

# Incremental Encoders

| Standard<br>ATEX, optical | Sendix 7000 (Shaft) | Push-Pull / RS422 |
|---------------------------|---------------------|-------------------|
|---------------------------|---------------------|-------------------|



The Sendix 7000 incremental encoders offer Ex protection in a compact 70 mm seawater resistant housing.

These shock and vibration resistant encoders operate flexibly with a resolution of up to 5000 ppr; they are also available with axial and radial cable outlets.



## Compact and safe

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns (IP67 protection)

## Explosion protection

- “Flameproof-enclosure” version
- ATEX with EC type examination certificate
- IECEx with Certificate of Conformity (CoC)

| Order code    | 8.7000 | . 1 | X | X | X | . XXXX | . XXXX |
|---------------|--------|-----|---|---|---|--------|--------|
| Shaft version | Type   | a   | b | c | d | e      | f      |

|                                                                                                                                                                        |                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>a</b> Flange<br>1 = clamping-synchronous flange, IP67<br>$\varnothing$ 70 mm [2.76"]                                                                                | <b>c</b> Output circuit / Power supply<br>4 = RS422 (with inverted signal) / 5 V DC<br>1 = RS422 (with inverted signal) / 5 ... 30 V DC<br>2 = Push-Pull (7272 compatible with inverted signal) / 5 ... 30 V DC<br>5 = Push-Pull (with inverted signal) / 10 ... 30 V DC | <b>e</b> Pulse rate<br>25, 50, 60, 100, 125, 200, 250, 256,<br>300, 360, 500, 512, 600, 720, 800,<br>1000, 1024, 1200, 1250, 1500, 2000,<br>2048, 2500, 3000, 3600, 4000, 4096,<br>5000<br>(e.g. 250 pulses => 0250)<br>Other pulse rates on request |
| <b>b</b> Shaft ( $\varnothing \times L$ )<br>2 = 10 x 20 mm [0.39 x 0.79"], with flat<br>1 = 12 x 25 mm [0.47 x 0.98"],<br>with keyway for 4 x 4 mm [0.16 x 0.16"] key | <b>d</b> Type of connection<br>1 = axial cable, 2 m [6.56'] PUR<br>2 = radial cable, 2 m [6.56'] PUR<br>A = axial cable, length > 2 m [6.56']<br>B = radial cable, length > 2 m [6.56']                                                                                  | <b>f</b> Cable length in dm <sup>1)</sup><br>0050 = 5 m [16.40']<br>0100 = 10 m [32.81']<br>0150 = 15 m [49.21']<br><br>optional on request<br>- special cable length                                                                                |

## Mounting accessory for shaft encoders

| Coupling | Bellows coupling $\varnothing$ 19 mm [0.75"] for shaft 10 mm [0.39"] | Order No.        |
|----------|----------------------------------------------------------------------|------------------|
|          |                                                                      | 8.0000.1101.1010 |

Further accessories can be found in the accessories section or in the accessories area of our website at: [www.kuebler.com/accessories](http://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](http://www.kuebler.com/connection_technology)

<sup>1)</sup> Not applicable with connection types 1 and 2

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|                                   |                            |                          |
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|-----------------------------------|----------------------------|--------------------------|

