

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.



Incremental encoders

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 XXXX . XXXX . XXXX
Shaft version	Type a b c d e f

- | | | |
|---|---|---|
| <p>a Flange
2 = clamping / synchronous flange, IP67, ø 70 mm [2.76"]</p> <p>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</p> <p>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</p> | <p>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']</p> <p>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)</p> | <p>f Cable length in dm ¹⁾
0050 = 5 m [16.40']
0100 = 10 m [32.81']
0150 = 15 m [49.21']</p> <p><i>Optional on request</i>
- other pulse rates
- special cable length</p> |
|---|---|---|

1) Not applicable with connection types 1 and 2.

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Order code Hollow shaft	8.7120 Type	.XXXXX a b c d	.XXXX e	.XXXX f
a Flange 2 = with spring element, short 6 = 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 dm ¹⁾ 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21'] <i>Optional on request</i> - other pulse rates - special cable length		
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, 100, 200, 250, 256, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000 (e.g. 100 pulses => 0100)			
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				

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 ... +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

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 (±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 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 RoHS guideline 2011/65/EU			

Incremental encoders

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 V _{sens}	+V _{sens}	\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 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, 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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Standard, ATEX/IECEX – mining optical

Sendix 7100 / 7120 (shaft / hollow shaft)

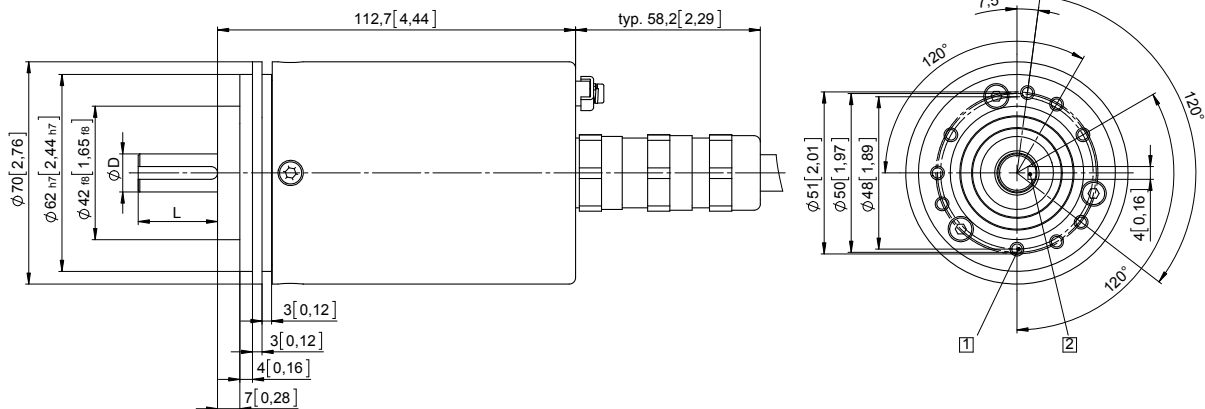
Push-pull / RS422

Dimensions shaft version

Dimensions in mm [inch]

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

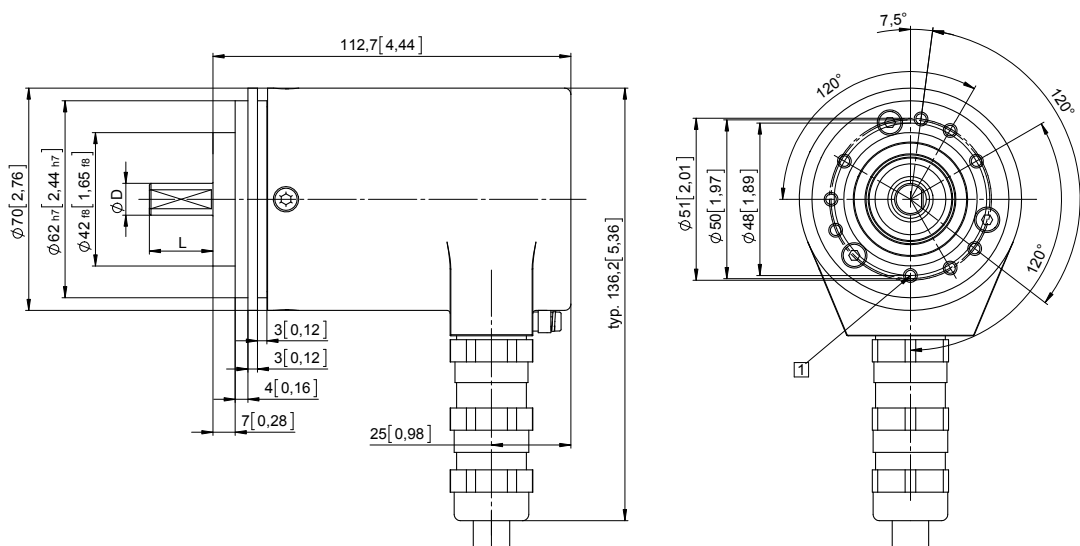
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



