

Incremental encoders

Standard
sine wave output, SIL2/PLd, optical

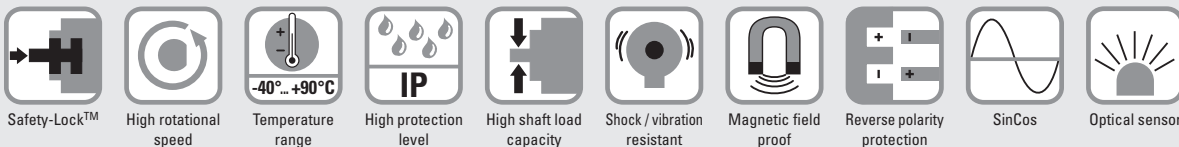
Sendix SIL 5814FS2 / 5834FS2 (shaft / hollow shaft)

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.



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

8.5814FS2
Type

1XXX.XXXX
a b c d e

If for each parameter of an encoder the underlined preferred option is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

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

Order code

8.5834FS2
Type

XXXX.XXXX
a b c d e

If for each parameter of an encoder the underlined preferred option is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

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 Hollow shaft

3 = ø 10 mm [0.39"]

4 = ø 12 mm [0.47"]

5 = ø 14 mm [0.55"]

K = ø 10 mm [0.39"], tapered shaft

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**

Optional on request

- Ex 2/22

(not for connection type E + F)

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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 – single-ended, 2 m [6.56'] PVC cable ¹⁾	05.00.6041.8211.002M
	M23 female connector with coupling nut – single-ended, 2 m [6.56'] PVC cable ¹⁾	8.0000.6901.0002
Connector, self-assembly (straight)	M12 female connector with coupling nut	05.CMB 8181-0
	M23 female connector with coupling nut	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	
Classification	PLd / SIL2
System structure	2 channel (Cat. 3 / HFT = 1)
PFH _d value ²⁾	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

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 ⁴⁾
UL approval	file 224618
CE compliant acc. to (up to April 19, 2016)	EMC guideline 2004/108/EC Machinery directive 2006/42/EC RoHS guideline 2011/65/EU
(as from April 20, 2016)	EMC guideline 2014/30/EU Machinery directive 2006/42/EC RoHS guideline 2011/65/EU

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] ³⁾	
Materials	
shaft / hollow shaft	stainless steel
flange	aluminium
housing	zinc die-cast
cable	PVC
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	

1) Other lengths available.

2) 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.

3) Cable version: -30°C ... + 90°C [-22°F ... +194°F] fixed installation.

4) Short circuit to 0 V or to output, one channel at a time, power supply correctly applied.

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EMC		SinCos interface	
Relevant standards	EN 55011 class B :2009 / A1:2010	Max. frequency -3dB	400 kHz
	EN 61000-6-3:2007 / A1:2011	Signal level	1 V _{pp} (±10 %)
	EN 61000-6-2:2005	Short circuit proof	yes ¹⁾
		Pulse rate	1024 / 2048 ppr

Terminal assignment

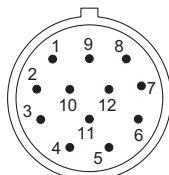
Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)							
1, 2	1, 2, A, B, E, F	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	$\perp$
		Cable colour:	WH	BN	GN	YE	GY	PK	shield
Output circuit	Type of connection	M23 connector, 12-pin							
1, 2	3, 4	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	$\perp$
		Pin:	10	12	5	6	8	1	PH ²⁾
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 ²⁾

+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) Short circuit to 0 V or to output, one channel at a time, power supply correctly applied.
 2) PH = shield is attached to connector housing.

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Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, $\varnothing 58$ [2.28]

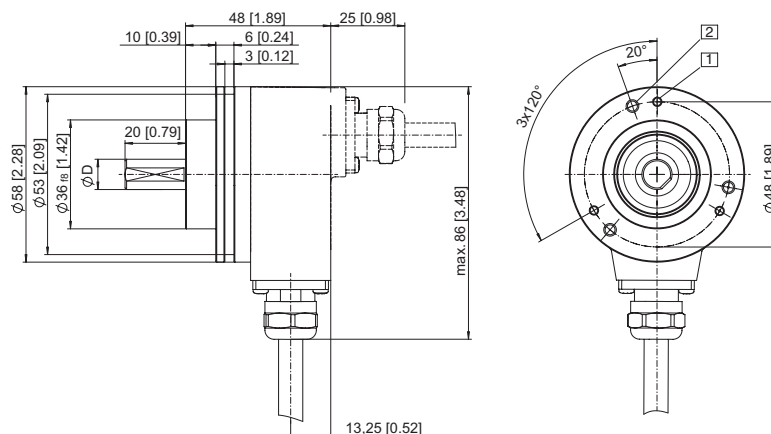
Flange type 1 with shaft type 2

(drawing with cable)