## Technical data

| Explosion protection ATEX              |                                                             | Mechanical characteristics                    |                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>EC type-examination certificate</b> | PTB09 ATEX 1106 X                                           | <b>Max. speed</b>                             | continuous 6 000 min <sup>-1</sup>                                                                                                    |
| <b>Category (gas)</b>                  | II 2 G Ex d IIC T4 - T6 Gb                                  | <b>Starting torque – at 20°C [68°F]</b>       | < 0.05 Nm                                                                                                                             |
| <b>Category (dust)</b>                 | II 2D Ex tb IIIC T135°C - T85°C Db IP6x                     | <b>Moment of inertia</b>                      | 4.0 x 10 <sup>-6</sup> kgm <sup>2</sup>                                                                                               |
| <b>Directive 94/9/EC</b>               | EN 60079-0: 2009;<br>EN 60079-1: 2007;<br>EN 60079-31: 2009 | <b>Load capacity of shaft</b>                 | radial 80 N<br>axial 40 N                                                                                                             |
| <b>Explosion protection IECEx</b>      |                                                             | <b>Weight</b>                                 | approx. 1.3 kg [45.86 oz]                                                                                                             |
| <b>Certificate of Conformity (CoC)</b> | IECEx PTB 13.0026 X                                         | <b>Protection acc. to EN 60529</b>            | IP67                                                                                                                                  |
| <b>Category (gas)</b>                  | Ex d IIC T4 - T6 Gb                                         | <b>Working temperature range</b>              | -40°C ... +60°C [-40 ... +140°F]                                                                                                      |
| <b>Category (dust)</b>                 | Ex tb IIIC T135°C - T85°C Db IP6x                           | <b>Materials</b>                              | shaft stainless steel<br>flange / housing seawater-resistant Al, type AISiMgMn (EN AW-6082) (stainless steel on request)<br>cable PUR |
| <b>IECEx</b>                           | IEC 60079-0:2007;<br>IEC 60079-1:2007;<br>IEC 60079-31:2008 | <b>Shock resistance acc. EN 60068-2-27</b>    | 2500 m/s <sup>2</sup> , 6 ms                                                                                                          |
|                                        |                                                             | <b>Vibration resistance acc. EN 60068-2-6</b> | 100 m/s <sup>2</sup> , 55 ... 2000 Hz                                                                                                 |

| Electrical characteristics                             |             |                                                   |                                |                            |                                     |
|--------------------------------------------------------|-------------|---------------------------------------------------|--------------------------------|----------------------------|-------------------------------------|
| Output circuit                                         | Ordercode   | RS422<br>(TTL compatible)<br>1                    | RS422<br>(TTL compatible)<br>4 | Push-Pull<br>5             | Push-Pull<br>(7272 compatible)<br>2 |
| <b>Power supply</b>                                    |             | 5 ... 30 V DC                                     | 5 V DC ±5%                     | 10 ... 30 V DC             | 5 ... 30 V DC                       |
| <b>Power consumption (no load)</b>                     |             | typ. 40 mA<br>max. 90 mA                          | typ. 40 mA<br>max. 90 mA       | typ. 50 mA<br>max. 100 mA  | typ. 50 mA<br>max. 100 mA           |
| <b>Permissible load / channel</b>                      |             | max. ±20 mA                                       | max. ±20 mA                    | max. ±20 mA                | max. ±20 mA                         |
| <b>Pulse frequency</b>                                 |             | max. 300 kHz                                      | max. 300 kHz                   | max. 300 kHz               | max. 300 kHz <sup>2)</sup>          |
| <b>Signal level</b>                                    | HIGH<br>LOW | min. 2.5 V<br>max. 0.5 V                          | min. 2.5 V<br>max. 0.5 V       | min +V - 1 V<br>max. 0.5 V | min. +V - 2.0 V<br>max. 0.5 V       |
| <b>Rising edge time t<sub>r</sub></b>                  |             | max. 200 ns                                       | max. 200 ns                    | max. 1 µs                  | max. 1 µs                           |
| <b>Falling edge time t<sub>f</sub></b>                 |             | max. 200 ns                                       | max. 200 ns                    | max. 1 µs                  | max. 1 µs                           |
| <b>Short circuit proof outputs <sup>3)</sup></b>       |             | yes <sup>4)</sup>                                 | yes <sup>4)</sup>              | yes                        | yes                                 |
| <b>Reverse polarity protection of the power supply</b> |             | yes                                               | no                             | yes                        | no                                  |
| <b>UL approval</b>                                     |             | File 224618                                       |                                |                            |                                     |
| <b>CE compliant acc. to</b>                            |             | EMC guideline 2004/108/EC, ATEX guideline 94/9/EC |                                |                            |                                     |
| <b>RoHS compliant acc. to</b>                          |             | guideline 2002/95/EC                              |                                |                            |                                     |

