## For static applications
## 1- and 2-axis measurement

**IN41** | **Analog**



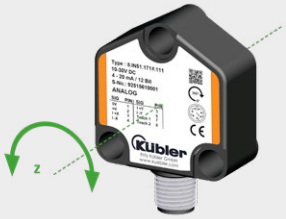
**High accuracy with minimal movement.**
Measurement is performed capacitively in acceleration measurement cells for applications with little or no movement. Vibrations and shocks can be compensated for within certain limits by software filters.

Analog Output | Analog Output

## Order code 1-axis measurement

8.IN41 . 1 X X 1 . 1 1 X . 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 . 2 X X X . 1 1 X . 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<br>1- and 2-axis measurement | IN41 | Analog |
|---|---|---|

## Accessories

| | | Order no. |
|---|---|---|
| **Teach adapter** | for activating the control inputs for the following functions:<br>- Reset to factory setting<br>- Center point of the measurement<br>- Scaling of the analog measuring range (start/end position)<br>- Setting the sensor filter | |
|  | **Teach adapter**, 5-pin | **05.TX40.1** |
|  | **Teach adapter**, 8-pin | **8.0010.9000.0017** |
| **EMC shield terminal** | For an EMC-compliant installation of the cable<br>- top-hat rail mounting<br>- spring steel, galvanized<br>- 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<br>single ended<br>2 m [6.56'] PVC cable | **05.00.6081.2211.002M** |
| | M12 female connector with coupling nut, 5-pin, A coded, straight<br>DT04 connector, male contacts, 6-pin, straight<br>2 m [6.56'] PVC cable | **05.00.6091.22C7.002M** |
| | M12 female connector with coupling nut, 5-pin, A coded, straight<br>single ended<br>2 m [6.56'] PUR cable | **05.00.60F1.2211.002M** |
| | M12 female connector with coupling nut, 8-pin, A coded, straight<br>single ended<br>2 m [6.56'] PVC cable | **05.00.6041.8211.005M** |
| | M12 female connector with coupling nut, 8-pin, A coded, straight<br>single ended<br>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
Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

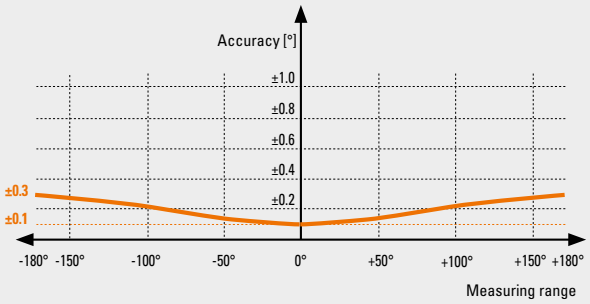
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| For static applications<br>1- and 2-axis measurement | IN41 | Analog |
|---|---|---|

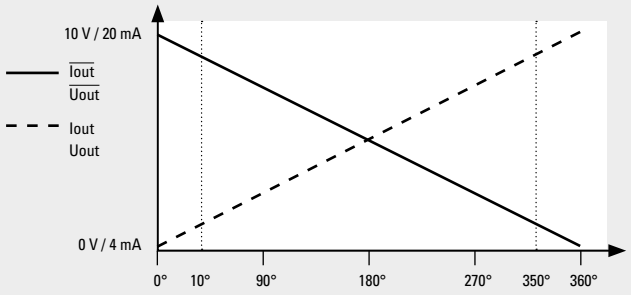
## Technical data

### General data 1-axis measurement

| | |
|---|---|
| **Measuring range** | 0 ... 360° |
| **Resolution** | |
| current interface | 0.01° internal sensor<br>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°<br>depending on the measuring range |

