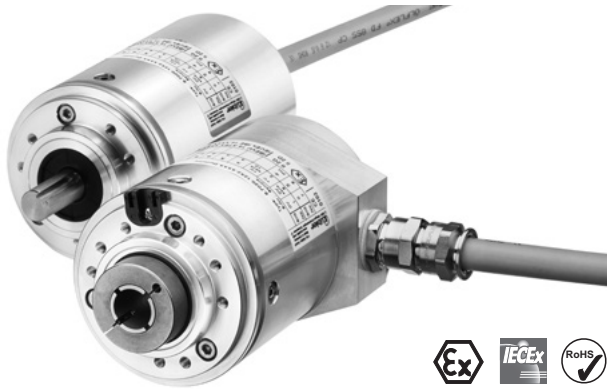
Standard
ATEX/IECEx – zone 1/21, optical | **Sendix 7000 / 7020 (shaft / hollow shaft)** | **Push-Pull / RS422**



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.

Ex approval | Safety-Lock™ | High rotational speed | High protection level | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor | Seawater durable

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	X	X	X	.	XXXX	.	XXXX
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*
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
- IP65 version for T6

1) Not applicable with connection types 1 and 2.

Standard
ATEX/IECEx – zone 1/21, optical | **Sendix 7000 / 7020 (shaft / hollow shaft)** | **Push-Pull / RS422**

Order code Hollow shaft

8.7020	.	X	X	X	X	.	XXXX	.	XXXX
Type		a	b	c	d		e		f

a *Flange*
1 = with spring element, short
5 = with stator coupling, IP67, ø 65 mm [2.56"]

b *Blind hollow shaft*
1 = ø 12 mm [0.47"]
2 = ø 14 mm [0.55"]

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
- IP65 version for T6

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)	Ex II 2 G Ex d IIC T4 - T6 Gb
Category (dust)	Ex II 2D Ex tb IIIC T135°C - T85°C Db IP6x
Relevant standards	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
Relevant standards	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)	Ex II 2 G Ex d IIC T4 - T6 Gb
Category (dust)	Ex II 2D Ex tb IIIC T135°C - T85°C Db
Relevant standards	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
Relevant standards	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2013

1) Not applicable with connection types 1 and 2.

Incremental encoders

Standard
ATEX/IECEx – zone 1/21, optical | **Sendix 7000 / 7020 (shaft / hollow shaft)** | **Push-Pull / RS422**

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 axial	80 N 40 N
Weight		approx. 1.5 kg [52.91 oz]
Protection acc. to EN 60529		IP67
Ambient temperature		-40°C ... +60°C [-40 ... +140°F] Please note the specifications for temperature class in EC type-examination certificate!
Materials	shaft flange / housing cable	stainless steel seawater durable Al, type AlSiMgMn (EN AW-6082) 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

EMC

Relevant standards	EN 55011 class B :2009 / A1:2010 EN 61000-6-2:2005 / AC:2005 EN 61000-6-3:2007 / A1:2011 EN 61326-1:2013

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 (±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 LOW	min. 2.5 V 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 µs	max. 1 µs
Falling edge time t_f	max. 200 ns	max. 200 ns	max. 1 µs	max. 1 µs
Short circuit proof outputs [2]	yes [3]	yes [3]	yes	yes
Reverse polarity protection of the power supply	yes	no	yes	no
CE compliant acc. to	EMC guideline 2014/30/EU ATEX guideline 2014/34/EU 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	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	0 V_{sens}	+V_{sens}	⏚
		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 V_{sens} / +V_{sens}: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
A, $\overline{A}$: Incremental output channel A / cosine signal
B, $\overline{B}$: Incremental output channel B / sine signal
0, $\overline{0}$: Reference signal
⏚: 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.

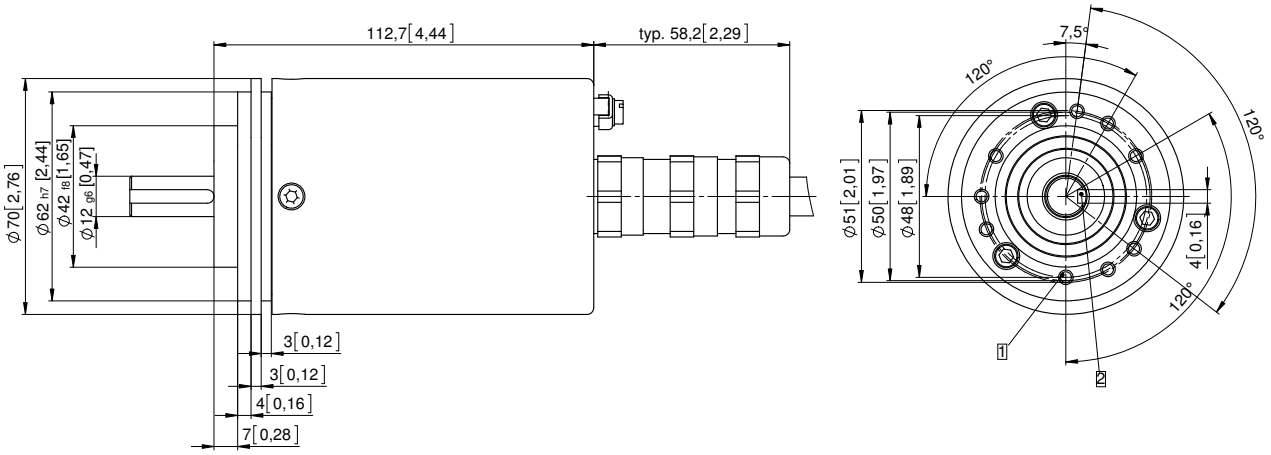
Standard
ATEX/IECEx – zone 1/21, optical | **Sendix 7000 / 7020 (shaft / hollow shaft)** | **Push-Pull / RS422**