1 3 x M3, 6 [0.24] deep

2 3 x M4, 8 [0.32] deep

D = 10¹⁷ [0.39]



Clamping flange, $\varnothing 58$ [2.28]

Flange type 1 with shaft type A

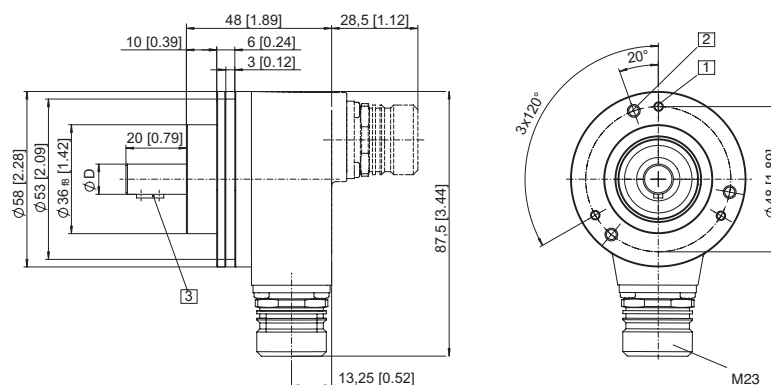
(drawing with M23 connector)

1 3 x M3, 6 [0.24] deep

2 3 x M4, 8 [0.32] deep

3 Feather key DIN 6885 - A - 3x3x6

D = 10¹⁷ [0.39]



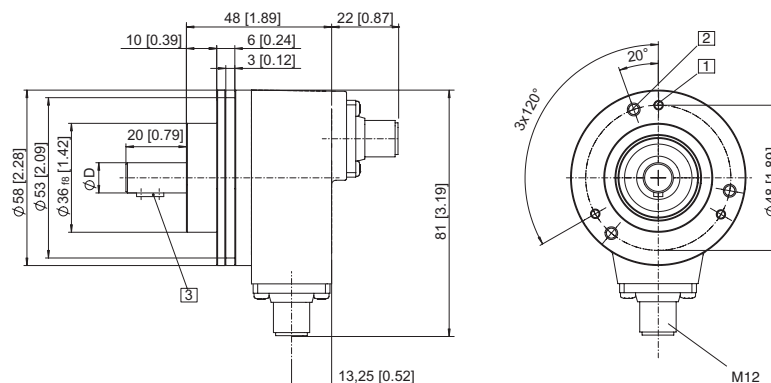
(drawing with M12 connector)

1 3 x M3, 6 [0.24] deep

2 3 x M4, 8 [0.32] deep

3 Feather key DIN 6885 - A - 3x3x6

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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with torque stop set, rigid

Flange type A

Through hollow shaft

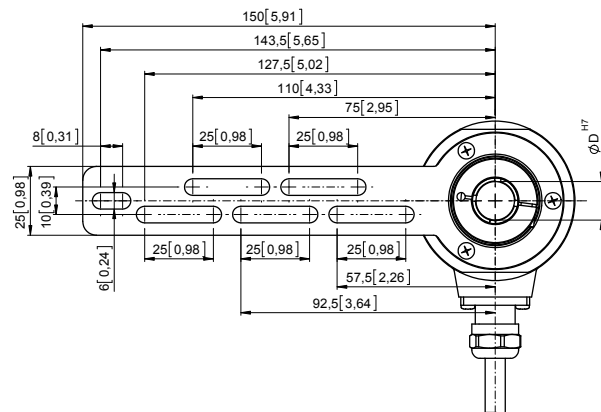
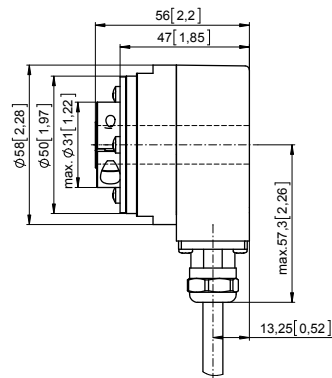
(drawing with cable)

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

$$D = 0.10^{H7} [0.39]$$

Ø 12^{H7} [0.47]

Ø 14^{H7} [0.55]