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

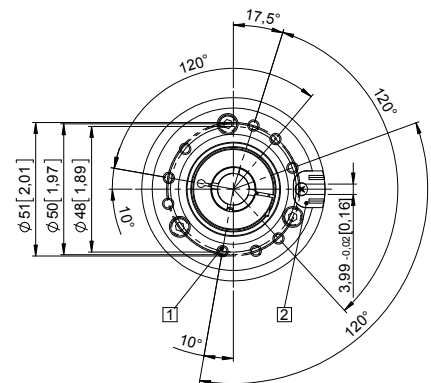
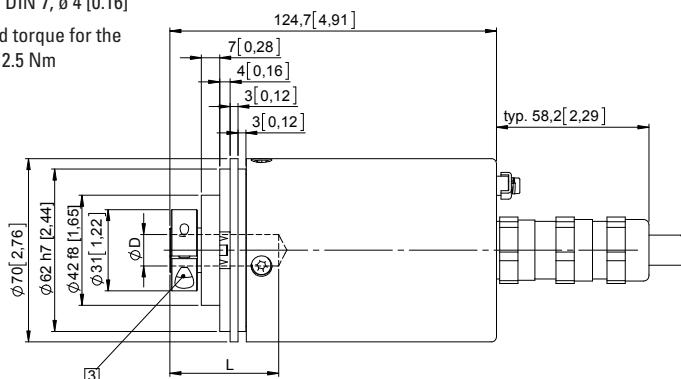
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Dimensions hollow shaft version

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: cylindrical pin DIN 7, \varnothing 4 [0.16]
- 3 Recommended torque for the clamping ring 2.5 Nm



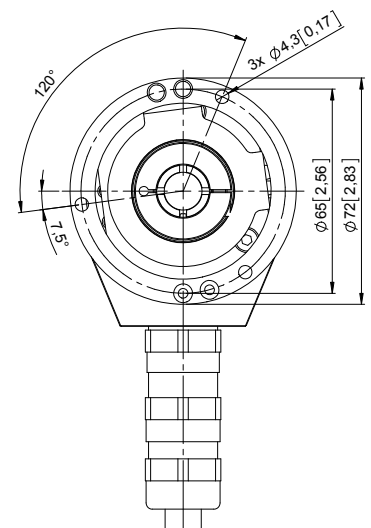
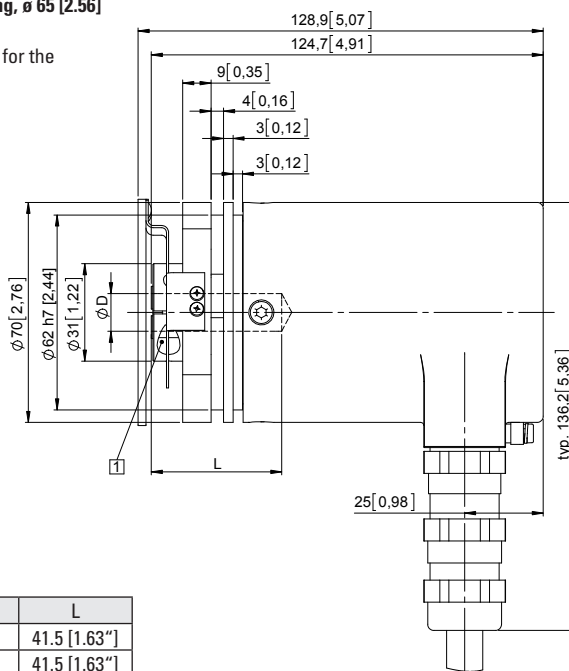
D	Fit	L
12 [0.47]	H7	41.5 [1.63"]
14 [0.55]	H7	41.5 [1.63"]

L = insertion depth max. blind hollow shaft

Flange with stator coupling, \varnothing 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