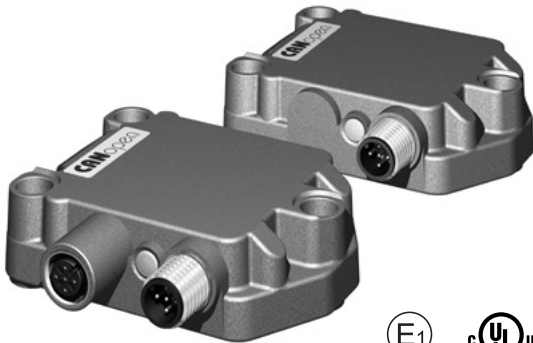


Inclinometers

**Inclinometer
MEMS / capacitive**

IN88, 1- and 2-dimensional

CANopen



The inclinometers of the IN88 series allow measuring 2-dimensional inclinations in the range of $\pm 85^\circ$ or 1-dimensional inclinations up to 360° .

With their high robustness, their protection level up to max. IP69k and their wide temperature range from -40°C to $+85^\circ\text{C}$, these devices are ideally suitable for outdoor use – e.g. for mobile automation applications.



CANopen



High protection level



Shock / vibration resistant



Reverse polarity protection



Redundancy

Robust

- High protection rating IP67 and IP69k in one device.
- Stable accuracy over a wide temperature range from -40°C up to $+85^\circ\text{C}$.
- High shock resistance up to 100 g and vibration resistance up to 10 g.

Versatile

- Parameterizable filter.
- Measuring direction 1- or 2-dimensional.
- With 1 x M12 connector or 2 x M12-connector.
- Stacked installation possible for redundancy.

**Order code ¹⁾
Inclinometer IN88**

8.IN88.XX21.12X
Type a b c d e

a Measuring direction
1 = 1-dimensional
2 = 2-dimensional

b Measuring range
6 = $\pm 85^\circ$ ²⁾
7 = $0^\circ \dots 360^\circ$ ³⁾

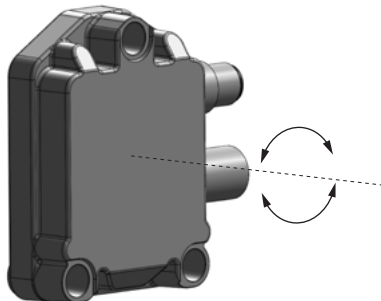
c Interface
2 = CANopen DS410

d Power supply
2 = 10 ... 30 V DC

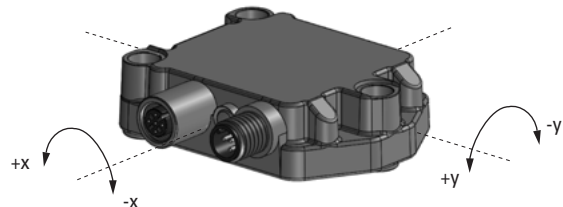
e Type of connection
1 = 1 x M12 connector, 5-pin
3 = 2 x M12 connector, 5-pin

Direction of inclination

1-dimensional



2-dimensional



1) Series availability as from July 2016.

2) Can only be ordered in conjunction with measuring direction 2-dimensional.
3) Can only be ordered in conjunction with measuring direction 1-dimensional.

Inclinometers

Inclinometer MEMS / capacitive	IN88, 1- and 2-dimensional	CANopen
Connection technology		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut for Bus in, 5-pin 5 m [16.40'] PVC cable	05.00.6021.2211.005M
	M12 male connector with external thread for Bus out, 5-pin 5 m [16.40'] PVC cable	05.00.6021.2411.005M
Connector, self-assembly (straight)	M12 female connector with coupling nut for Bus in, 5-pin	05.B-8151-0/9
	M12 male connector with external thread for Bus out, 5-pin	05.BS-8151-0/9

Further accessories can be found in the accessories section or in the accessories area of our website at: www.kuebler.com/accessories
 Additional connectors can be found in the connection technology section or in the connection technology area of our website at: www.kuebler.com/connection_technology

