

Inclinometers

For static applications
1- and 2-axis measurement

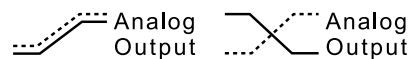
IN41

Analog



High accuracy with minimal movement.

Measurement is performed capacitively in acceleration measurement cells for applications with little or no movement. Vibrations and shocks can be compensated for within certain limits by software filters.



Order code 1-axis measurement

8.IN41.1XX1.11X.XXXX
Type a b c d f g

- a** Measurement axes
1 = 1-axis
vertical mounting



- b** Measuring range
7 = 0° ... 360° (±180°)
8 = 0° ... 180° (±90°)

- c** Analog interface
1 = 4 ... 20 mA
2 = 0,1 ... 4,9 V
3 = 0,5 ... 4,5 V
4 = 0 ... 5 V
5 = 0 ... 10 V

- d** Filter
1 = no filter
Preset filter functions up to
10 Hz available on request

- f** Type of connection
1 = M12 connector, 8-pin
2 = M12 connector, 5-pin
4 = cable 5-core, open ended, 1 m
B = cable 5-core, open ended,
special lengths

- g** Special lengths
only for type of connection **f** = B
(other lengths on request)
0050 = 5 m
0100 = 10 m

Stock types
8.IN41.1711.112

Order code 2-axis measurement

8.IN41.2XXX.11X.XXXX
Type a b c d f g

- a** Measurement axes
2 = 2-axis
horizontal mounting



- b** Measuring range
1 = ±10°
2 = ±15°
3 = ±30°
4 = ±45°
5 = ±60°
6 = ±85°

- c** Analog interface
1 = 4 ... 20 mA
2 = 0,1 ... 4,9 V
3 = 0,5 ... 4,5 V
4 = 0 ... 5 V
5 = 0 ... 10 V

- d** Filter
1 = no filter
Preset filter functions up to
10 Hz available on request

- f** Type of connection
1 = M12 connector, 8-pin
2 = M12 connector, 5-pin
4 = cable 5-core, open ended, 1 m
B = cable 5-core, open ended,
special lengths

- g** Special lengths
only for type of connection **f** = B
(other lengths on request)
0050 = 5 m
0100 = 10 m

Stock types
8.IN41.2611.112

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For static applications 1- and 2-axis measurement		IN41	Analog
Accessories			Order no.
Teach adapter  	for activating the control inputs for the following functions: - Reset to factory setting - Center point of the measurement - Scaling of the analog measuring range (start/end position) - Setting the sensor filter		
	Teach adapter, 5-pin Teach adapter, 8-pin		05.TX40.1 8.0010.9000.0017
EMC shield terminal 	For an EMC-compliant installation of the cable - top-hat rail mounting - spring steel, galvanized - shield diameter 3.0 ... 12.0 mm		8.0000.4G06.0312
Cables and connectors			Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight single ended 2 m [6.56'] PVC cable		05.00.6081.2211.002M
	M12 female connector with coupling nut, 5-pin, A coded, straight DT04 connector, male contacts, 6-pin, straight 2 m [6.56'] PVC cable		05.00.6091.22C7.002M
	M12 female connector with coupling nut, 5-pin, A coded, straight single ended 2 m [6.56'] PUR cable		05.00.60F1.2211.002M
	M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PVC cable		05.00.6041.8211.005M
	M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PUR cable		05.00.6051.8211.002M
Connectors	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)		05.CMB 8181-0
	M12 female connector with coupling nut, 5-pin, A coded, straight (metal)		8.0000.5116.0000

Further Kübler accessories can be found at: [kuebler.com/accessories](https://www.kuebler.com/accessories)

Further Kübler cables and connectors can be found at: [kuebler.com/connection-technology](https://www.kuebler.com/connection-technology)

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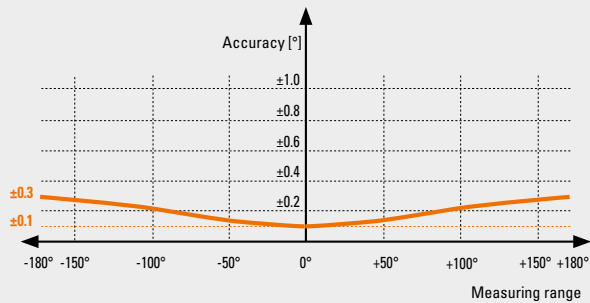
IN41

