

Incremental encoders

Standard sine wave output, SIL3/PLe, optical	Sendix SIL 5814FS3 / 5834FS3 (shaft / hollow shaft)	SinCos
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The incremental encoders 5814FS3 and 5834FS3 of the Sendix SIL family are suited for use in safety-related applications up to SIL3 according to EN 61800-5-2 or PLe to EN ISO 13849-1.

These encoders are particularly suited for applications in the field of safe drive technology.



Safety-Lock™



High rotational speed



Temperature range
-40°... +90°C



High protection level
IP



High shaft load capacity



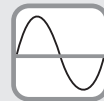
Shock / vibration resistant



Magnetic field proof



Reverse polarity protection



SinCos



Optical sensor

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.

Flexible

- Shaft and hollow shaft versions.
- Cable and connector variants.
- Various mounting options available.

Order code 8.5814FS3 . 1 XXX . XXXX
Shaft version Type a b c d e

a Flange

1 = clamping flange, IP65, ø 58 mm [2.28"]

b Shaft (ø x L)

2 = 10 x 20 mm [0.39 x 0.79"], with flat
 A = 10 x 20 mm [0.39 x 0.79"], with feather key

c Output circuit / power supply

1 = SinCos / 5 V DC
 2 = SinCos / 10 ... 30 V DC

d Type of connection

1 = axial cable, 1 m [3.28'] PVC
 A = axial cable, special length PVC *)
 2 = radial cable, 1 m [3.28'] PVC
 B = radial cable, special length PVC *)
 3 = axial M23 connector, 12-pin
 4 = radial M23 connector, 12-pin
 5 = axial M12 connector, 8-pin
 6 = radial M12 connector, 8-pin

*) Available special lengths (connection types A, B):
 2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21']
 order code expansion .XXXX = length in dm
 ex.: 8.5814FS3.122A.2048.0030 (for cable length 3 m)

e Pulse rate

1024, 2048

Optional on request
 - Ex 2/22 ¹⁾

1) For the cable connection type, cable material PUR.

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Order code Hollow shaft	8.5834FS3 Type	.XXXXX a b c d e	.XXXX e
a Flange 9 = with torque stop, flexible, IP65 A = with torque stop set, rigid, IP65 B = with stator coupling, IP65, ø 63 mm [2.48"]	b Through hollow shaft 3 = ø 10 mm [0.39"] 4 = ø 12 mm [0.47"] 5 = ø 14 mm [0.55"] <i>Tapered shaft</i> K = ø 10 mm [0.39"]	c Output circuit / power supply 1 = SinCos / 5 V DC 2 = SinCos / 10 ... 30 V DC	d Type of connection 2 = radial cable, 1 m [3.28'] PVC B = radial cable, special length PVC *) E = tangential cable, 1 m [3.28'] PVC F = tangential cable, special length PVC *) 4 = radial M23 connector, 12-pin 6 = radial M12 connector, 8-pin *) Available special lengths (connection types B, F): 2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.5834FS3.B42B.2048.0030 (for cable length 3 m)
			e Pulse rate 1024, 2048 <i>Optional on request</i> - Ex 2/22 (not for connection type E + F) ¹⁾

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.

Connection technology		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut, 8-pin 2 m [6.56'] PVC cable ²⁾	05.00.6041.8211.002M
	M23 female connector with coupling nut, 12-pin 2 m [6.56'] PVC cable ²⁾	8.0000.6901.0002
Connector, self-assembly (straight)	M12 female connector with coupling nut, 8-pin	05.CMB 8181-0
	M23 female connector with coupling nut, 12-pin	8.0000.5012.0000

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.

Technical data	
Notes regarding "Functional Safety"	Safety characteristics
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.	Classification PLe / SIL3
	System structure 2 channel (Cat. 4)
	PFH_d value ³⁾ 1.09 x 10 ⁻⁸ 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

1) For the cable connection type, cable material PUR.

2) Other lengths available.

3) 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.