Technical data		
General electrical characteristics		
Power supply	10 ... 30 V DC	
Power consumption	max. 70 mA	
Reverse polarity protection	yes	
Measuring axes	1 or 2	
Measuring range	1-dimensional	360°, no limit stop
	2-dimensional	±85°
Resolution	0.01°	
Absolut accuracy (at 25°C)	±0.4°	
Transverse sensitivity ¹⁾	max. ±0.5°	
Repeat accuracy	±0.2°	
Temperature drift	typ. ±0,006°/K	
Sampling rate	50 Hz (20 ms)	
Limit frequency with Butterworth filter factory setting	0.1 ... 20 Hz, 8th order typ. 10 Hz	
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU	
Harmonized standards		
DIN EN 61326-1	Electrical equipment for measurement, control and laboratory use	
DIN EN 61000-6-2	Immunity for industrial environments	
DIN EN 61000-6-3	Emitted interferences for residential environments	
DIN EN ISO 14982	Agricultural and forestry machinery, electromagnetic compatibility, test methods and acceptance criteria	
DIN EN 13309	Construction machinery - Electromagnetic compatibility of machines with internal power supply	
Mechanical characteristics		
Connection CAN	1 x M12 connector 2 x M12 connector	5-pin, male connector 5-pin, male connector / 5-pin, female connector
Weight	approx. 185 g	
Protection acc. to EN 60529	IP67 / IP69k	
Working temperature range	-40°C ... +85°C [-40°F ... +185°F]	
Material	housing	Aluminium
Shock resistance	1000 m/s ² , 6 ms	
Vibration resistance	100 m/s ² , 10 ... 2000 Hz	
Dimensions	80 x 60 x 23 mm [3.15 x 2.36 x 0.91"]	
Interface characteristics CANopen		
Interface	CANopen according to CiA DS-301, Profile to CiA DSP-410	
Data rates	10 kbit/s, 20 kbit/s, 50 kbit/s, 125 kbit/s, 250 kbit/s, 500 kbit/s, 800 kbit/s, 1 Mbit/s	
Functions	TPDO (RTR, cyclic, event-driven, synchronized), parameterization per SDO and object register, digital filter (Butterworth Low pass, 8th order, parameterization per SDO), SYNC Consumer, EMCY Producer, output and control of internal device temperature (±2.0 K accuracy), failure control with the help of Heartbeat, LSS functions	

A full description of the technical data can be found in the relevant product manual at www.kuebler.com.

1) Only for 2-dimensional measuring direction.

Inclinometers

Inclinometer MEMS / capacitive	IN88, 1- and 2-dimensional	CANopen
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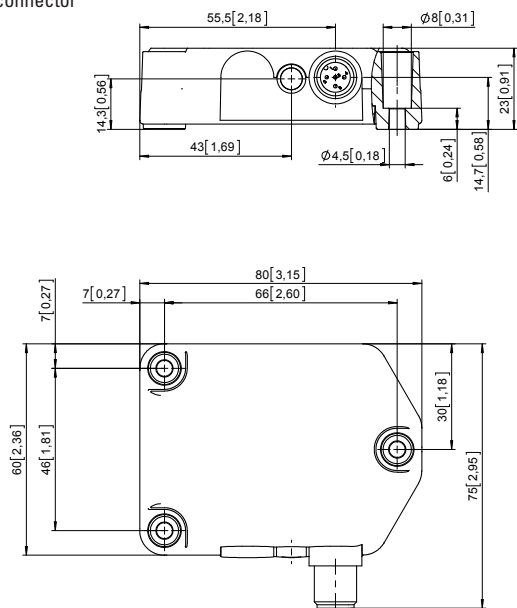
Terminal assignment

Interface	Type of connection	1 x M12 connector, 5-pin						
2	1	Bus IN						
		Signal:	+V	0 V	CAN_GND	CAN_H		CAN_L
		Pin:	2	3	1	4		5
Interface	Type of connection	2 x M12 connector, 5-pin						
2	3	Bus OUT						
		Signal:	+V	0 V	CAN_GND	CAN_H		CAN_L
		Pin:	2	3	1	4		5
		Bus IN						
		Signal:	+V	0 V	CAN_GND	CAN_H		CAN_L
		Pin:	2	3	1	4		5

Dimensions

Dimensions in mm [inch]

1 x M12 connector



2 x M12 connector

