

Incremental Encoders

Standard ATEX / IECEx – Zone 1 / 21, SIL3/PLe, optical	Sendix SIL 7014FS3 (Shaft)	SinCos
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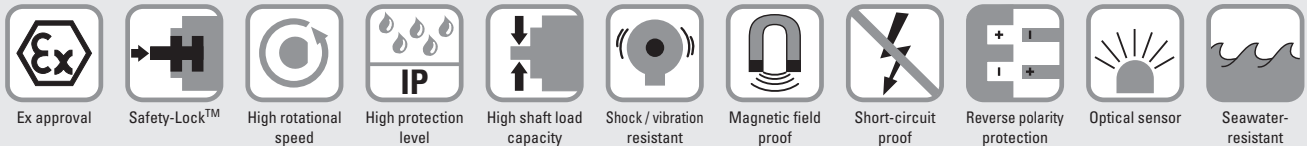
Ex protection and Functional Safety in one device.

The incremental encoders 7014FS3 of the Sendix SIL 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-resistant aluminium.



Incremental Encoders



Functional Safety

- Encoder with individual certificate from IFA / 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

a Flange 1 = clamping-synchronous flange, IP67 ø 70 mm [2.76"]	c Output circuit / Power supply 1 = SinCos / 5 V DC 2 = SinCos / 10 ... 30 V DC	b Pulse rate 1024, 2048 <i>optional on request - special cable length</i>
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	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']

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

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.

1) Not applicable with connection types 1 and 2.

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Technical data

Explosion protection ATEX	
EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	II 2 G Ex d IIC T4 - T6 Gb
Category (dust)	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

Explosion protection 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

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	10 ... 30 V DC
Current consumption (no load)	max. 45 mA
Reverse polarity protection for power supply (+V)	yes
CE compliant acc. to	EMC guideline 2004/108/EC ATEX guideline 94/9/EC Machinery directive 2006/42/EC
RoHS compliant acc. to	guideline 2011/65/EU

EMC	
Relevant standards	EN 55011 Class B :2009 / A1:2010 EN 61000-6-3 :2007 / A1:2011 EN 61000-6-2 :2005

Safety characteristics	
Classification	PLe / SIL3
System structure	2 channel (Cat. 4 / HFT = 1)
PFH _d value ¹⁾	1.09 x 10 ⁻⁸ h ⁻¹
Proof-test interval	20 years
Relevant standards	EN ISO 13849-1:2008; EN ISO 13849-2:2013; EN 61800-5-2:2007

Mechanical characteristics		
Max. speed	continuous 6 000 min ⁻¹	
Starting torque – at 20°C [68°F]	< 0.05 Nm	
Moment of inertia	4.0 x 10 ⁻⁶ kgm ²	
Load capacity of shaft	radial	80 N
	axial	40 N
Weight	approx. 1.3 kg [45.86 oz]	
Protection acc. to EN 60529	IP67	
Working temperature range	-40°C ... +60°C [-40 ... +140°F]	
Materials	shaft	stainless steel
	flange / housing	seawater-resistant Al, type AISiMgMn (EN AW-6082) (stainless steel on request)
	cable	PUR
Shock resistance acc. EN 60068-2-27	500 m/s ² , 11 ms	
Vibration resistance acc. EN 60068-2-6	200 m/s ² , 10 ... 150 Hz	

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

Terminal assignment

Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)							
1, 2	1, 2, A, B	Signal:	0 V	+V	A	\bar{A}	B	\bar{B}	\perp
		Cable 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)

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, supply voltage correctly applied.

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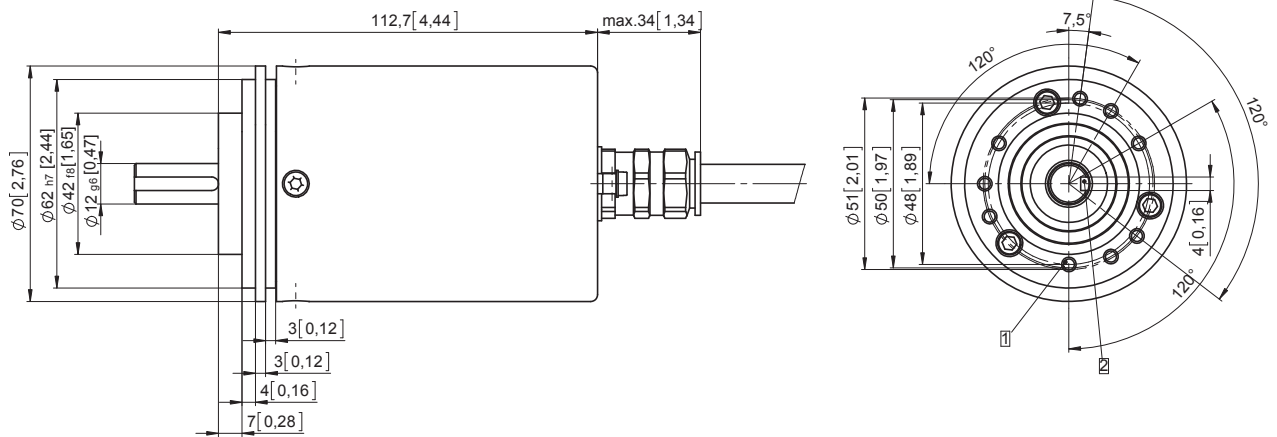
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Dimensions

Dimensions in mm [inch]

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

- 1 6 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 6 x M4, 10 [0.39] deep