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Mechanical characteristics	
Maximum speed, shaft version	
up to 70°C [158°F]	12000 min ⁻¹ , 10000 min ⁻¹ (continuous)
up to T _{max}	8000 min ⁻¹ , 5000 min ⁻¹ (continuous)
Maximum speed, hollow shaft version	
up to 70°C [158°F]	9000 min ⁻¹ , 6000 min ⁻¹ (continuous)
up to T _{max}	6000 min ⁻¹ , 3000 min ⁻¹ (continuous)
Starting torque – at 20°C [68°F]	
shaft version	< 0.01 Nm
hollow shaft version	< 0.03 Nm
Mass moment of inertia	
shaft version	4.0 x 10 ⁻⁶ kgm ²
hollow shaft version	7.0 x 10 ⁻⁶ kgm ²
Insertion depth for shaft	
hollow shaft version	min. 34 mm [1.34"]
Load capacity of shaft	
radial	80 N
axial	40 N
Weight	approx. 0.45 kg [15.87 oz]
Protection acc. to EN 60529	IP65
Working temperature range	-40°C ... +90°C [-40°F ... +194°F] ¹⁾
Materials	
shaft / hollow shaft	stainless steel
flange	aluminum
housing	zinc die-cast
cable	PVC (PUR for Ex 2/22)
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

Electrical characteristics	
Power supply	5 V DC (±5 %) or 10 ... 30 V DC
Power consumption (no load)	5 V DC max. 70 mA 10 ... 30 V DC max. 45 mA
Reverse polarity protection of the power supply	yes
Short circuit proof outputs	yes ²⁾
UL approval	file no. E224618
CE compliant acc. to	EMC guideline 2014/30/EU Machinery directive 2006/42/EC RoHS 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

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 cores individually before initial start-up)							
1, 2	1, 2, A, B, E, F	Signal:	0 V	+V	A	\bar{A}	B	\bar{B}	\perp
		Core color:	WH	BN	GN	YE	GY	PK	shield

Output circuit	Type of connection	M23 connector, 12-pin							
1, 2	3, 4	Signal:	0 V	+V	A	\bar{A}	B	\bar{B}	\perp
		Pin:	10	12	5	6	8	1	PH ³⁾

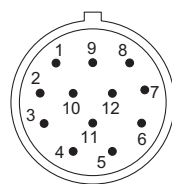
Output circuit	Type of connection	M12 connector, 8-pin							
1, 2	5, 6	Signal:	0 V	+V	A	\bar{A}	B	\bar{B}	\perp
		Pin:	1	2	3	4	5	6	PH ³⁾

- +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
- PH \perp : Plug connector housing (shield)

Top view of mating side, male contact base



M12 connector, 8-pin



M23 connector, 12-pin

1) Cable version: -30°C ... +90°C [-22°F ... +194°F] fixed installation.
 2) Short circuit to 0 V or to output, one channel at a time, power supply correctly applied.
 3) PH = shield is attached to connector housing.

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Dimensions shaft version

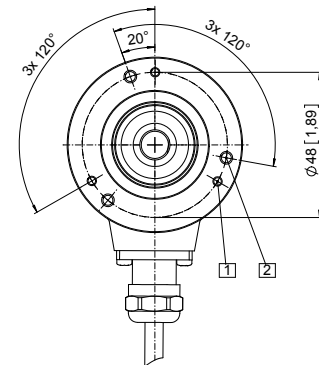
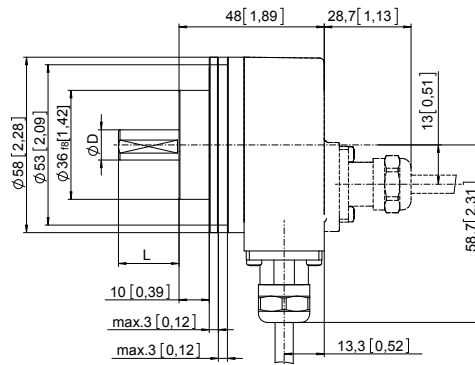
Dimensions in mm [inch]

Clamping flange, \varnothing 58 [2.28]

Flange type 1 with shaft type 2

(drawing with cable)

- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep



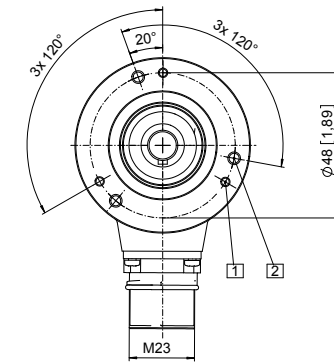
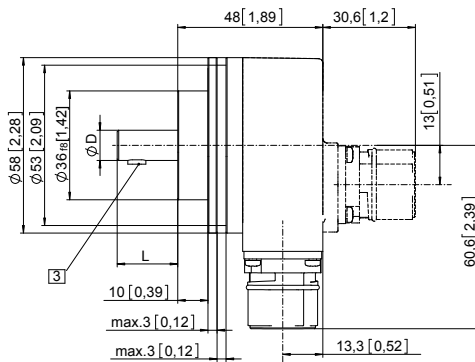
D	Fit	L
10 [0.39]	f7	20 [0.79]

