

Incremental encoders

Standard, ATEX/IECEX – mining optical	Sendix 7100 / 7120 (shaft / hollow shaft)	Push-pull / RS422
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The incremental encoders Sendix 7100 / 7120 in a compact 70 mm stainless steel housing have an ATEX/IECEX mining approval.

These shock and vibration resistant encoders operate flexibly with a resolution of up to 5000 pulses per revolution; 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

Compact and safe

- Can be used even when space is tight.
- Minimal installation depth, diameter 70 mm.
- Compact cable outlet axial or radial.
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns (IP67 protection).

Explosion protection

- Mining approval.
- “Flame-proof enclosure” construction.
- ATEX with EC type examination certificate.
- IECEX with certificate of conformity (CoC).

Order code	8.7100	. 2	X	X	X	. XXXX	. XXXX
Shaft version	Type	a	b	c	d	e	f
a Flange	2 = clamping / synchronous flange, IP67, ø 70 mm [2.76"]	d Type of connection				f Cable length in dm ¹⁾	
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	1 = axial cable, 2 m [6.56'] PUR	2 = radial cable, 2 m [6.56'] PUR			0050 = 5 m [16.40']	
c Output circuit / supply voltage	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	A = axial cable, length > 2 m [6.56']	B = radial cable, length > 2 m [6.56']			0100 = 10 m [32.81']	
		e Pulse rate				0150 = 15 m [49.21']	
		1, 5, 10, 12, 36, 50, 100, 200, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000 (e.g. 100 pulses => 0100)				<i>Optional on request</i> - other pulse rates - special cable length	

1) Not applicable with connection types 1 and 2.

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Order code	8.7120	.XXXXX.	.XXXX.	.XXXX	
Hollow shaft	Type	a b c d	e	f	
a Flange	2 = with spring element, short 6 = with stator coupling, 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 dm ¹⁾	0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']
b Blind hollow shaft	(insertion depth max. 41.5 mm [1.63"]) 1 = ø 12 mm [0.47"] 2 = ø 14 mm [0.55"]	e Pulse rate	1, 5, 10, 12, 36, 50, 100, 200, 250, 256, 300, 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
c Output circuit / supply voltage	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				

Technical data

Explosion protection 7100	
ATEX	
EC type-examination certificate	IBExU 14 ATEX 1047 X
Category	⊕ I M2 Ex d I/IIC T4 - T6 Mb
Relevant standards	EN 60079-0:2012; ATEX guideline 94/9/EC EN 60079-1:2007
IECEX	
Certificate of Conformity (CoC)	IECEX IBE 14.0023 X
Category	Ex d I/IIC T4 - T6 Mb
Relevant standards	IEC 60079-0:2011; IEC 60079-1:2007

Explosion protection 7120	
ATEX	
EU type-examination certificate	IBExU 15 ATEX 1057 X
Category	⊕ I M2 Ex db I/IIC T4/120°C (T4)/T6 Mb
Relevant standards	EN 60079-0:2012 + A11:2013; ATEX guideline 2014/34/EU EN 60079-1:2014
IECEX	
Certificate of Conformity (CoC)	IECEX IBE 15.0019 X
Category	Ex db I/IIC T4/120°C (T4)/T6 Mb
Relevant standards	IEC 60079-0:2011; IEC 60079-1:2014

Mechanical characteristics		
Maximum speed	shaft	6000 min ⁻¹ (continuous)
	hollow shaft	3000 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. 2.8 kg [98.77 oz]	
Protection acc. to EN 60529	IP67	
Ambient temperature	-40 °C ... +60 °C [-40 °F ... +140 °F] Please note the specifications for temperature class in EC type-examination certificate!	
Materials	shaft	stainless steel
	flange / housing	stainless steel
	cable	PUR
Shock resistance	acc. to EN/IEC 60068-2-27 1000 m/s ² , 6 ms	
Vibration resistance	acc. to EN/IEC 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

Approvals		
CE compliant in accordance with		
	EMC Directive	2014/30/EU
	RoHS Directive	2011/65/EU
	ATEX Directive	2014/34/EU (for Ex 2/22 variants)

