

**posirot<sup>®</sup>**  
**Magnetic Angle Sensors,  
explosion protected**



Angle sensor, explosion protected



- **Measurement range 0°... 360°**
- **Protection class IP65**
- **Robust stainless steel housing**
- **Measurement with 10 mm shaft or 6 mm hollow shaft**
-  **II 3D Ex tc IIIC T80°C Dc X**  
(X = examined with low impact energy of 4J)

## Product versions



**Analog output (dust-EX-proof)**



## PRAS3EX - Magnetic Angle Sensor

Version with analog output (dust-EX-proof)

### Specifications

|                                        |                                                                                                                                                                                                | Order options |                                |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------|
| Mechanical connection                  | 10 mm shaft<br>6 mm hollow shaft                                                                                                                                                               | <b>1</b>      | V<br>H                         |
| Measurement range                      | 0 ... 15° to 0 ... 360° (in 15° increments)                                                                                                                                                    | <b>2</b>      | 15 / 30 / 45 / ... / 345 / 360 |
| Output                                 | Voltage 0.5 ... 10 V<br>Voltage 0.5 ... 4.5 V ratiometric<br>Current 4 ... 20 mA, 3 wire                                                                                                       | <b>3</b>      | U2<br>U6<br>I1                 |
| Signal characteristics                 | Signal increasing CW, clockwise<br>Signal increasing CCW, counterclockwise                                                                                                                     | <b>4</b>      | CW<br>CCW                      |
| Resolution                             | 0.03% (60 ... 360°); 0.1% (15 ... 45°)                                                                                                                                                         |               |                                |
| Repeatability                          | ±0.03% (60 ... 360°); ±0.1% (15 ... 45°)                                                                                                                                                       |               |                                |
| Linearity                              | ±0.3% f.s. (typical)                                                                                                                                                                           |               |                                |
| Connection                             | 5-pin connector M12 axial (compatible with 4-pin connector)<br>5-pin connector M12 radial (compatible with 4-pin connector)                                                                    | <b>5</b>      | M12A5<br>M12R5                 |
| Housing material                       | Stainless steel EN 1.4404 (AISI 316L)                                                                                                                                                          |               |                                |
| Mounting                               | Clamps, mounting plate                                                                                                                                                                         |               |                                |
| Protection class                       | Housing: IP65<br>Dust-EX-proof:  II 3D Ex tc IIIC T80°C Dc X<br>(X = examined with low impact energy of 4J) |               |                                |
| Life cycle of bearings (shaft version) | 100 x 10 <sup>6</sup> revolutions (<1500 r.p.m.)                                                                                                                                               |               |                                |
| Revolutions per minute (mechanical)    | 1000 r.p.m.                                                                                                                                                                                    |               |                                |
| Allowable shaft load                   | 100 N radial / 100 N axial                                                                                                                                                                     |               |                                |
| Shock                                  | DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks                                                                                                                                                |               |                                |
| Vibration                              | DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles                                                                                                                                             |               |                                |
| Temperature range                      | -20 ... +40°C                                                                                                                                                                                  |               |                                |
| Weight                                 | 330 g approx.                                                                                                                                                                                  |               |                                |
| EMC                                    | DIN EN 61326-1:2013                                                                                                                                                                            |               |                                |
| Dust-EX-proof                          | DIN EN 60079-0 (September 2019)<br>DIN EN 60079-31 (December 2014)                                                                                                                             |               |                                |

