

Incremental encoders

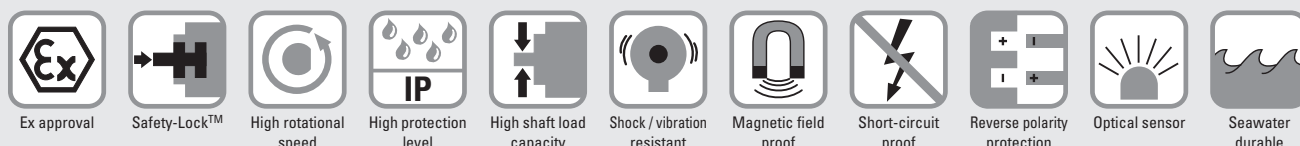
Standard, ATEX/IECEx – zone 1/21 SIL2/PLd, optical	Sendix SIL 7014FS2 (shaft)	SinCos
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Ex protection and Functional Safety in one device.

The incremental encoders 7014FS2 of the Sendix SIL family are suited for use in safety-related applications up to SIL2 acc. to EN 61800-5-2 or PLd to EN ISO 13849-1.

In addition, these devices ensure Ex protection in a compact 70 mm housing out of seawater durable aluminum.



Functional Safety

- Encoder with individual certificate from IFA / TÜV.
- Suitable for applications up to SIL2 acc. to EN 61800-5-2.
- Suitable for applications up to PLd 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 Shaft version

8.7014 FS2	.	1	X	X	X	.	X	X	X	.	X	X	X	X
Type		a	b	c	d		e				f			

a Flange

- 1 = clamping / synchronous flange, IP67
ø 70 mm [2.76"]

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

c Output circuit / power supply

- 1 = SinCos / 5 V DC
- 2 = SinCos / 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

- 1024, 2048

f Cable length in dm ¹⁾

- 0050 = 5 m [16.40']
- 0100 = 10 m [32.81']
- 0150 = 15 m [49.21']

Optional on request

- special cable length
- seawater resistant (stainless steel V4A)

Stainless steel V4A as standard types (deliverable as from 1 unit)

- 8.7014FS2.22X1.XXXX-V4A
- 8.7014FS2.22XA.XXXX.XXXX-V4A



Accessories

		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
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 SIL2 acc. to EN 61800-5-2 and PLd 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 ($\pm 5\%$) 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 61000-6-2:2005 / AC:2005 EN 61000-6-3:2007 / A1:2011 EN 61326-1:2013
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Safety characteristics

Classification	PLd / SIL2
System structure	2 channel (Cat. 3)
PFH_d value ¹⁾	$2.16 \times 10^{-8} \text{ h}^{-1}$
Mission time / Proof test interval	20 years
Relevant standards	EN ISO 13849-1:2008; EN ISO 13849-2:2013; 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	$4.0 \times 10^{-6} \text{ kgm}^2$
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 , 10 ... 150 Hz

SinCos interface

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

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)

1) The specified value is based on a diagnostic coverage of 90 %, that must be achieved with an encoder evaluation unit.
The encoder evaluation unit must meet at least the requirements for SIL2.

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

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**Standard, ATEX/IECEX – zone 1/21
SIL2/PLd, optical**

Sendix SIL 7014FS2 (shaft)

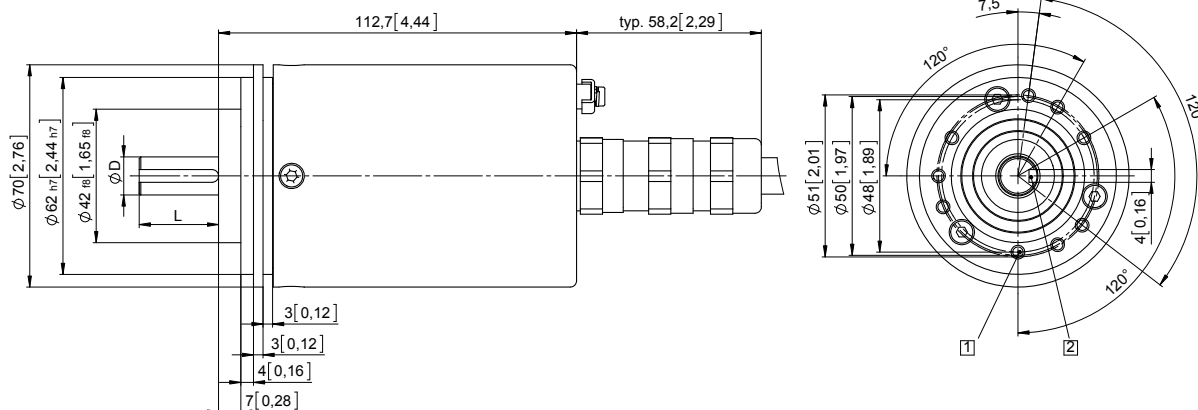
SinCos

Dimensions shaft version

Dimensions in mm [inch]

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

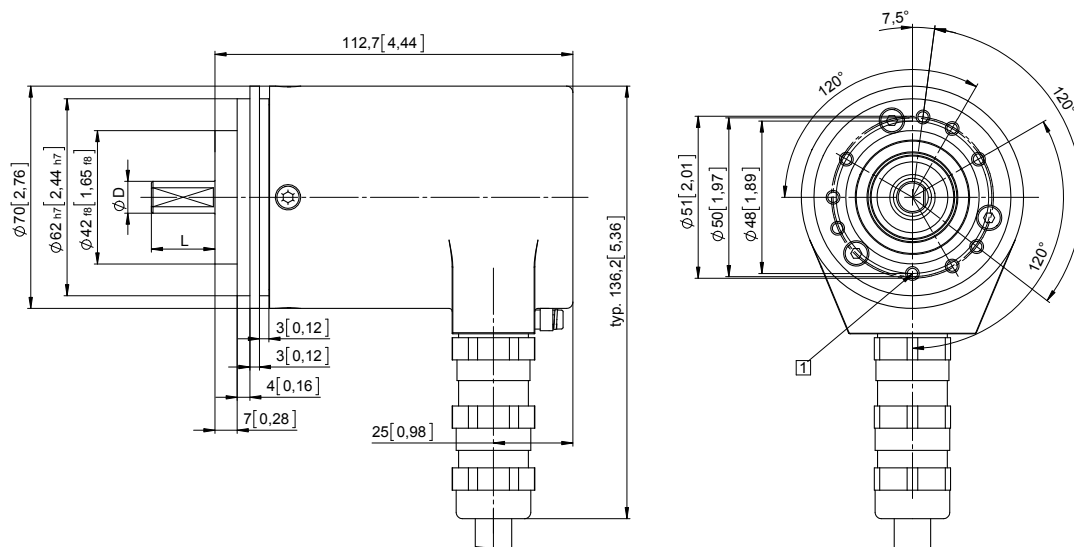
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



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

**Clamping / synchronous flange, ø 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]