

Incremental encoders

Standard, ATEX/IECEX – zone 1/21 SIL3/PLe, optical	Sendix 7014FS3 / 7034FS3 (shaft / hollow)	SinCos
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SIL3
Functional Safety
PLe

Ex protection and Functional Safety in one device.

The incremental encoders 7014FS3 and 7034FS3 of the Sendix family are suited for use in safety-related applications up to SIL3 acc. to EN 61800-5-2 or PLe to EN ISO 13849-1. In addition, these devices ensure Ex protection in a compact 70 mm housing out of seawater durable aluminum.



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

Functional Safety

- Encoder with individual certificate from TÜV.
- Suitable for applications up to SIL3 acc. to EN 61800-5-2.
- Suitable for applications up to PLe acc. to EN ISO 13849-1.
- With incremental SinCos tracks.
- Certified mechanical mounting + electronic.

Explosion protection

- “Flameproof-enclosure” version.
- ATEX with EC type examination certificate.
- IECEX with certificate of conformity (CoC).

Order code	8.7014 FS3	. 1 X X X . XXXX . XXXX
Shaft version	Type	a b c d e f

- | | | |
|--|--|--|
| <p>a Flange
1 = clamping / synchronous flange, IP67, \varnothing 70 mm [2.76"]</p> <p>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</p> <p>c Output circuit / power supply
1 = SinCos / 5 V DC
2 = SinCos / 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
1024, 2048</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>
- special cable length
- seawater resistant (stainless steel V4A)</p> |
|--|--|--|

Order code	8.7034 FS3	. X X X X . XXXX . XXXX
Hollow shaft	Type	a b c d e f

- | | | |
|--|--|--|
| <p>a Flange
1 = with spring element, short
5 = with stator coupling, IP67, \varnothing 65 mm [2.56"]</p> <p>b Blind hollow shaft
(insertion depth max. 41.5 mm [1.63"])
1 = \varnothing 12 mm [0.47"]
2 = \varnothing 14 mm [0.55"]</p> <p>c Output circuit / power supply
1 = SinCos / 5 V DC
2 = SinCos / 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
1024, 2048</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>
- special cable length
- seawater resistant (stainless steel V4A)</p> |
|--|--|--|

1) Not applicable with connection types 1 and 2.

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Accessories		Order no.
EMC shield terminal	for top-hat rail mounting	8.0000.4G06.0312
Screw retention	Loctite 243, 5 ml	8.0000.4G05.0000
Bellows coupling, safety-oriented	You will find an overview of our couplings for Sendix shaft encoders in the accessories section or under kuebler.com/accessories .	
Safety modules Safety-M compact	You will find an overview of our systems and components for Functional Safety and the corresponding software in the safety technology section or under kuebler.com/safety .	

Further accessories can be found in the accessories section or in the accessories area of our website at: kuebler.com/accessories.
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: kuebler.com/connection_technology.

Technical data

Explosion protection	
ATEX	
EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2 G Ex d IIC T4 - T6 Gb
Category (dust)	Ex tb IIIC T135°C - T85°C Db
Relevant standards	EN 60079-0:2012; EN 60079-1:2014; 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
Relevant standards	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2008

Notes regarding "Functional Safety"
These encoders are suitable for use in safety-related systems up to SIL3 acc. to EN 61800-5-2 and PLe to EN ISO 13849-1 in conjunction with controllers or evaluation units, which possess the necessary functionality. Additional functions can be found in the operating manual.

Electrical characteristics	
Power supply	5 V DC (±5 %) or 10 ... 30 V DC
Current consumption (no load)	max. 45 mA
Reverse polarity protection for power supply	yes
Short circuit proof outputs	yes ²⁾
CE compliant acc. to	EMC guideline 2014/30/EU ATEX guideline 2014/34/EU Machinery directive 2006/42/EC RoHS guideline 2011/65/EU

EMC	
Relevant standards	EN 55011 class B:2009 / A1:2010 EN 61326-1:2013 EN 61326-3-1:2008

Safety characteristics	
Classification	PLe / SIL3
System structure	2 channel (Cat. 4)
PFH_d value ¹⁾	1.09 x 10 ⁻⁸ h ⁻¹
Mission time / Proof test interval	20 years
Relevant standards	EN ISO 13849-1:2015; EN ISO 13849-2:2012; EN 61800-5-2:2007

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
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 seawater durable Al, type AlSiMgMn (EN AW-6082) cable PUR
Shock resistance acc. to EN 60068-2-27	500 m/s ² , 11 ms
Vibration resistance acc. to EN 60068-2-6	200 m/s ² , 5 ... 2000 Hz

SinCos interface	
Max. frequency -3dB	400 kHz
Signal level	1 V _{pp} (±10 %)
Short circuit proof	yes ²⁾
Pulse rate	1024 / 2048 ppr

1) The specified value is based on a diagnostic coverage of 99 %, that must be achieved with an encoder evaluation unit.
The encoder evaluation unit must meet at least the requirements for SIL3.