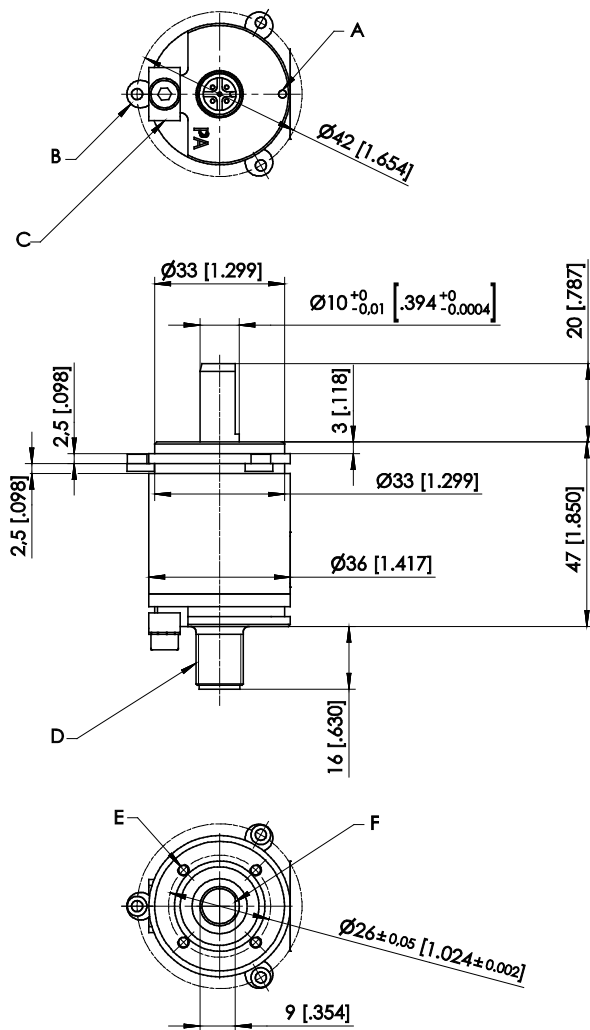
### Order code

PRAS3EX – **1** – **2** – **3** – **4** – **5**

Order example: PRAS3EX – V – 360 – I1 – CW – M12A5

## Dimensions

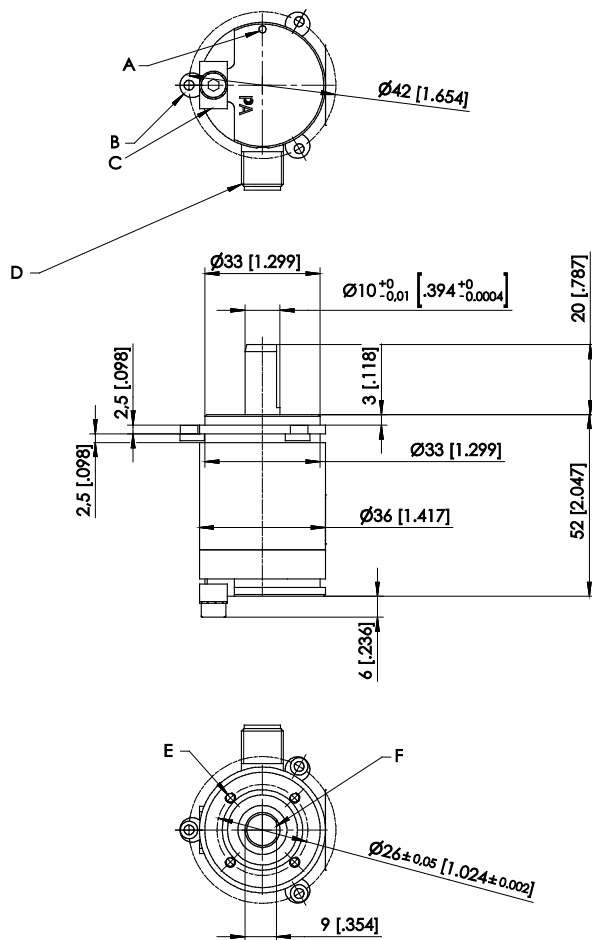
### Connector M12, axial



- A – Marking
- B – Mounting clamps PRTP-BFS1
- C – Earthing
- D – Connector M12
- E – 4x M3 – 5 [0.197] deep,  
screw hole orientation to marking not defined!!
- F – Flat

Dimensions in mm [inch]. Weight approx. 290 g.  
Dimensions informative only.  
For guaranteed dimensions consult factory.

# Connector M12, radial



- A – Marking
- B – Mounting clamps PRTP-BFS1
- C – Earthing
- D – Connector M12
- E – 4x M3 – 5 [.197] deep  
screw hole orientation to marking not defined!
- F – Flat

Dimensions in mm [inch]. Weight approx. 330 g.  
Dimensions informative only.  
For guaranteed dimensions consult factory.

