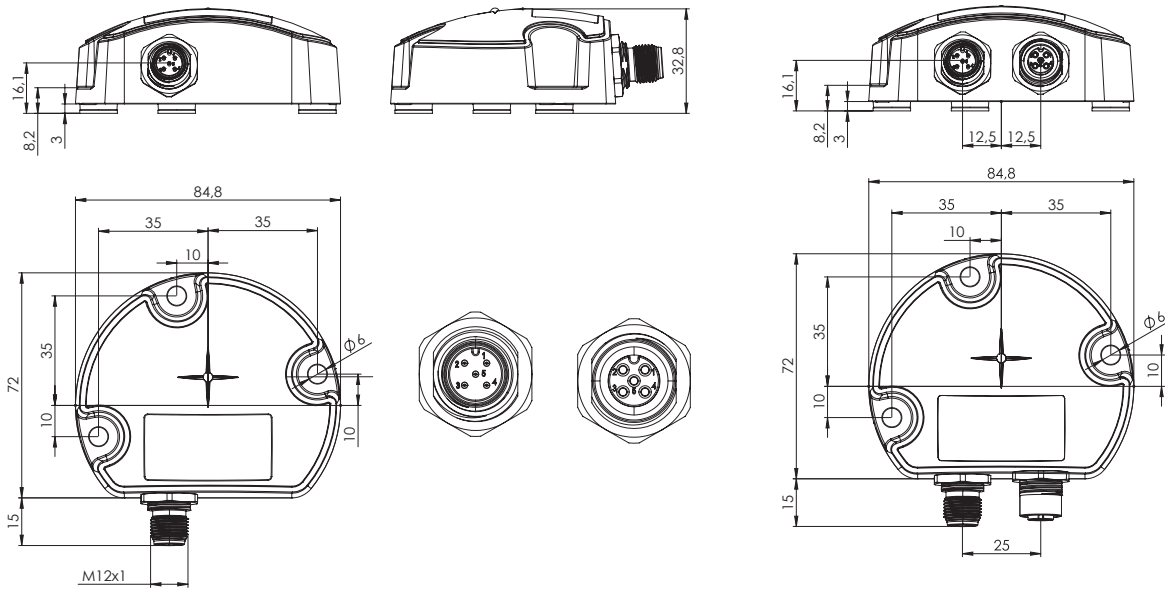


SINGLE VERTICAL AXIS

Tilt angle Z



Drawing 1

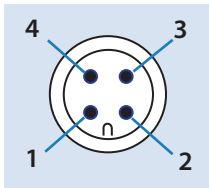


WIRING DIAGRAMS

A = single connector M12 – (M) – 4 pin

G = double connector 2*M12 –(M + M) – 4 pin

L = double connector 2*M12 – (M+F) – 4 pin

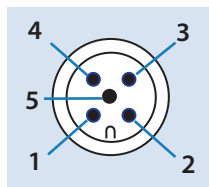


PIN	PINOUT 5	PINOUT 6	PINOUT 3	PINOUT 4	PINOUT 7
1	Vdc	Vdc	Vdc	Vdc	Vdc
2	Gnd	Gnd	Signal z	Gnd	Gnd
3	Signal x	Signal z	Gnd	CAN_H	Signal z1
4	Signal y	n.c.	n.c.	CAN_L	Signal z2
	(x+y) Single channel	(z) Single channel		(x+y+z) Redundant	(z) Dual channel

B = single connector M12 – (M) – 5 pin

H = double connector 2*M12 –(M + M) – 5 pin

M = double connector 2*M12 – (M+F) – 5 pin



PIN	PINOUT 7	PINOUT 5	PINOUT 3	PINOUT 4
1	Vdc	Vdc	Shield	Gnd
2	Signal y	n.c.	Vdc	Vdc
3	Gnd	Gnd	Gnd	Signal z
4	Signal x	Signal z	CAN_H	n.c.
5	n.c.	n.c.	CAN_L	n.c.
	(x+y) Single channel	(z) Single channel	(x+y+z) Redundant	(z) Single channel

W: PUR Cable output



Cable	Analogue output PINOUT 4	CAN output CAN PINOUT 2
Blue	Vdc	Vdc
White	Gnd	Gnd
Green	Signal 1	CAN_H
Red	Signal 2	CAN_L

Ordering code: INCLINOMETRIC AND ANGULAR SENSOR, 7A SERIES

MODEL 7A

Number of chanel

- S** : Single
- D** : Dual
- R** : Redundant (only CAN version)
for details see installation manual

Power supply

- 1** : 9-36 Vdc
- 2** : 5 Vdc +/- 10% (only for ratiometric output)

Measuring range (degree °)

- V** : Angular range for single axis Z (vertical) 030-060-090-120-150-180-210-240-270.300-330-360
- H** : Angular range for double axes X/Y (horizontal) +/- 010-020-030-040-050-060-070-080

Electrical connection

- A*** : single M12 - M - 4 pin connector (wiring diagram 3-4-5-6-7)
- G*** : double M12 - M+M - 4 pin connector (wiring diagram 3-4-5-6-7 dual channel)
- L4** : double M12 - M+F - 4 pin connector (wiring diagram 4 - CANopen IN-OUT)
- B*** : single M12 - M - 5 pin connector (wiring diagram 3-4-5-7)
- H*** : double M12 - M+M - 5 pin connector (wiring diagram 3-4-5-7 dual channel)
- M3** : double M12 - M+F - 5 pin connector (wiring diagram 3 - CANopen IN-OUT)
- W4** : Pigtailed PUR cable – analogue
- W2** : Pigtailed PUR cable – digital

* : to specified the number of the wiring diagram

Cable length for option W4-W2 electrical connections

- Q** : M12 integrated connector * = minimum batch 20 pcs./order
- R** : standard : 1000mm
- *V** : 3000mm
- *W** : 5000mm

Output signal

Voltage:

- V3** = 0.5 – 4.5 Vdc
- V6** = 4.5 – 0.5 Vdc
- V8** = 0.5 – 4.5 Vdc ratiometric
- V9** = 4.5 – 0.5 Vdc ratiometric

Current:

- A1** = 4 - 20 mA.
- A2** = 20 - 4 mA.

Digital CANopen

- C1** : CANopen baud rate 50 Kbit
- C2** : CANopen baud rate 125 Kbit
- C3** : CANopen baud rate 250 Kbit (factory default value)
- C4** : CANopen baud rate 500 Kbit
- C5** : CANopen baud rate 800 Kbit
- C6** : CANopen baud rate 1000 Kbit

Digitale CAN SAE J1939

- J3** : CAN SAE J 1939 baud rate 250 Kbit (factory default value)
- J4** : CAN SAE J 1939 baud rate 500 Kbit

Node ID (only for digital output)

Channel 1

- Default value for CANopen = **7A**
- Value for CAN SAE J1939 = **FA**
- Value for Analog Output = **00**

Channel 2 (only for Model D)

- for single channel version the default value is 00



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