

Incremental encoders

Standard
sine wave output, SIL2/PLd, optical

Sendix SIL 5814FS2 / 5834FS2 (shaft / hollow shaft)

SinCos



The incremental encoders 5814FS2 and 5834FS2 of the Sendix SIL family are suited for use in safety-related applications up to SIL2 according to EN 61800-5-2 or PLd to EN ISO 13849-1.

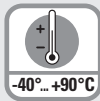
These encoders are particularly suited for applications in the field of safe drive technology.



Safety-Lock™



High rotational speed



Temperature range



High protection level



High shaft load capacity



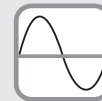
Shock / vibration resistant



Magnetic field proof



Reverse polarity protection



SinCos



Optical sensor

Functional Safety

- Encoder with individual certificate from IFA / TÜV.
- Suitable for applications up to 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.

Flexible

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

Order code
Shaft version

8.5814FS2 . 1 XXX . XXXX
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.: 8.5814FS2.122A.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	8.5834FS2 Type	. X X X X . X X X X a b c d 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.: 8.5834FS2.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" 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.											
Safety characteristics <table> <tr> <td>Classification</td><td>PLd / SIL2</td></tr> <tr> <td>System structure</td><td>2 channel (Cat. 3)</td></tr> <tr> <td>PFH_d value ³⁾</td><td>2.16 x 10⁻⁸ h⁻¹</td></tr> <tr> <td>Mission time / Proof test interval</td><td>20 years</td></tr> <tr> <td>Relevant standards</td><td>EN ISO 13849-1:2008; EN ISO 13849-2:2013; EN 61800-5-2:2007</td></tr> </table>		Classification	PLd / SIL2	System structure	2 channel (Cat. 3)	PFH_d value ³⁾	2.16 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
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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 90 %, that must be achieved with an encoder evaluation unit.
The encoder evaluation unit must meet at least the requirements for SIL2.

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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 224618
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 Vpp (±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, 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⁾

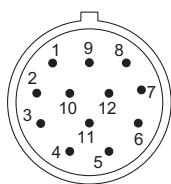
Output circuit	Type of connection	M12 connector, 8-pin							
1, 2	5, 6	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	$\perp$
		Pin:	1	2	3	4	5	6	PH ³⁾

+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.

Incremental encoders

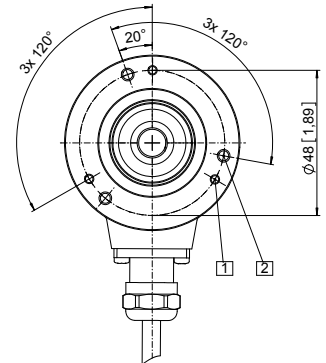
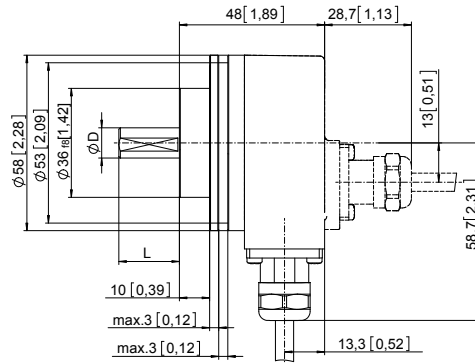
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Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 58 [2.28]
Flange type 1 with shaft type 2
(drawing with cable)

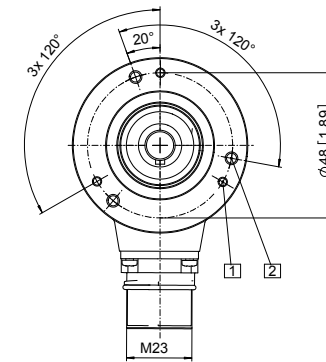
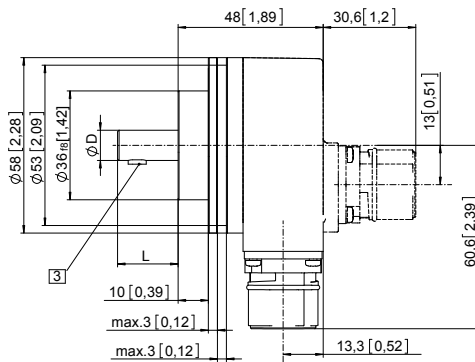
- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep



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

Clamping flange, ø 58 [2.28]
Flange type 1 with shaft type A
(drawing with M23 connector)

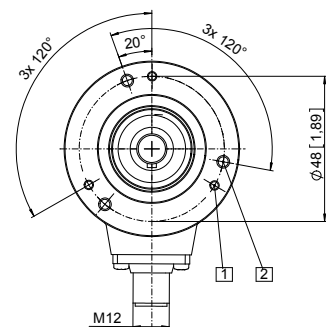
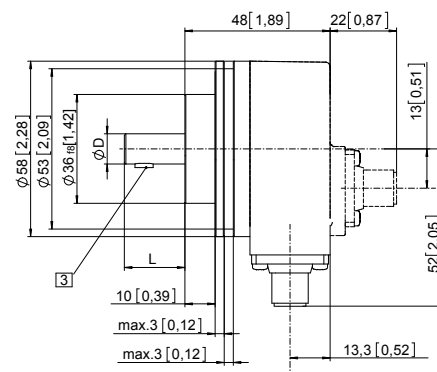
- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep
- 3 Feather key DIN 6885 - A - 3x3x6



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]