## Output specification

### Analog output

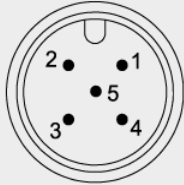
|                                                                                                                                  |                         |                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>U2</b><br>Voltage output<br>0.5 ... 10 V<br> | Excitation voltage      | 24 V DC (18 ... 36 V DC)                                                                                              |
|                                                                                                                                  | Excitation current      | typical 10 mA<br>max. 15 mA                                                                                           |
|                                                                                                                                  | Output voltage          | 0.5 ... 10 V DC                                                                                                       |
|                                                                                                                                  | Output current          | 2 mA max.                                                                                                             |
|                                                                                                                                  | Measuring rate          | 1 kHz standard                                                                                                        |
|                                                                                                                                  | Stability (temperature) | $\pm 50 \times 10^{-6}$ / °C f.s. (typical for 90° ... 360°)<br>$\pm 100 \times 10^{-6}$ / °C f.s. (typical for <90°) |
|                                                                                                                                  | Protection              | Reverse polarity, short circuit                                                                                       |
|                                                                                                                                  | Operating temperature   | -40 ... +85 °C                                                                                                        |
|                                                                                                                                  | EMC                     | DIN EN 61326-1:2013                                                                                                   |

|                                                                                                                                               |                         |                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>U6</b><br>Voltage output<br>10 ... 90 % ratiometric<br> | Excitation voltage      | 5 V DC $\pm 10$ %                                                                                                     |
|                                                                                                                                               | Excitation current      | typical 8 mA<br>max. 12 mA                                                                                            |
|                                                                                                                                               | Output voltage          | 10 ... 90 % of the excitation voltage                                                                                 |
|                                                                                                                                               | Output current          | 2 mA max.                                                                                                             |
|                                                                                                                                               | Measuring rate          | 1 kHz standard                                                                                                        |
|                                                                                                                                               | Stability (temperature) | $\pm 50 \times 10^{-6}$ / °C f.s. (typical for 90° ... 360°)<br>$\pm 100 \times 10^{-6}$ / °C f.s. (typical for <90°) |
|                                                                                                                                               | Protection              | Reverse polarity, short circuit                                                                                       |
|                                                                                                                                               | Operating temperature   | -40 ... +85 °C                                                                                                        |
|                                                                                                                                               | EMC                     | DIN EN 61326-1:2013                                                                                                   |

|                                                                                                                                          |                         |                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>I1</b><br>Current output<br>4 ... 20 mA, 3 wires<br> | Excitation voltage      | 24 V DC (18 ... 36 V DC)                                                                                            |
|                                                                                                                                          | Excitation current      | typical 30 mA<br>max. 35 mA                                                                                         |
|                                                                                                                                          | Load R <sub>L</sub>     | 500 Ω max.                                                                                                          |
|                                                                                                                                          | Output current          | 4 ... 20 mA                                                                                                         |
|                                                                                                                                          | Measuring rate          | 1 kHz standard                                                                                                      |
|                                                                                                                                          | Stability (temperature) | ±50 x 10 <sup>-6</sup> / °C f.s. (typical for 90° ... 360°)<br>±100 x 10 <sup>-6</sup> / °C f.s. (typical for <90°) |
|                                                                                                                                          | Protection              | Reverse polarity, short circuit                                                                                     |
|                                                                                                                                          | Operating temperature   | -40 ... +85 °C                                                                                                      |
|                                                                                                                                          | EMC                     | DIN EN 61326-1:2013                                                                                                 |

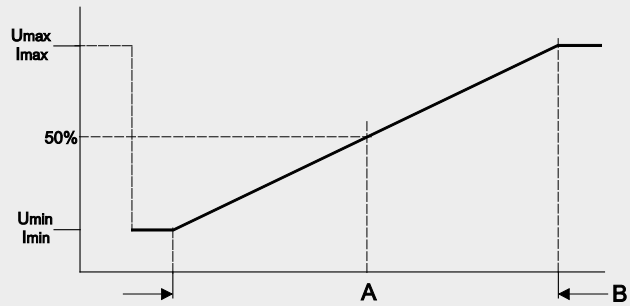
#### 1 channel M12, 5 pin (connector output)

| Signal wiring                                                                                                                                     | Output signals  | Connector pin no. |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
| <b>Connector M12, 5 pin</b><br><br>View to the sensor connector | Excitation +    | 1                 |
|                                                                                                                                                   | Signal          | 2                 |
|                                                                                                                                                   | GND             | 3                 |
|                                                                                                                                                   | Do not connect! | 4                 |
|                                                                                                                                                   | Do not connect! | 5                 |