Analog

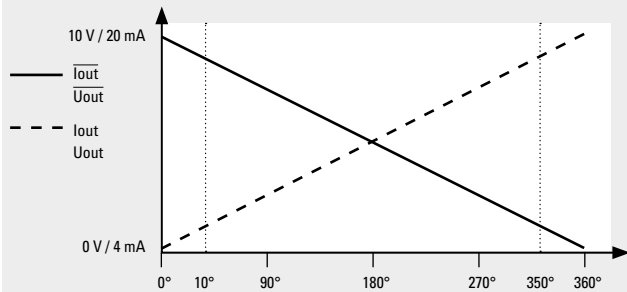
Technical data

General data 1-axis measurement

Measuring range	0 ... 360°
Resolution	current interface 0.01° internal sensor 12 bit D/A converter voltage interface 12 bit
Repeat accuracy	≤ 0,2°
Linearity deviation	±0,1°
Temperature drift	typ. ±0.006 %/K
Accuracy (at 25°C)	±0.1 ... ±0.3° depending on the measuring range

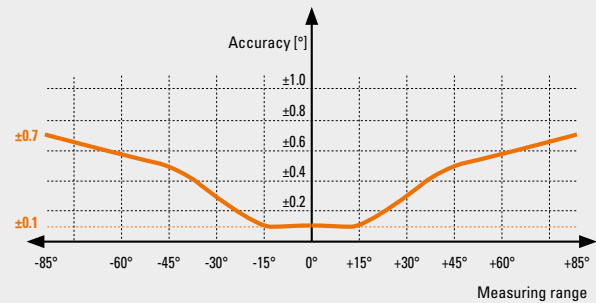


Course of the output signal – factory setting

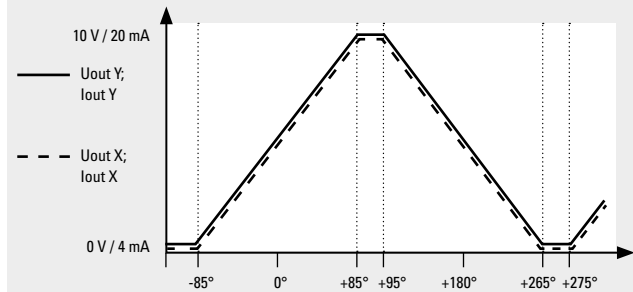


General data 2-axis measurement

Measuring range	-85° ... +85°
Resolution	current interface 0.01° internal sensor 12 bit D/A converter voltage interface 12 bit
Repeat accuracy	≤ 0,2°
Linearity deviation	±0,45°
Temperature drift	typ. ±0.006 %/K
Accuracy (at 25°C)	±0.1 ... ±0.7° depending on the measuring range



Course of the output signal – factory setting



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Electrical characteristics current interface

Supply voltage	4 ... 20 mA	10 ... 30 V DC
Current consumption	max. 40 mA	
Reverse polarity protection of the supply voltage	yes	
PowerON Time (PowerOn until valid output value)	< 0.5 s	
Output load	at 10 VDC at 24 VDC at 30 VDC	max. 200 Ohm max. 900 Ohm max. 1200 Ohm
Setting time	< 1 ms ($R_{load} = 900 \text{ Ohm}$, 25 °C)	
Sampling rate	50 Hz (20 ms)	
Limit frequency with Butterworth filter	0.1 ... 10 Hz, 8th order	

Mechanical characteristics

Electrical connection	M12 connector, 8-pin M12 connector, 5-pin cable, 8-pin cable, 5-pin
Weight	approx. 60 g [2.1 oz]
Protection acc. to EN 60529	IP68/IP69k
Working temperature range	-40 °C ... +85 °C [-40 °F ... +185 °F]
Material	housing plastic, PC
Shock resistance acc. to EN 60068-2-27	100 m/s ² , 10 ... 2000 Hz
Vibration resistance acc. to EN 60068-2-6	1000 m/s ² , 6 ms
Dimensions	44.5 x 42.5 x 20 mm [1.75 x 1.67 x 0.79"]

Electrical characteristics voltage interface

Supply voltage	0.1 ... 4.9 V / 0.5 ... 5 V / 0 ... 5 V 0 ... 10 V	10 ... 30 V 15 ... 30 V
Current consumption (no load)	max. 40 mA	
Reverse polarity protection of the supply voltage	yes	
PowerON Time (PowerOn until valid output value)	< 0.5 s	
Output load	max. 10 mA	
Setting time	< 1 ms ($R_{load} = 1000 \text{ Ohm}$, 25 °C)	
Sampling rate	50 Hz (20 ms)	
Limit frequency with Butterworth filter	0.1 ... 10 Hz, 8th order	