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	
Supply voltage	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 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 µs	max. 1 µs	
Falling edge time t_f	max. 200 ns	max. 200 ns	max. 1 µs	max. 1 µs	
Short circuit proof outputs²⁾	yes ³⁾	yes ³⁾	yes	yes	
Reverse polarity protection of the supply voltage	yes	no	yes	no	

Terminal assignment

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

- +V: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder 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, \bar{A} : Incremental output channel A
- B, \bar{B} : Incremental output channel B
- 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, supply voltage 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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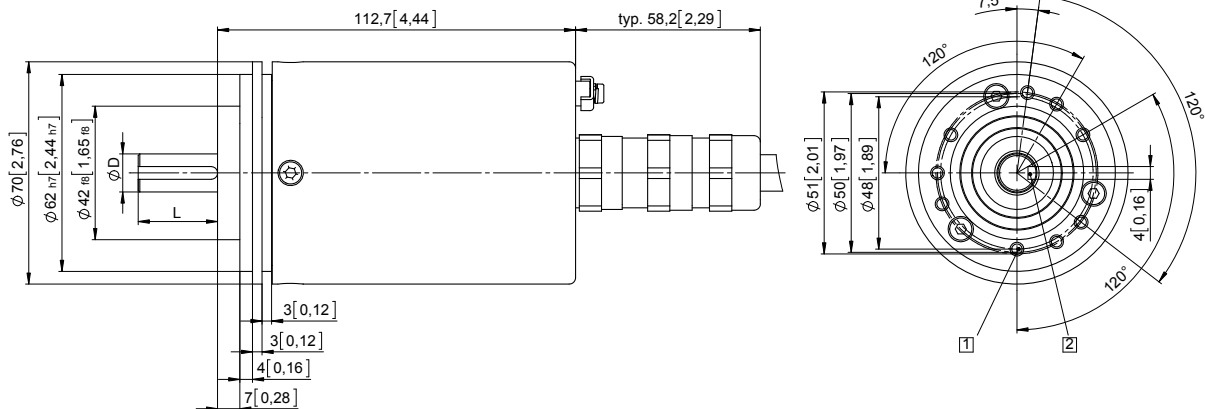
Push-pull / RS422

Dimensions shaft version

Dimensions in mm [inch]

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

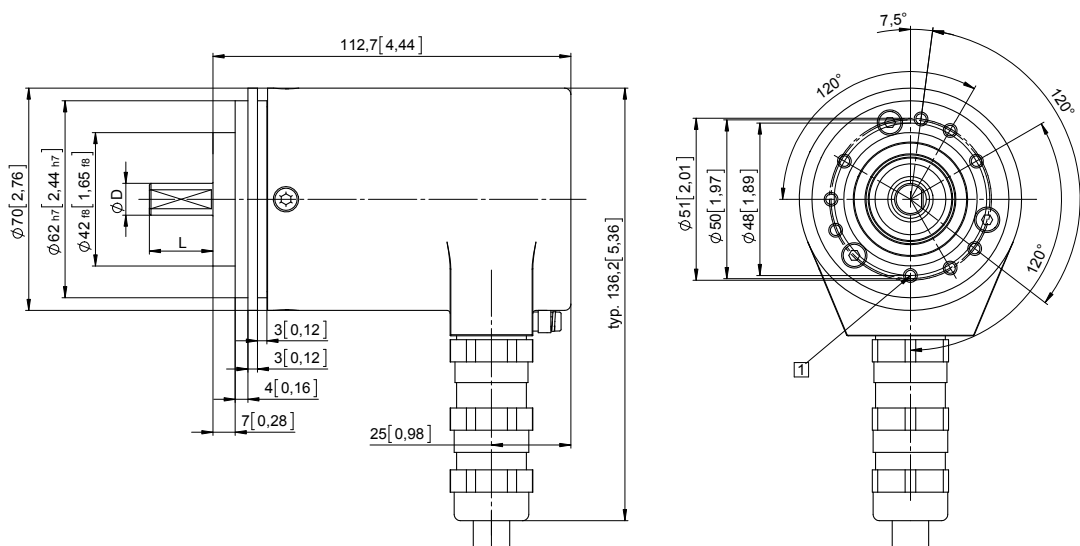
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



D	Fit	L
12 [0.47]	g6	25 [0.98]

