

Incremental encoders

Standard
ATEX/IECEx – zone 1/21, optical

Sendix 7000 / 7020 (shaft / hollow shaft)

Push-Pull / RS422



The Sendix 7000 / 7020 incremental encoders offer Ex protection in a compact 70 mm seawater durable aluminium housing.

These shock and vibration resistant encoders operate flexibly with a resolution of up to 5000 pulses per rotation; 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 durable 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
Shaft version

8.7000 . 1 XXXX . XXXX . XXXX
Type a b c d e f

a Flange

1 = clamping / synchronous flange, IP67, \varnothing 70 mm [2.76"]

b Shaft ($\varnothing \times L$)

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

1, 5, 10, 12, 36, 100, 200, 250, 256,
360, 400, 500, 512, 600, 800, 1000,
1024, 1200, 2000, 2048, 2500, 3600,
4096, 5000

(e.g. 100 pulses => 0100)

f Cable length in dm ¹⁾

0050 = 5 m [16.40']

0100 = 10 m [32.81']

0150 = 15 m [49.21']

Optional on request

- other pulse rates
- special cable length
- stainless steel version

1) Not applicable with connection types 1 and 2.

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Order code Hollow shaft	8.7020 Type	.XXXXX a b c d	.XXXX e	.XXXX f
a Flange 1 = with spring element, short 5 = with stator coupling, IP67, ø 65 mm [2.56"]	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']	f Cable length in dm¹⁾ 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']		
b Blind hollow shaft 1 = ø 12 mm [0.47"] 2 = ø 14 mm [0.55"]	e Pulse rate 1, 5, 10, 12, 36, 100, 200, 250, 256, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000 (e.g. 100 pulses => 0100)	Optional on request - other pulse rates - special cable length - stainless steel version		
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				

Mounting accessory for shaft encoders	Order no.
Coupling bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]	8.0000.1102.1010

Further accessories can be found in the accessories section or in the accessories area of our website at: 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.

Technical data

Explosion protection Sendix 7000	
ATEX	
EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	II 2 G Ex d IIC T4 - T6 Gb
Category (dust)	II 2D Ex tb IIIC T135°C - T85°C Db IP6x
Directive 94/9/EC	EN 60079-0:2009; EN 60079-1:2007; EN 60079-31:2009
IECEX	
Certificate of Conformity (CoC)	IECEX PTB 13.0026 X
Category (gas)	Ex d IIC T4 - T6 Gb
Category (dust)	Ex tb IIIC T135°C - T85°C Db IP6x
IECEX	IEC 60079-0:2007; IEC 60079-1:2007; IEC 60079-31:2008

Explosion protection Sendix 7020	
ATEX	
EC type-examination certificate	IBExU 15 ATEX 1091 X
Category (gas)	II 2 G Ex d IIC T4 - T6 Gb
Category (dust)	II 2D Ex tb IIIC T135°C - T85°C Db
Directive 94/9/EC	EN 60079-0:2012; EN 60079-1:2014; EN 60079-31:2014
IECEX	
Certificate of Conformity (CoC)	IECEX IBE 15.0020 X
Category (gas)	Ex d IIC T4 - T6 Gb
Category (dust)	Ex tb IIIC T135°C - T85°C Db
IECEX	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2013

Mechanical characteristics	
Maximum speed	6000 min ⁻¹ (continuous)
Starting torque – at 20°C [68°F]	< 0.05 Nm
Mass moment of inertia	4.0 x 10 ⁻⁶ kgm ²
Load capacity of shaft	radial 80 N axial 40 N
Weight	approx. 1.5 kg [52.91 oz]
Protection acc. to EN 60529	IP67
Working temperature range	-40°C ... +60°C [-40 ... +140°F]
Materials	shaft stainless steel flange / housing seawater durable Al, type AlSiMgMn (EN AW-6082) cable PUR
Shock resistance acc. to EN 60068-2-27	2500 m/s ² , 6 ms
Vibration resistance acc. to EN 60068-2-6	100 m/s ² , 55 ... 2000 Hz

1) Not applicable with connection types 1 and 2.