EMC

Relevant standards	EN 61326-1	Electrical equipment for measurement, control and laboratory use
	EN 55011 Klasse B, EN 61000-6-3	Emitted interferences for residential environments

Approvals

E1 compliant in accordance with	ECE guideline	
UL compliant in accordance with ¹⁾	File no. E224618	
CE compliant in accordance with	EMC Directive RoHS Directive	2014/30/EU 2011/65/EU

1) The IP protection class is not UL-tested. Verified by Kübler.

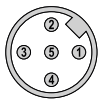
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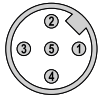
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Analog

Terminal assignment, 1-axis

Type of connection	M12 connector, 8-pin									
1	Signal – Interface 1 (current):	0 V	+V	Iout+	Iout-	Iout+	Iout-	Teach 1	Teach 2	
	Signal – Interface 2, 3, 4, 5 (voltage):	0 V	+V	Uout+	Uout-	Uout+	Uout-	Teach 1	Teach 2	
	Pin:	1	2	3	4	5	6	7	8	
Type of connection	M12 connector, 5-pin									
2	Signal – Interface 1 (current):	+V	Iout+	0 V	Iout+	Teach				
	Signal – Interface 2, 3, 4, 5 (voltage):	+V	Uout+	0 V	Uout+	Teach				
	Pin:	1	2	3	4	5				
Type of connection	Cable, 8-pin									
3, A	Signal – Interface 1 (current):	0 V	+V	Iout+	Iout-	Iout+	Iout-	Teach 1	Teach 2	
	Signal – Interface 2, 3, 4, 5 (voltage):	0 V	+V	Uout+	Uout-	Uout+	Uout-	Teach 1	Teach 2	
	Core color:	WH	BN	GN	YE	GY	PK	BU	RD	
Type of connection	Cable, 5-pin									
4, B	Signal – Interface 1 (current):	+V	Iout+	0 V	Iout+	Teach				
	Signal – Interface 2, 3, 4, 5 (voltage):	+V	Uout+	0 V	Uout+	Teach				
	Core color:	BN	GY	WH	GN	BU				

Terminal assignment, 2-axis

Type of connection	M12 connector, 8-pin									
1	Signal – Interface 1 (current):	0 V	+V	Iout+ X	Iout- X	Iout+ Y	Iout- Y	Teach 1	Teach 2	
	Signal – Interface 2, 3, 4, 5 (voltage):	0 V	+V	Uout+ X	Uout- X	Uout+ Y	Uout- Y	Teach 1	Teach 2	
	Pin:	1	2	3	4	5	6	7	8	
Type of connection	M12 connector, 5-pin									
2	Signal – Interface 1 (current):	+V	Iout+ Y	0 V	Iout+ X	Teach				
	Signal – Interface 2, 3, 4, 5 (voltage):	+V	Uout+ Y	0 V	Uout+ X	Teach				
	Pin:	1	2	3	4	5				
Type of connection	Cable, 8-pin									
3, A	Signal – Interface 1 (current):	0 V	+V	Iout+ X	Iout- X	Iout+ Y	Iout- Y	Teach 1	Teach 2	
	Signal – Interface 2, 3, 4, 5 (voltage):	0 V	+V	Uout+ X	Uout- X	Uout+ Y	Uout- Y	Teach 1	Teach 2	
	Core color:	WH	BN	GN	YE	GY	PK	BU	RD	
Type of connection	Cable, 5-pin									
4, B	Signal – Interface 1 (current):	+V	Iout+ Y	0 V	Iout+ X	Teach				
	Signal – Interface 2, 3, 4, 5 (voltage):	+V	Uout+ Y	0 V	Uout+ X	Teach				
	Core color:	BN	GY	WH	GN	BU				

+V Supply voltage +V DC
 0V Supply voltage ground GND (0 V)
 Teach 1 Input 1 for various teaching functions
 Teach 2 Input 2 for various teaching functions

Uout+ X X axis voltage output
 Uout- X X axis voltage output GND
 Uout+ Y Y axis voltage output
 Uout- Y Y axis voltage output GND
 1-axis version
 Uout+ Voltage output
 Uout- Voltage output GND
 Uout+ Inverted voltage output
 Uout- Inverted voltage output GND