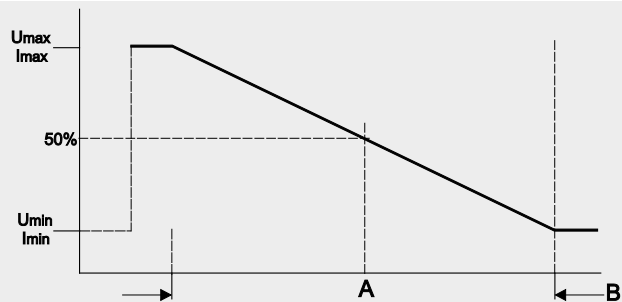
3-wire current 4...20 mA interface: GND has to be connected!

## Characteristics for magnetic angle sensors

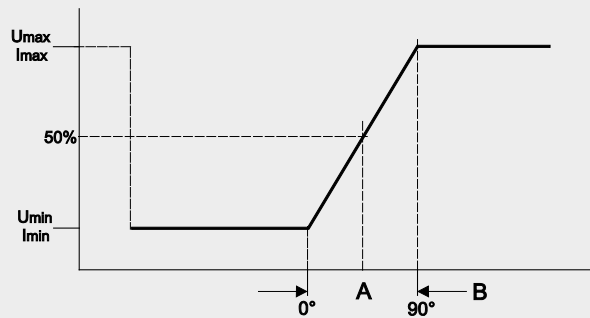
### Output signal CW (clockwise increasing)



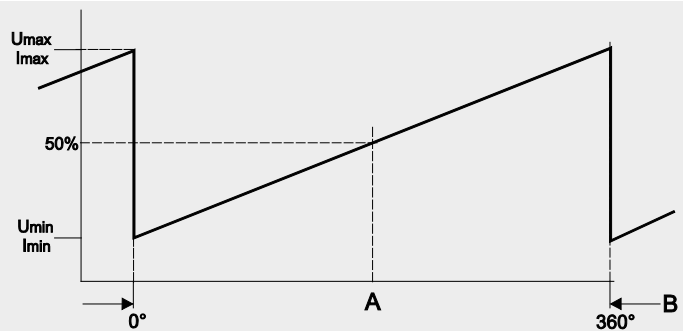
### Output signal CCW (counterclockwise increasing)



### Example angular range 90°



### Example angular range 360°



A – Marking

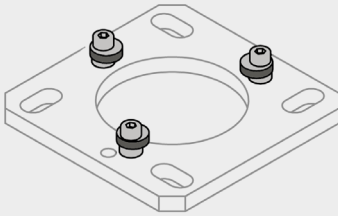
B – Measurement range [°]

## Accessories

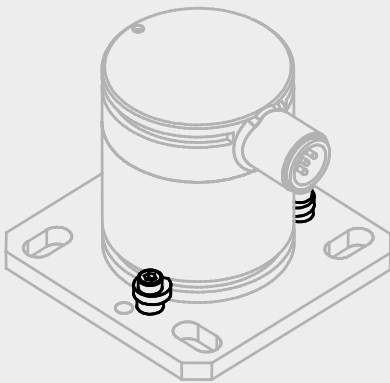
### Mounting plates

#### Mounting possibilities PRxS3

##### Mounting possibilities of PRxS3 sensors

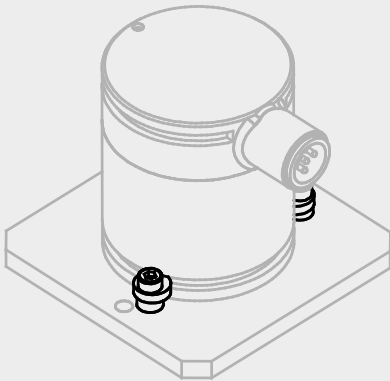


**Mounting clamp BFS1**



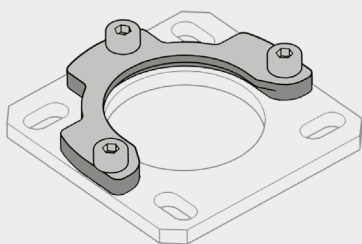
**PRPT-BPL1 + PRPT-BFS1**

(Mounting plates for screw mounting + mounting clamp)