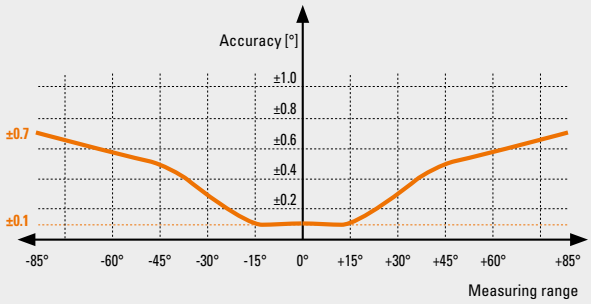



**Course of the output signal – factory setting**

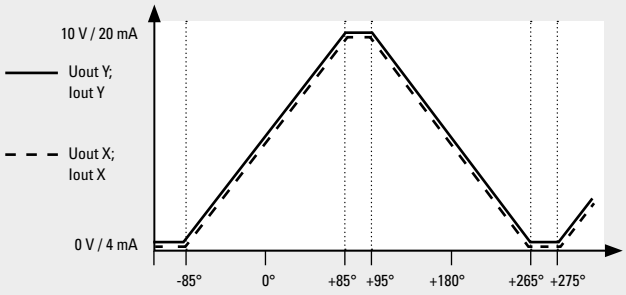



### General data 2-axis measurement

| | |
|---|---|
| **Measuring range** | -85° ... +85° |
| **Resolution** | |
| current interface | 0.01° internal sensor<br>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°<br>depending on the measuring range |




**Course of the output signal – factory setting**




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## For static applications
## 1- and 2-axis measurement

**IN41** | **Analog**

### 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<br>at 24 VDC<br>at 30 VDC | max. 200 Ohm<br>max. 900 Ohm<br>max. 1200 Ohm |
| **Setting time** | | < 1 ms ($R_{load}$ = 900 Ohm, 25 °C) |
| **Sampling rate** | | 50 Hz (20 ms) |
| **Limit frequency** | with Butterworth filter | 0.1 ... 10 Hz, 8th order |

### Electrical characteristics voltage interface

| | | |
|---|---|---|
| **Supply voltage** | 0.1 ... 4.9 V / 0.5 ... 5 V / 0 ... 5 V<br>0 ... 10 V | 10 ... 30 V<br>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 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<br>M12 connector, 5-pin<br>cable, 8-pin<br>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/s², 10 ... 2000 Hz |
| **Vibration resistance** acc. to EN 60068-2-6 | | 1000 m/s², 6 ms |
| **Dimensions** | | 44.5 x 42.5 x 20 mm [1.75 x 1.67 x 0.79“] |

### 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 | 2014/30/EU |
| RoHS Directive | 2011/65/EU |

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

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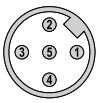
## For static applications 1- and 2-axis measurement | IN41 | Analog

### Terminal assignment, 1-axis

| Type of connection | M12 connector, 8-pin | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Signal – Interface 1 (current): | 0 V | +V | Iout+ | Iout- | $\overline{\text{Iout+}}$ | $\overline{\text{Iout-}}$ | Teach 1 | Teach 2 |
| | Signal – Interface 2, 3, 4, 5 (voltage): | 0 V | +V | Uout+ | Uout- | $\overline{\text{Uout+}}$ | $\overline{\text{Uout-}}$ | 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 | $\overline{\text{Iout+}}$ | 0 V | Iout+ | Teach |
| | Signal – Interface 2, 3, 4, 5 (voltage): | +V | $\overline{\text{Uout+}}$ | 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- | $\overline{\text{Iout+}}$ | $\overline{\text{Iout-}}$ | Teach 1 | Teach 2 |
| | Signal – Interface 2, 3, 4, 5 (voltage): | 0 V | +V | Uout+ | Uout- | $\overline{\text{Uout+}}$ | $\overline{\text{Uout-}}$ | Teach 1 | Teach 2 |
| | Core color: | WH | BN | GN | YE | GY | PK | BU | RD |

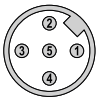
| Type of connection | Cable, 5-pin | | | | | |
|---|---|---|---|---|---|---|
| 4, B | Signal – Interface 1 (current): | +V | $\overline{\text{Iout+}}$ | 0 V | Iout+ | Teach |
| | Signal – Interface 2, 3, 4, 5 (voltage): | +V | $\overline{\text{Uout+}}$ | 0 V | Uout+ | Teach |
| | Core color: | BN | 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
$\overline{\text{Uout+}}$ Inverted voltage output
$\overline{\text{Uout-}}$ 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
$\overline{\text{Iout+}}$ Inverted current output
$\overline{\text{Iout-}}$ Inverted current output GND

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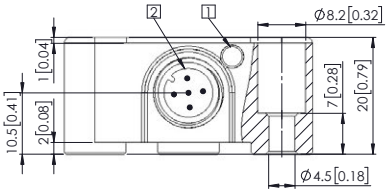
| For static applications<br>1- and 2-axis measurement | IN41 | Analog |
|---|---|---|

