

# Incremental Encoders

**Standard**  
ATEX/IECEX – Zone 1/21, 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**

### **a** Flange

1 = clamping-synchronous flange, IP67  
 ø 70 mm [2.76"]

### **b** Shaft (ø x L)

2 = 10 x 20 mm [0.39 x 0.79"], with flat  
 1 = 12 x 25 mm [0.47 x 0.98"],  
 with keyway for 4 x 4 mm [0.16 x 0.16"] key

### **c** Output circuit / Power supply

4 = RS422 (with inverted signal) / 5 V DC  
 1 = RS422 (with inverted signal) / 5 ... 30 V DC  
 2 = Push-Pull (7272 compatible with inverted signal) / 5 ... 30 V DC  
 5 = Push-Pull (with inverted signal) / 10 ... 30 V DC

### **d** Type of connection

1 = axial cable, 2 m [6.56'] PUR  
 2 = radial cable, 2 m [6.56'] PUR  
 A = axial cable, length > 2 m [6.56']  
 B = radial cable, length > 2 m [6.56']

### **e** Pulse rate

25, 50, 60, 100, 125, 200, 250, 256,  
 300, 360, 500, 512, 600, 720, 800,  
 1000, 1024, 1200, 1250, 1500, 2000,  
 2048, 2500, 3000, 3600, 4000, 4096,  
 5000  
 (e.g. 250 pulses => 0250)  
 Other pulse rates on request

### **f** Cable length in dm <sup>1)</sup>

0050 = 5 m [16.40']  
 0100 = 10 m [32.81']  
 0150 = 15 m [49.21']

optional on request  
 - special cable length

## Mounting accessory for shaft encoders

Order No.

### Coupling

Bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]

**8.0000.1101.1010**

Further accessories can be found in the accessories section or in the accessories area of our website.  
 Additional connectors can be found in the connection technology section or in the connection technology area of our website.

1) Not applicable with connection types 1 and 2

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## Technical data

Explosion protection ATEX	
<b>EC type-examination certificate</b>	PTB09 ATEX 1106 X
<b>Category (gas)</b>	II 2 G Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	II 2D Ex tb IIIC T135°C - T85°C Db IP6x
<b>Directive 94/9/EC</b>	EN 60079-0: 2009; EN 60079-1: 2007; EN 60079-31: 2009

Explosion protection IECEx	
<b>Certificate of Conformity (CoC)</b>	IECEX PTB 13.0026 X
<b>Category (gas)</b>	Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	Ex tb IIIC T135°C - T85°C Db IP6x
<b>IECEX</b>	IEC 60079-0:2007; IEC 60079-1:2007; IEC 60079-31:2008

Mechanical characteristics	
<b>Max. speed</b>	continuous 6 000 min <sup>-1</sup>
<b>Starting torque – at 20°C [68°F]</b>	< 0.05 Nm
<b>Moment of inertia</b>	4.0 x 10 <sup>-6</sup> kgm <sup>2</sup>
<b>Load capacity of shaft</b>	radial 80 N axial 40 N
<b>Weight</b>	approx. 1.3 kg [45.86 oz]
<b>Protection acc. to EN 60529</b>	IP67
<b>Working temperature range</b>	-40°C ... +60°C [-40 ... +140°F]
<b>Materials</b>	shaft stainless steel flange / housing seawater-resistant Al, type AISiMgMn (EN AW-6082) (stainless steel on request) cable PUR
<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

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## Electrical characteristics

Output circuit	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull 5	Push-Pull (7272 compatible) 2
Ordercode	1	4	5	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 max. 90 mA	typ. 40 mA max. 90 mA	typ. 50 mA max. 100 mA	typ. 50 mA 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 min. 2.5 V LOW max. 0.5 V	min. 2.5 V max. 0.5 V	min +V - 1 V max. 0.5 V	min. +V - 2.0 V 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>CE compliant acc. to</b>	EMC guideline 2004/108/EC, ATEX guideline 94/9/EC			
<b>RoHS compliant acc. to</b>	guideline 2011/65/EU			

## 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.