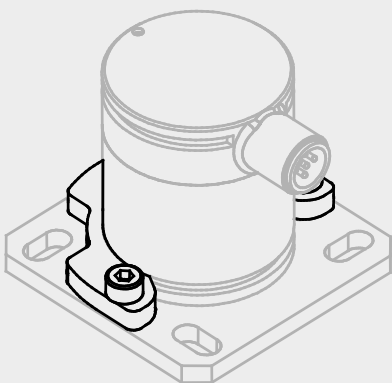


**PRPT-BPL2 + PRPT-BFS1**

(Mounting plates for welding assembly + mounting clamp)

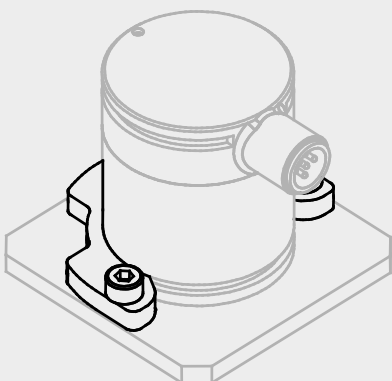


**Mounting clamp BFS2**



**PRPT-BPL1 + PRPT-BFS2**

(Mounting plates for screw mounting + mounting clamp)



**PRPT-BPL2 + PRPT-BFS2**

(Mounting plates for welding assembly + mounting clamp)

### PRPT-BPL1

(Screw mounting)

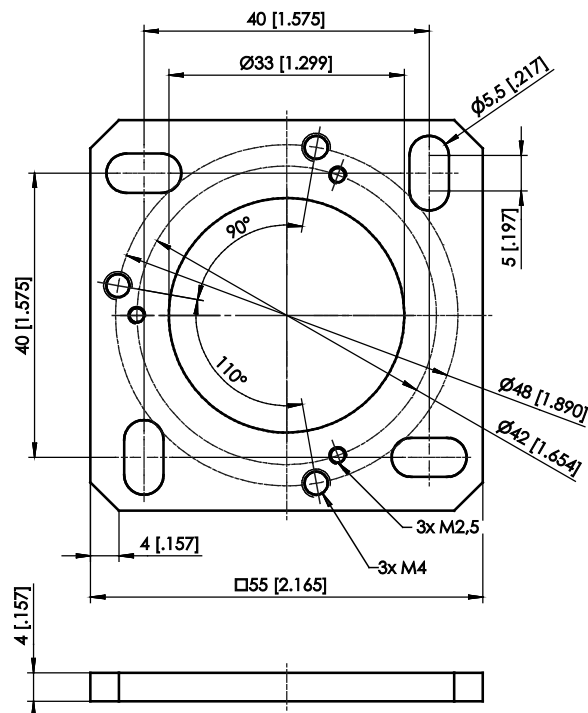
In combination with the mounting clamps PRPT-BFS1 (3 x M2.5) or in combination with the mounting bracket PRPT-BFS2 (3 x M4).

Dimensions in mm [inch].

Weight 30 g approx.

Dimensions informative only.

For guaranteed dimensions please consult factory.



### PRPT-BPL2

(Welding assembly)

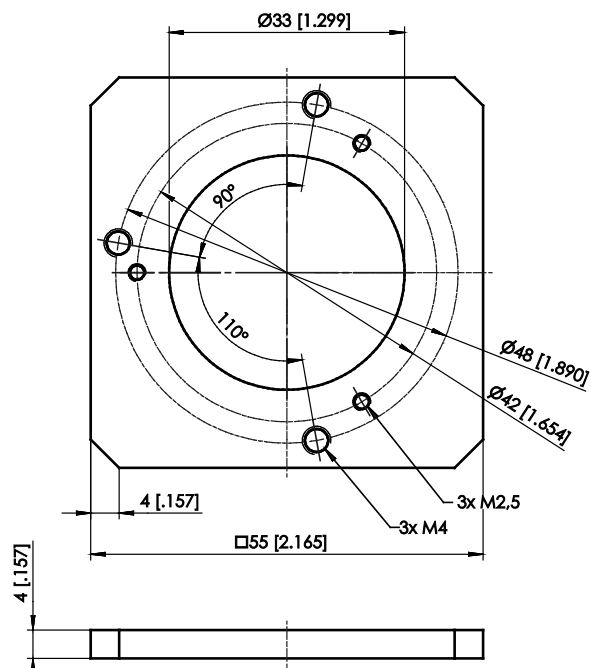
In combination with the mounting clamps PRPT-BFS1 (3 x M2.5) or in combination with the mounting bracket PRPT-BFS2 (3 x M4).