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Electrical characteristics				
Output circuit	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull	Push-Pull (7272 compatible)
	Order code 1	4	5	2
Power supply	5 ... 30 V DC	5 V DC ($\pm 5\%$)	10 ... 30 V DC	5 ... 30 V DC
Power consumption (no load)	typ. 40 mA max. 90 mA	typ. 40 mA max. 90 mA	typ. 50 mA max. 100 mA	typ. 50 mA max. 100 mA
Permissible load / channel	max. +/- 20 mA	max. +/- 20 mA	max. +/- 20 mA	max. +/- 20 mA
Pulse frequency	max. 300 kHz	max. 300 kHz	max. 300 kHz	max. 300 kHz ¹⁾
Signal level	HIGH min. 2.5 V LOW max. 0.5 V	min. 2.5 V max. 0.5 V	min +V - 1.0 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V
Rising edge time t_r	max. 200 ns	max. 200 ns	max. 1 μ s	max. 1 μ s
Falling edge time t_f	max. 200 ns	max. 200 ns	max. 1 μ s	max. 1 μ s
Short circuit proof outputs²⁾	yes ³⁾	yes ³⁾	yes	yes
Reverse polarity protection of the power supply	yes	no	yes	no
CE compliant acc. to	EMC guideline 2004/108/EC ATEX guideline 94/9/EC RoHS 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	$\bar{0}$	\bar{A}	0 Vsens	+Vsens	\perp	
		Cable marking:	1	2	3	4	5	6	7	8	9	0	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) Max. recommended cable length 30 m [98.43'].

2) Short-circuit with 0 V or output, only one channel at a time, power supply correctly applied.

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

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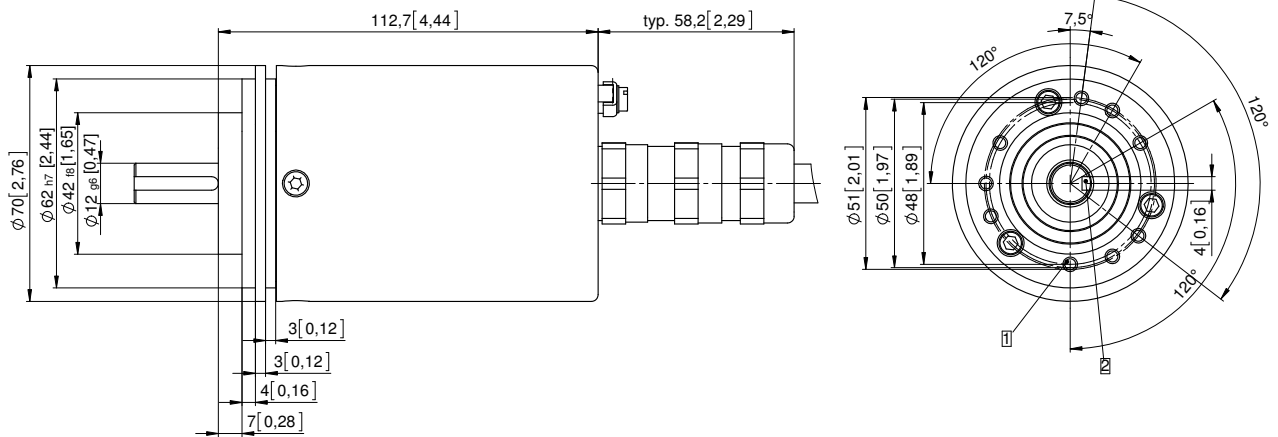
Dimensions shaft version

Dimensions in mm [inch]

Clamping / synchronous flange, \varnothing 70 [2.76]