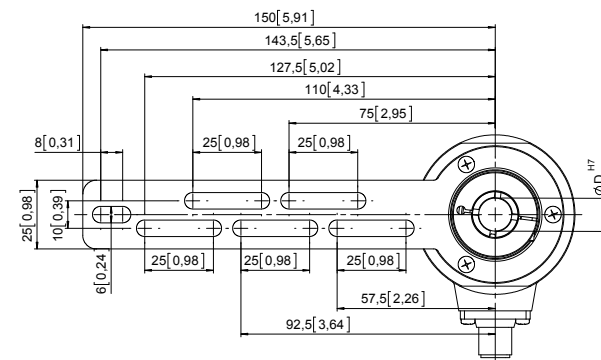
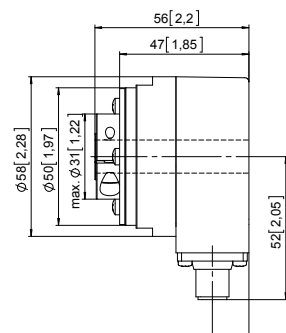
(drawing with M12 connector)

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

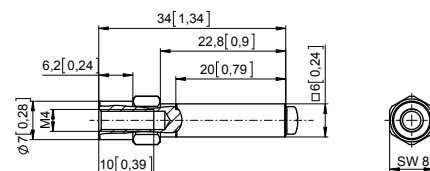
$$D = \varnothing 10^{H7} [0.39]$$

Ø 12^{H7} [0.47]

Ø 14^{H7} [0.55]



Torque pin with rectangular sleeve
with M4 thread



Flange with torque stop, flexible

Flange type 9

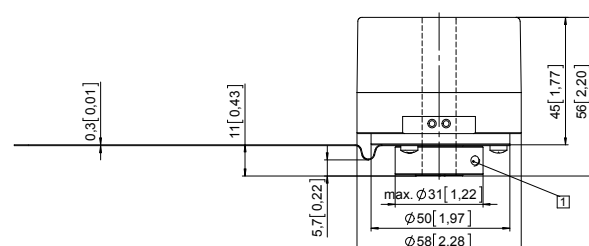
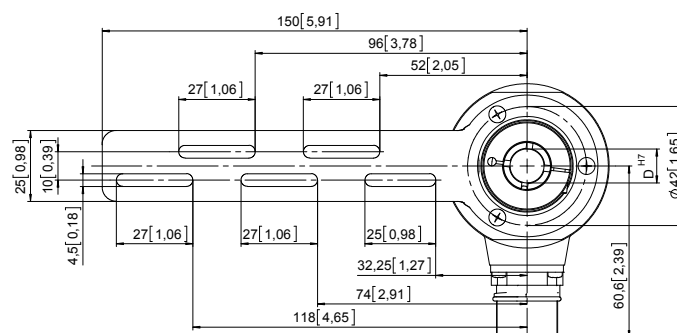
Through hollow shaft

(drawing with M23 connector)

- 1** Recommended torque for the clamping ring 2.5 Nm

$$D = \varnothing 10^{H7} [0.39]$$
 $\emptyset 12^{H7} [0.47]$

Ø 14^{H7} [0.55]



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SinCos

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with stator coupling, ø 63 [2.48]

Flange type B

Through hollow shaft

(drawing with M23 connector)

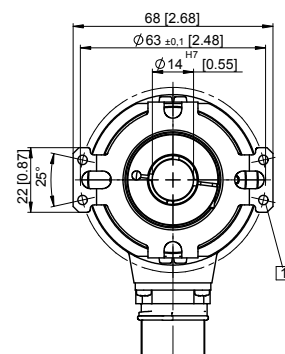
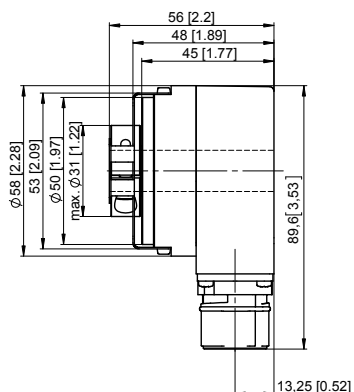
- 1 SW 3,
recommended torque for the
clamping ring 2.5 Nm

- 2 For (4x) M3 screw

D = ø 10^{H7} [0.39]

ø 12^{H7} [0.47]

ø 14^{H7} [0.55]



Flange with stator coupling, ø 63 [2.48]

Flange type B

Tapered shaft

(drawing with tangential cable outlet)

- 1 For (4x) M3 screw

- 2 Status LED

- 3 SET button

- 4 SW 4