## Terminal assignment

| Output circuit | Type of connection | Cable (isolate unused wires individually before initial start-up) |     |    |   |           |   |           |   |           |         |        |         |
|----------------|--------------------|-------------------------------------------------------------------|-----|----|---|-----------|---|-----------|---|-----------|---------|--------|---------|
| 1, 2, 4, 5     | 1, 2, A, B         | Signal:                                                           | 0 V | +V | A | $\bar{A}$ | B | $\bar{B}$ | 0 | $\bar{0}$ | 0 Vsens | +Vsens | $\perp$ |
|                |                    | Cable marking:                                                    | 1   | 2  | 3 | 4         | 5 | 6         | 7 | 8         | 9       | 10     | shield  |

+V: Encoder power supply +V DC  
 0 V: Encoder power supply ground GND (0 V)  
 0 Vsens / +Vsens: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.  
 A,  $\bar{A}$ : Incremental output channel A / cosine signal  
 B,  $\bar{B}$ : Incremental output channel B / sine signal  
 0,  $\bar{0}$ : Reference signal  
 $\perp$ : Plug connector housing (Shield)

1) Short-circuit with 0 V or output, only one channel at a time, supply voltage correctly applied  
 2) Max. recommended cable length 30 m [98.43']  
 3) If supply voltage correctly applied

4) Only one channel allowed to be shorted-out:  
 If +V= 5 V DC, short-circuit to channel, 0 V, or +V is permitted.  
 If +V= 5 ... 30 V DC, short-circuit to channel or 0 V is permitted.

# Incremental Encoders

**Standard  
ATEX, optical**

**Sendix 7000 (Shaft)**

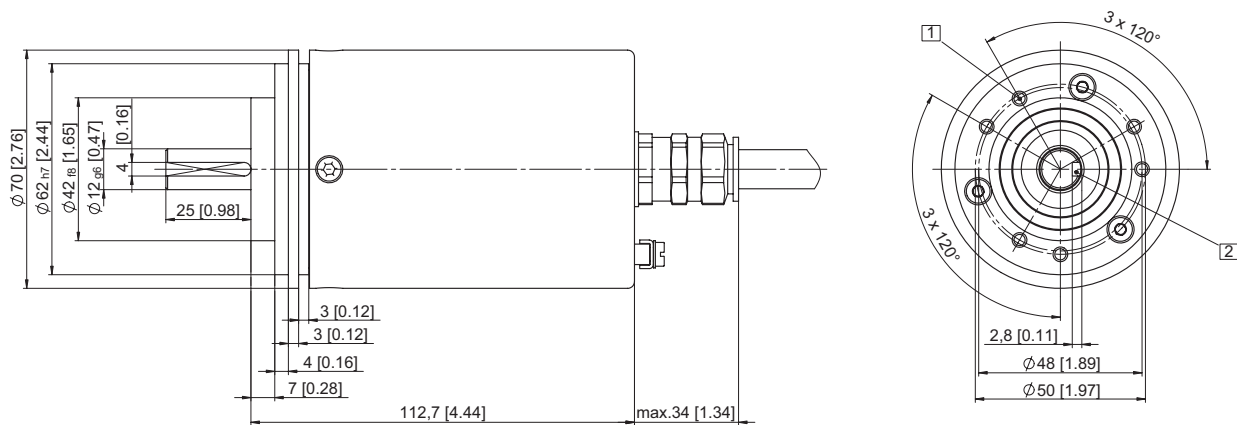
**Push-Pull / RS422**

## Dimensions

Dimensions in mm [inch]

**Clamping-synchronous flange,  $\varnothing$  70 [2.76]  
Shaft type 1 with axial cable outlet**

- 1 6 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



**Clamping-synchronous flange,  $\varnothing$  70 [2.76]  
Shaft type 2 with radial cable outlet**

- 1 6 x M4, 10 [0.39] deep