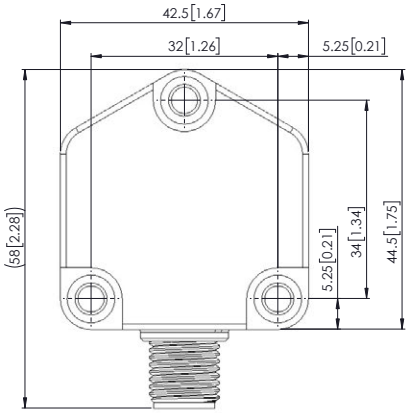
## Dimensions

Dimensions in mm [inch]

### Version with M12 connector

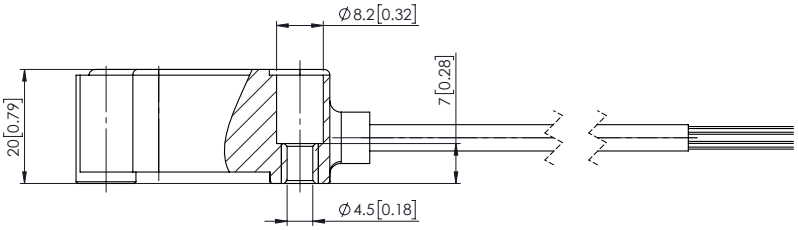
1 RGB LED status indicator
2 M12 connector

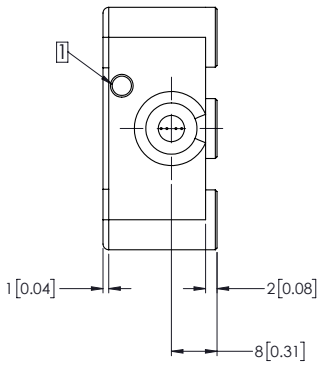


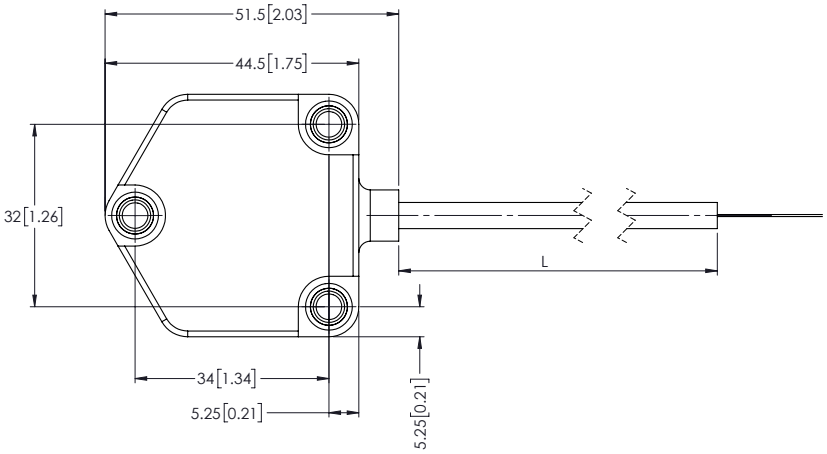




### Version with cable

1 RGB LED status indicator




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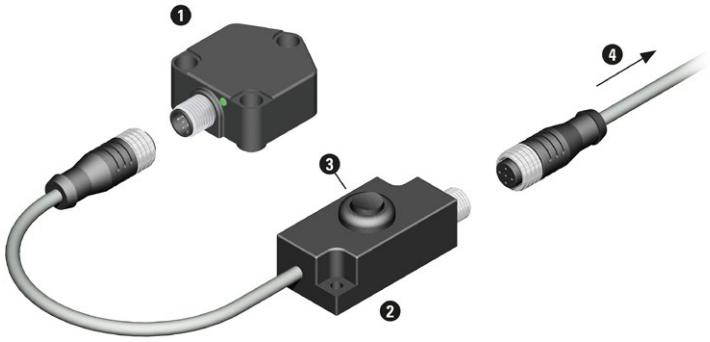
| For static applications<br>1- and 2-axis measurement | IN41 | Analog |
|---|---|---|

## Technology in detail

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

**Connection**
The teach adapter ❷ is connected between the sensor ❶ and the connection cable to the application ❹.

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




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