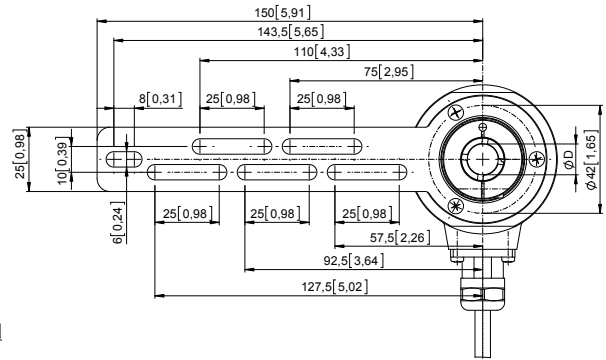
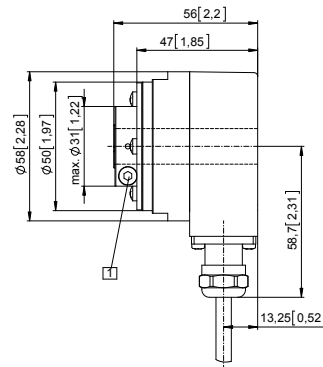
Flange with torque stop set, rigid

Flange type A

Through hollow shaft

(drawing with cable)

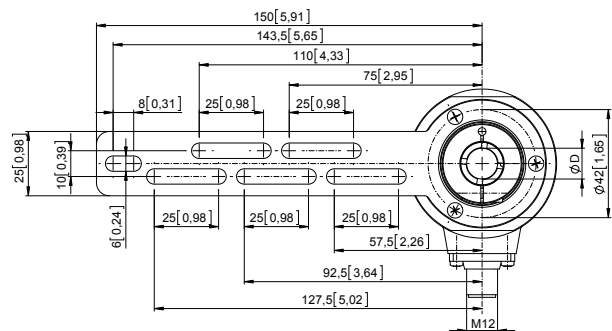
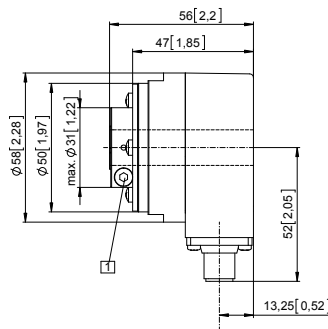
- 1 SW 3, recommended torque for the clamping ring 2.5 Nm



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

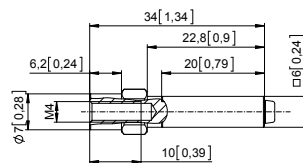
(drawing with M12 connector)

- 1 SW 3, recommended torque for the clamping ring 2.5 Nm



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

Torque pin with rectangular sleeve with M4 thread, 10 [0.39] deep



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Dimensions hollow shaft version

Dimensions in mm [inch]

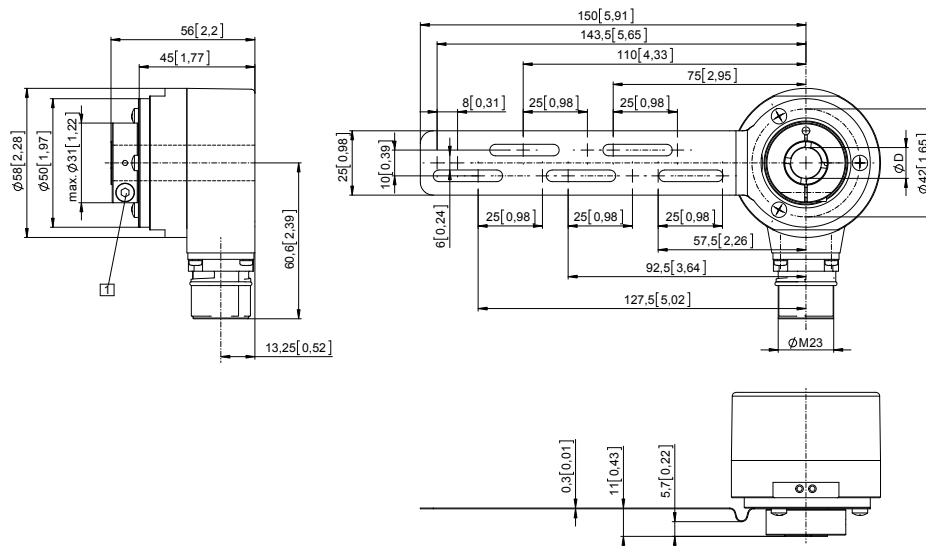
Flange with torque stop, flexible

Flange type 9

Through hollow shaft

(drawing with M23 connector)

- 1 SW 3, recommended torque for the clamping ring 2.5 Nm



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

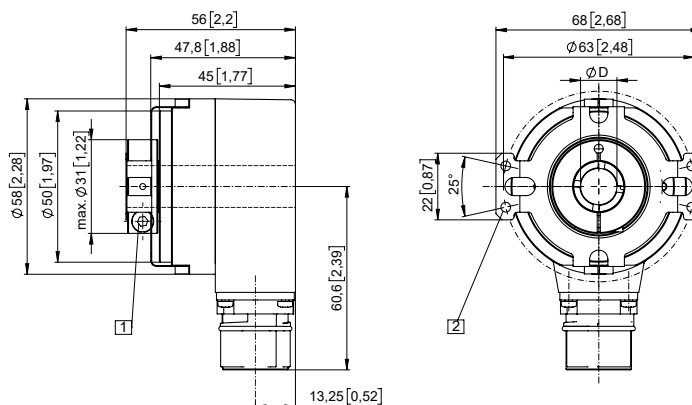
Flange with stator coupling, Ø 63 [2.48]

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