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

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Terminal assignment

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

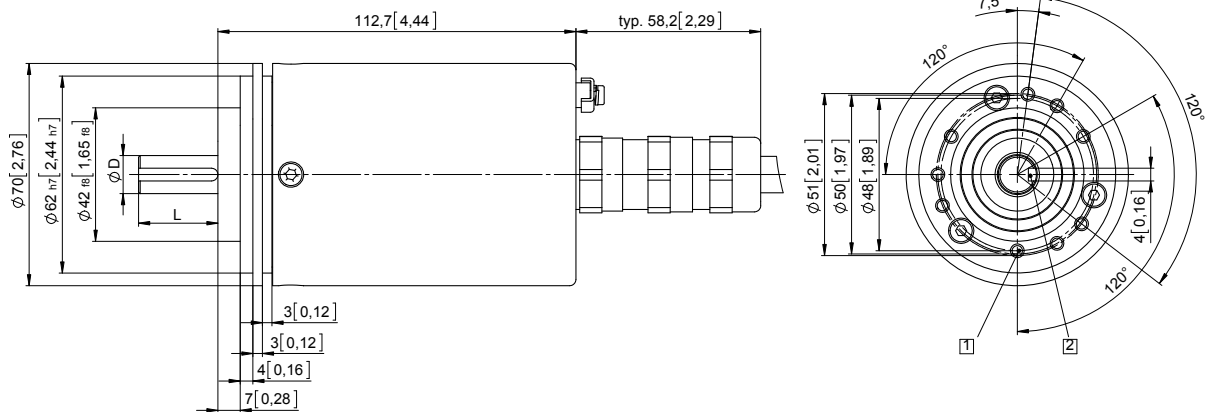
- +V: Encoder power supply +V DC
- 0 V: Encoder power supply ground GND (0 V)
- A, \bar{A} : Cosine signal
- B, \bar{B} : Sine signal
- \perp : Plug connector housing (shield)

Dimensions shaft version

Dimensions in mm [inch]

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

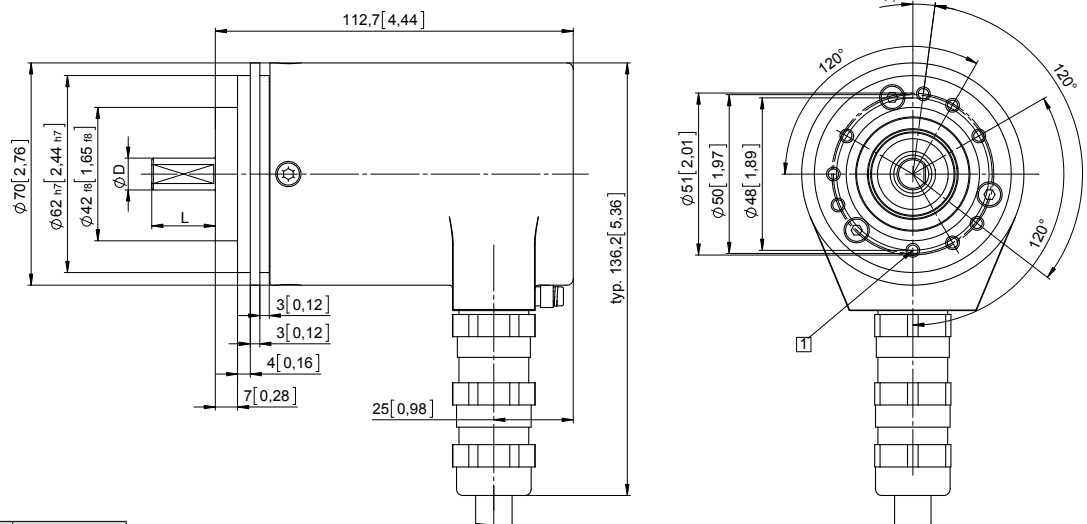
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



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]