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

- 1 9 x M4, 10 [0.39] deep



D	Fit	L
10 [0.39]	f7	20 [0.79]

Incremental encoders

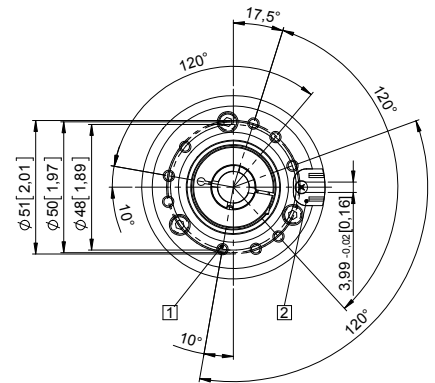
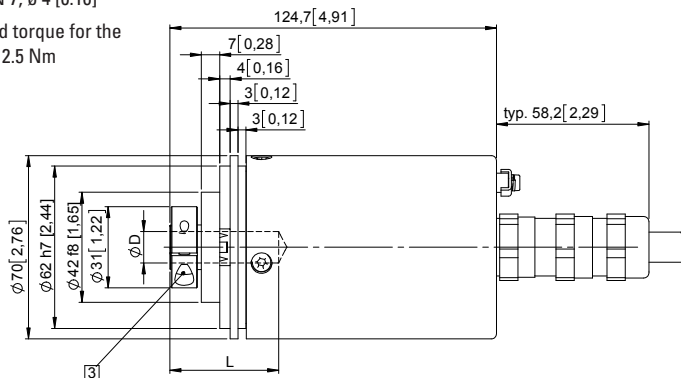
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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, short Flange type 2

- 1 9 x M4, 10 [0.39] deep
- 2 Slot spring element, recommendation: torque pin DIN 7, ϕ 4 [0.16]
- 3 Recommended torque for the clamping ring 2.5 Nm

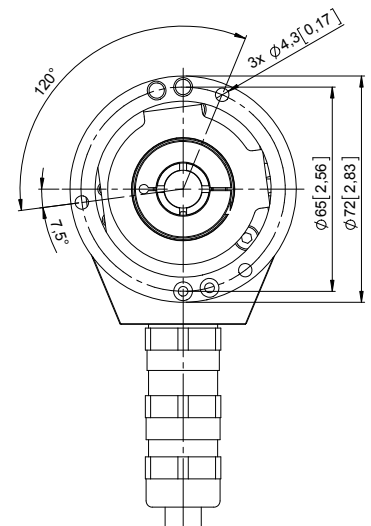
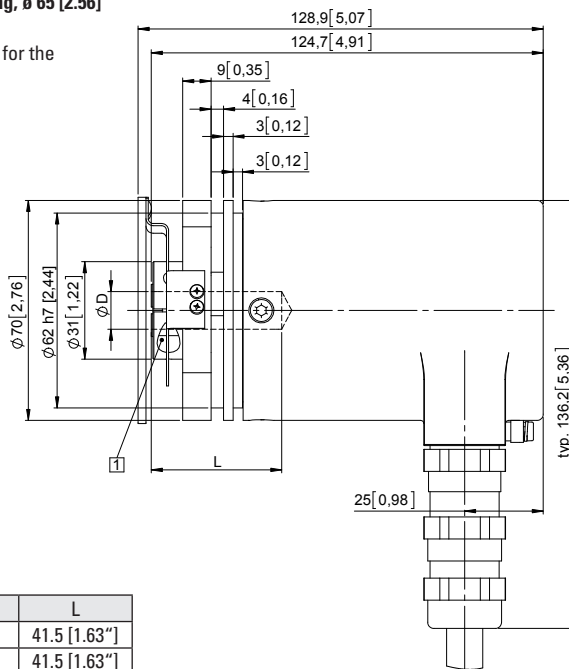


D	Fit	L
12 [0.47]	H7	41.5 [1.63"]
14 [0.55]	H7	41.5 [1.63"]

L = insertion depth max. blind hollow shaft

Flange with stator coupling, ϕ 65 [2.56] Flange type 6

- 1 Recommended torque for the clamping ring 2.5 Nm



D	Fit	L
12 [0.47]	H7	41.5 [1.63"]
14 [0.55]	H7	41.5 [1.63"]

L = insertion depth max. blind hollow shaft