Clamping flange, \varnothing 58 [2.28]

Flange type 1 with shaft type A

(drawing with M23 connector)

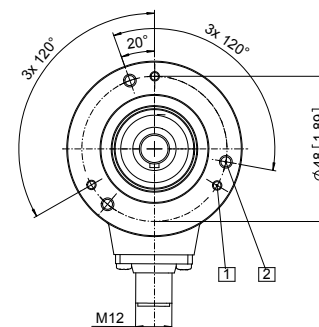
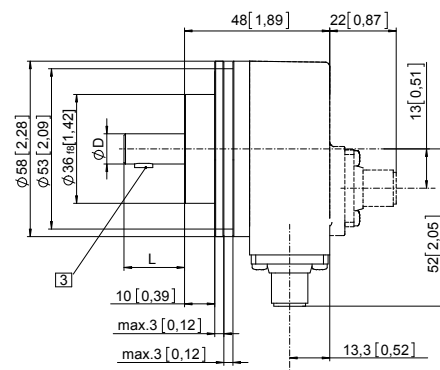
- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep
- 3 Feather key DIN 6885 - A - 3x3x6



D	Fit	L
10 [0.39]	f7	20 [0.79]

(drawing with M12 connector)

- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep
- 3 Feather key DIN 6885 - A - 3x3x6



D	Fit	L
10 [0.39]	f7	20 [0.79]

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Dimensions hollow shaft version

Dimensions in mm [inch]

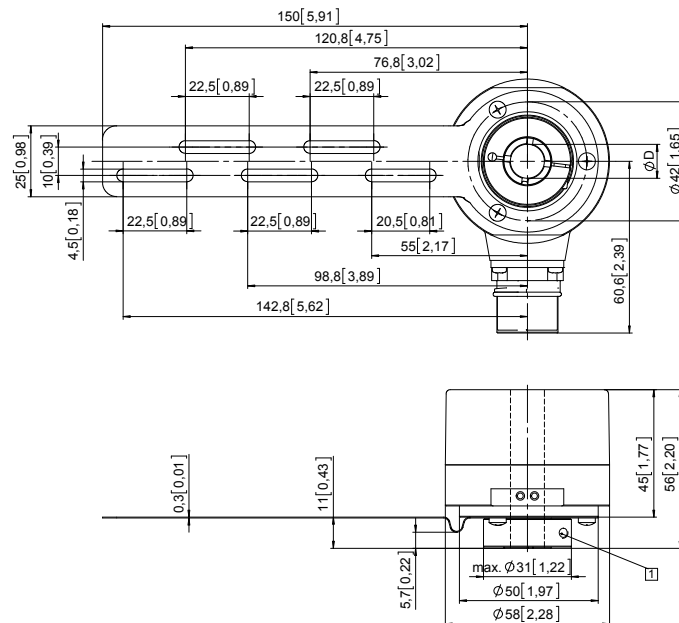
Flange with torque stop, flexible

Flange type 9

Through hollow shaft

(drawing with M23 connector)

- 1 Recommended torque for the clamping ring 2.5 Nm



D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7

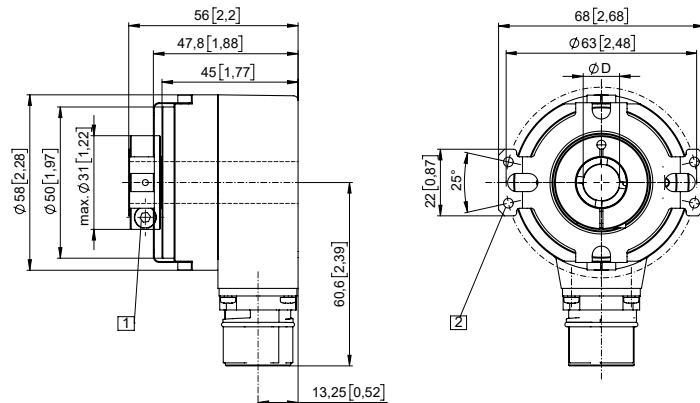
Flange with stator coupling, Ø 63 [2.48]

Flange type B

Through hollow shaft

(drawing with M23 connector)

- 1 SW 3, recommended torque for the clamping ring 2.5 Nm
2 For (4x) M3 screw



D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7

Flange with stator coupling, Ø 63 [2.48]

Flange type B

Tapered shaft

(drawing with tangential cable outlet)

- 1 For (4x) M3 screw
2 Recommended torque for (SW 4) tightening screw 3^{+0.5} Nm