Iout+ X X axis current output
 Iout- X X axis current output GND
 Iout+ Y Y axis current output
 Iout- Y Y axis current output GND
 1-axis version
 Iout+ Current output
 Iout- Current output GND
 Iout+ Inverted current output
 Iout- Inverted current output GND

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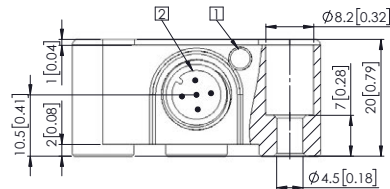
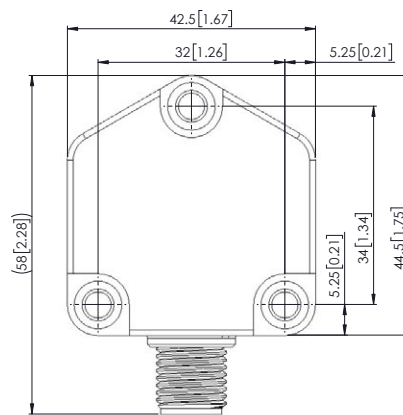
Analog

Dimensions

Dimensions in mm [inch]

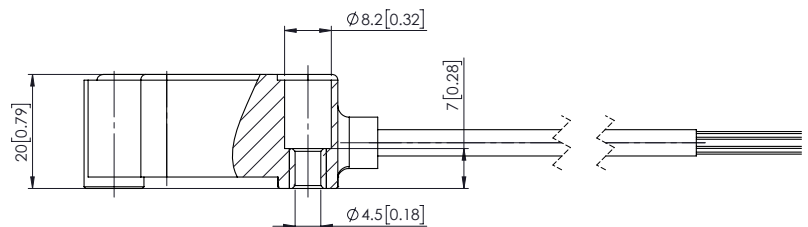
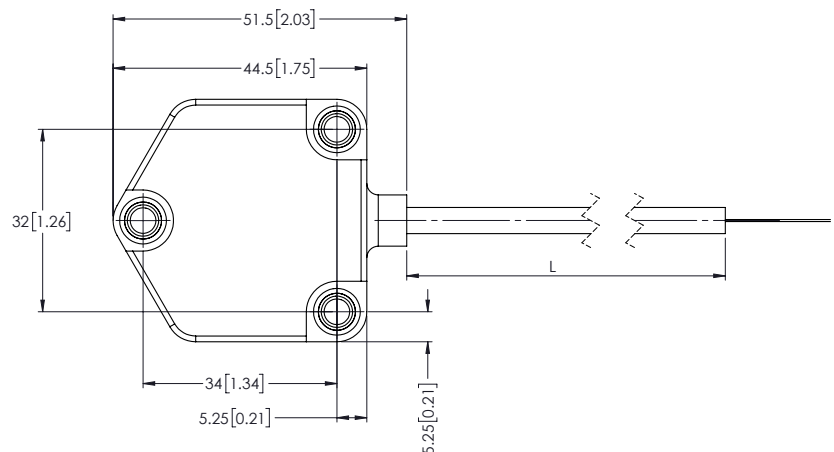
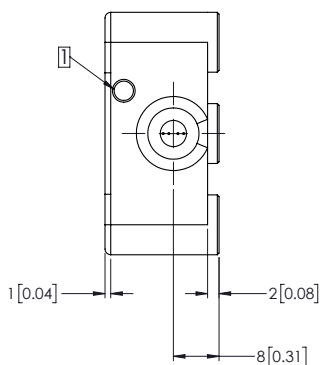
Version with M12 connector

- 1 RGB LED status indicator
- 2 M12 connector



Version with cable

- 1 RGB LED status indicator



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Technology in detail

Quick setting options via the Easy-Teach function with teach adapter

Connection

The teach adapter **2** is connected between the sensor **1** and the connection cable to the application **4**.

Parameterization

The following settings can be made quickly and easily by pressing the toggle switch **3**:

- Reset to factory setting
- Start/end point of the measuring range
(for 1-axis measurement)
- Midpoint of the measuring range
- Setting the sensor filter:
no filter, 0.1 Hz, 0.3 Hz, 0.5 Hz, 1.0 Hz, 2.0 Hz, 5.0 Hz or 10.0 Hz