Dimensions in mm [inch].

Weight 30 g approx.

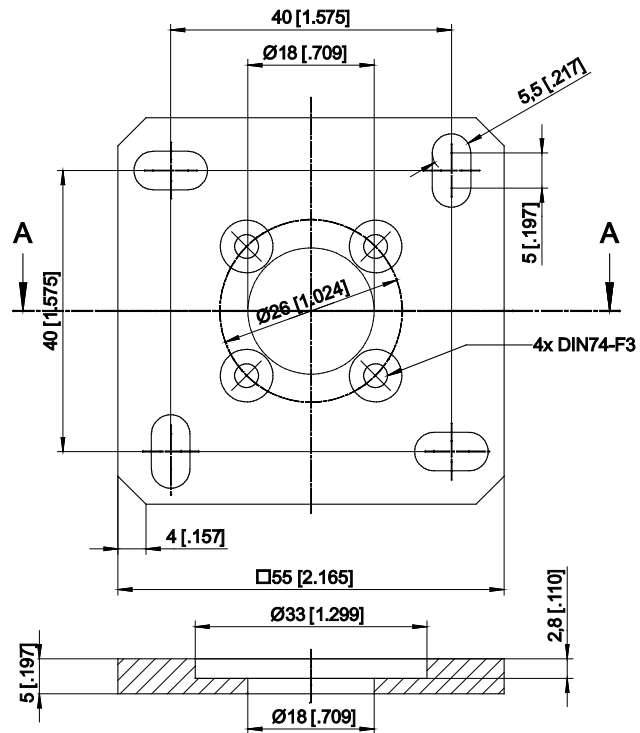
Dimensions informative only.

For guaranteed dimensions please consult factory.



### PRPT-BPL3

In combination with PRAS3/PRDS3 and frontal mounting.



Dimensions in mm [inch]. Weight 30 g approx.

Dimensions informative only.

For guaranteed dimensions please consult factory.

## Connector cable M12, 4 pin

### (angular coupling)

shielded connector

Suitable for 5-pin

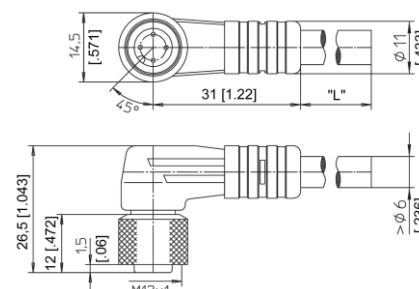
sensor connectors

The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end.

Available lengths are 2 m, 5 m and 10 m.

Wire: cross sectional area 0.34 mm<sup>2</sup>

Cable diameter: 5.6 ±0.2 mm



### Order code

KAB - xM - M12/4F/W - LITZE

IP69: KAB - xM - M12/4F/W/69K - LITZE

xM = length in m

## Connector cable M12, 4 pin

### (straight coupling)

shielded connector

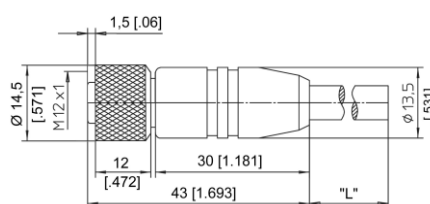
Suitable for 5-pin

sensor connectors

The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2 m, 5 m and 10 m.

Wire: cross sectional area 0.34 mm<sup>2</sup>

Cable diameter: 5.6 ±0.2 mm



### Order code

KAB - xM - M12/4F/G - LITZE

IP69: KAB - xM - M12/4F/G/69K - LITZE

xM = length in m

| Signal wiring<br>M12, 4 pin | Plug connection / cable color |       |      |       |
|-----------------------------|-------------------------------|-------|------|-------|
|                             | 1                             | 2     | 3    | 4     |
|                             | brown                         | white | blue | black |

### Applicable for cable carriers

|                        |                     |
|------------------------|---------------------|
| Maximum movement speed | 3 m/s               |
| Maximum acceleration   | 5 m/s <sup>2</sup>  |
| Minimum bending radius | 10 x cable diameter |