Shaft type 1 with axial cable outlet

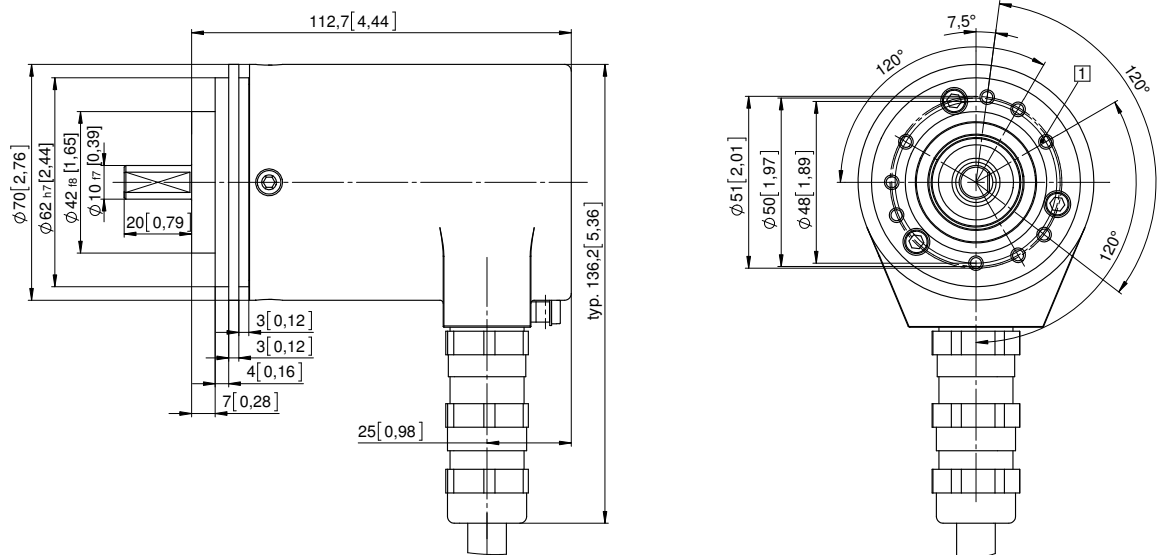
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



Clamping / synchronous flange, \varnothing 70 [2.76]

Shaft type 2 with radial cable outlet

- 1 9 x M4, 10 [0.39] deep



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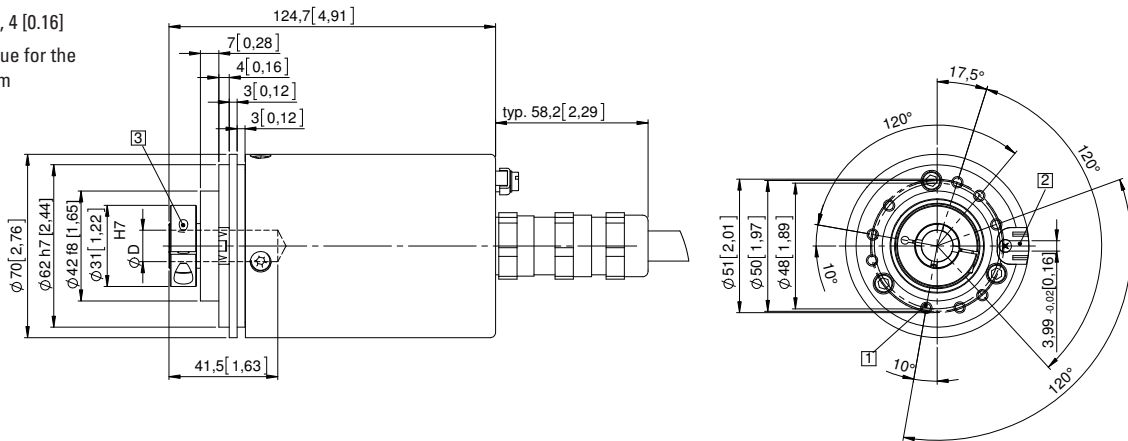
Push-Pull / RS422

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, short Flange type 1

- 1 9 x M4, 10 [0.39] deep
- 2 Torque stop slot, recommendation: cylindrical pin DIN7, 4 [0.16]
- 3 Recommended torque for the clamping ring 2,5 Nm



Flange with stator coupling, $\varnothing 65 [2,56]$ Flange type 5

- 1 Recommended torque for the clamping ring 2,5 Nm