Dimensions shaft version

Dimensions in mm [inch]

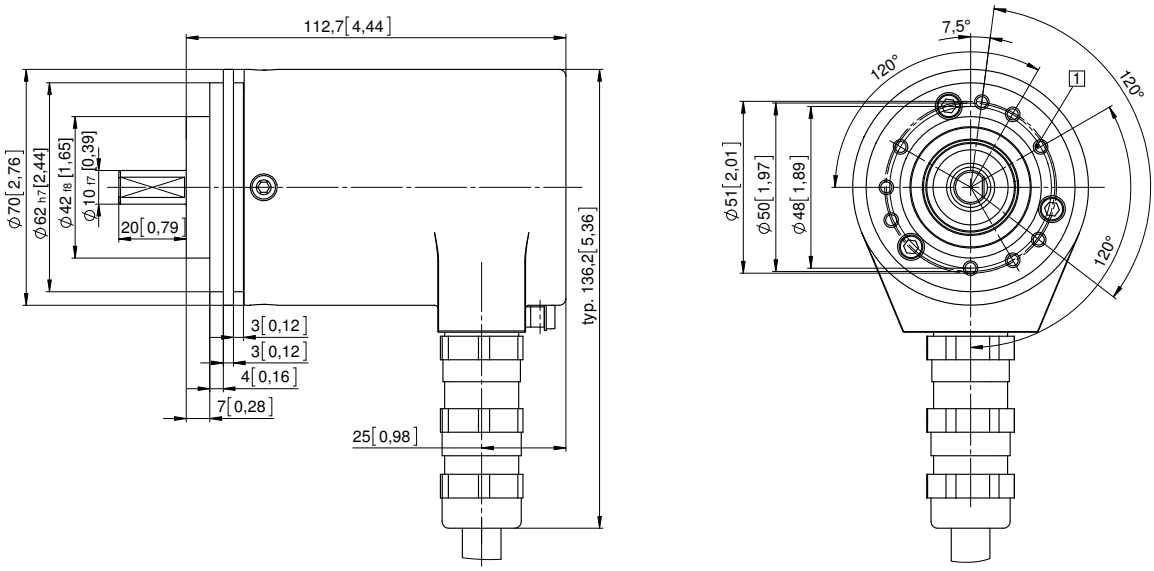
Clamping / synchronous flange, ø 70 [2.76]
Shaft type 1 with axial cable outlet

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



Clamping / synchronous flange, ø 70 [2.76]
Shaft type 2 with radial cable outlet

1 9 x M4, 10 [0.39] deep



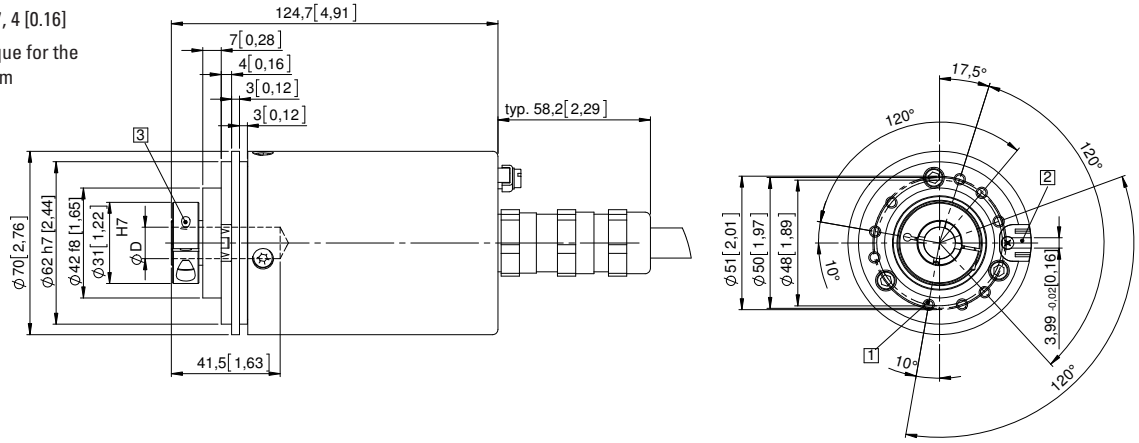
Standard
ATEX/IECEx – zone 1/21, optical | **Sendix 7000 / 7020 (shaft / hollow shaft)** | **Push-Pull / RS422**

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, ø 65 [2.56]
Flange type 5

1 Recommended torque for the clamping ring 2,5 Nm