

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 X X X . 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
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a Flange
 2 = with spring element, short
 6 = 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

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
Directive 94/9/EC	EN 60079-0:2012; EN 60079-1:2007
IECEX	
Certificate of Conformity (CoC)	IECEX IBE 14.0023 X
Category	I M2 Ex d I/IIC T4 - T6 Mb
IECEX	IEC 60079-0:2011; IEC 60079-1:2007

Explosion protection 7120	
ATEX	
EC type-examination certificate	IBExU 15 ATEX 1057 X
Category	⊕ I M2 Ex d I/IIC T4 Mb
Directive 94/9/EC	EN 60079-0:2012; EN 60079-1:2014
IECEX	
Certificate of Conformity (CoC)	IECEX IBE 15.0019 X
Category	Ex d I/IIC T4 Mb
IECEX	IEC 60079-0:2011; IEC 60079-1:2014

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. 2.8 kg [98.77 oz]
Protection acc. to EN 60529	IP67
Working temperature range	-40°C ... +60°C [-40 ... +140°F]
Materials	shaft stainless steel flange / housing stainless steel cable PUR
Shock resistance acc. to EN 60068-2-27	1000 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 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 2004/108/EC ATEX guideline 94/9/EC 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	$\bar{0}$	\bar{A}	0 V _{sens}	+V _{sens}	\perp
		Cable marking:	1	2	3	4	5	6	7	8	9	0	10	shield

- | | | | |
|--|--|----------------|--|
| +V: | Encoder power supply +V DC | A, \bar{A} : | Incremental output channel A / cosine signal |
| 0 V: | Encoder power supply ground GND (0 V) | B, \bar{B} : | Incremental output channel B / sine signal |
| 0 V _{sens} / +V _{sens} : | Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly. | 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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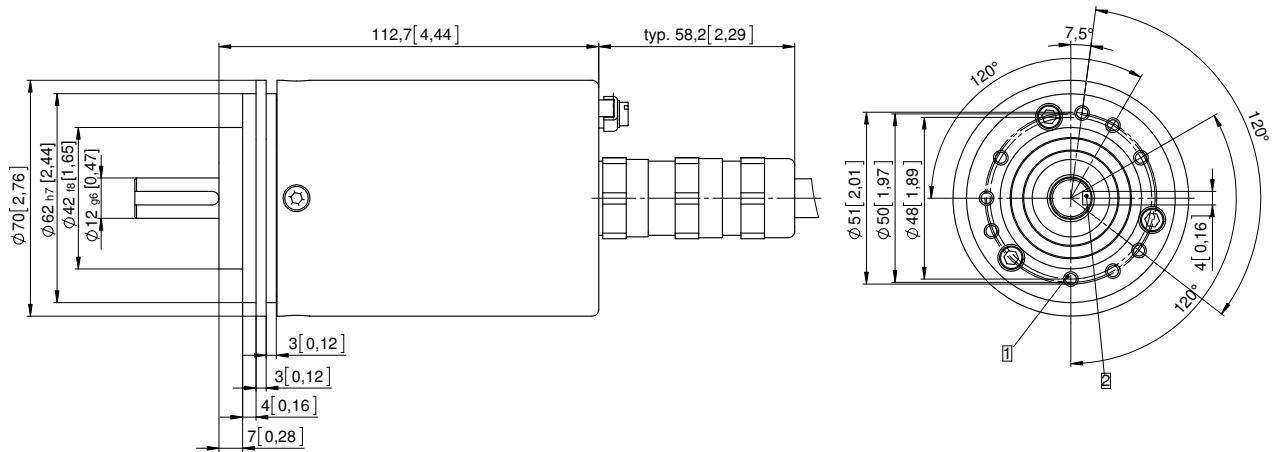
Push-Pull / RS422

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



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

- 1 9 x M4, 10 [0.39] deep

