

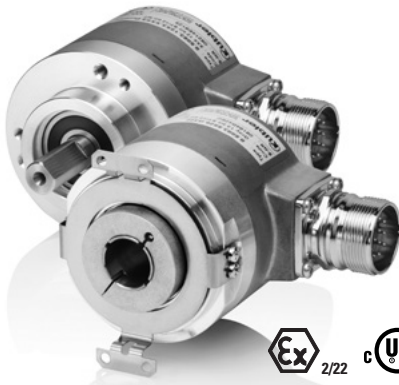
Incremental Encoders

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 according 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



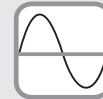
Shock / vibration resistant



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 . 1XXX . XXXX
Type 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

e Pulse rate

1024, 2048

d Type of connection

1 = axial cable, 1 m [3.28'] PVC

2 = radial cable, 1 m [3.28'] PVC

3 = M23 connector, 12 pin, axial

4 = M23 connector, 12 pin, radial

5 = M12 connector, 8 pin, axial

6 = M12 connector, 8 pin, radial

optional on request

- special cable length

- Ex 2/22

Order code Hollow shaft

8.5834FS2 . XXXX . XXXX
Type 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

e Pulse rate

1024, 2048

d Type of connection

2 = radial cable, 1 m [3.28'] PVC

E = tangential cable, 1 m [3.28'] PVC

4 = M23 connector, 12 pin, radial

6 = M12 connector, 8 pin, radial

optional on request

- special cable length

- Ex 2/22

Incremental Encoders

Standard Sine wave output, SIL2/PLd, optical		Sendix SIL 5814FS2 / 5834FS2 (Shaft / Hollow shaft)	SinCos
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 .		
Connection technology			Order No.
Cordset, pre-assembled	M12 female connector with coupling nut, 2 m [6.56'] PVC cable ¹⁾		05.00.6041.8211.002M
	M23 female connector with coupling nut, 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
	M23 female connector with coupling nut, Ex zone 2/22		8.0000.5012.0000.Ex

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.

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
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 (+V)	yes
Short circuit proof outputs	yes ⁴⁾
UL approval	File 224618
CE compliant acc. to	EMC guideline 2004/108/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

Mechanical characteristics		
Max. speed, shaft version	up to 70°C [158°F]	12 000 min ⁻¹ , 10 000 min ⁻¹ (continuous)
	up to T _{max}	8 000 min ⁻¹ , 5 000 min ⁻¹ (continuous)
Max. speed, hollow shaft version	up to 70°C [158°F]	9 000 min ⁻¹ , 6 000 min ⁻¹ (continuous)
	up to T _{max}	6 000 min ⁻¹ , 3 000 min ⁻¹ (continuous)
Starting torque – at 20°C [68°F]	shaft version	< 0.01 Nm
	hollow shaft version	< 0.03 Nm
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
EX approval for hazardous areas		optional zone 2 and 22
Working temperature range		-40°C ... +90°C [-40°F ... +194°F] ³⁾
Materials	shaft / hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
	cable	PVC
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

- 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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Standard	Sendix SIL 5814FS2 / 5834FS2 (Shaft / Hollow shaft)	SinCos
Sine wave output, SIL2/PLd, optical		

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

Terminal assignment

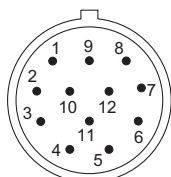
Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)							
1, 2	1, 2, E	Signal:	0 V	+V	A	\bar{A}	B	\bar{B}	\perp
		Cable colour:	WH	BN	GN	YE	GY	PK	shield
Output circuit	Type of connection	M23 connector, 12-pin							
1, 2	3, 4	Signal:	0 V	+V	A	\bar{A}	B	\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, supply voltage correctly applied
 2) PH = shield is attached to connector housing

Incremental Encoders

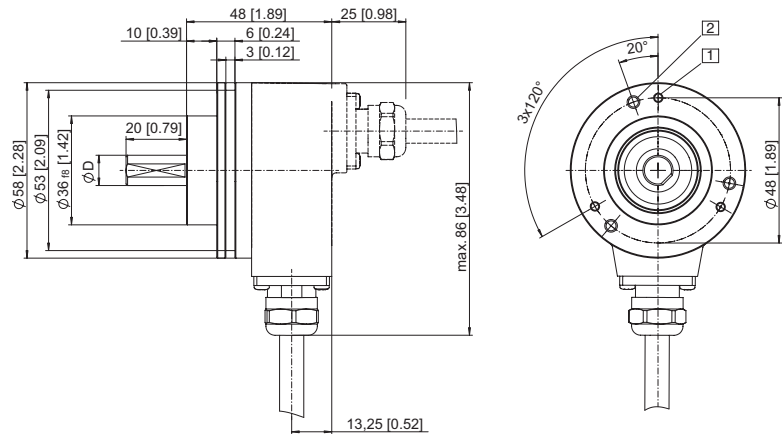
Standard Sine wave output, SIL2/PLd, optical	Sendix SIL 5814FS2 / 5834FS2 (Shaft / Hollow shaft)	SinCos
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Dimensions shaft version

Dimensions in mm [inch]

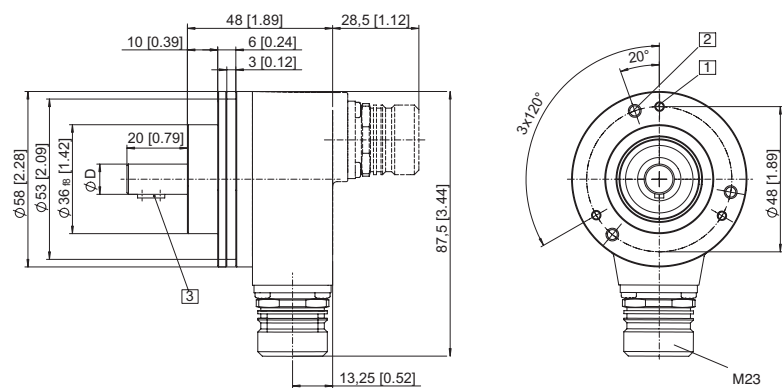
Clamping flange, \varnothing 58 [2.28]
Flange type 1 with shaft type 2
 (Drawing with cable)

- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep
- D = 10 ^{f7} [0.39]



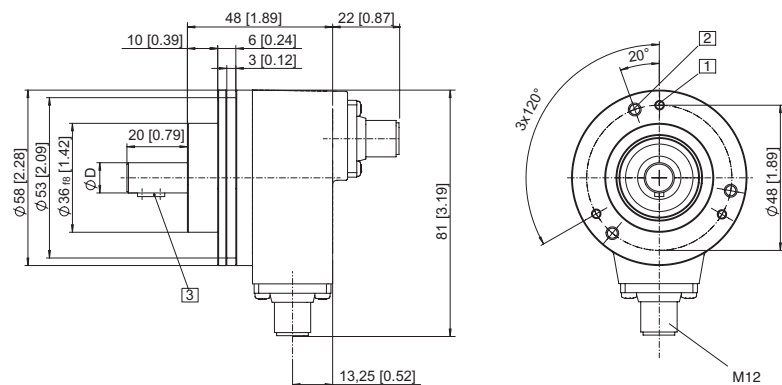
Clamping flange, \varnothing 58 [2.28]
Flange type 1 with shaft type A
 (Drawing with M23 connector)

- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep
- 3 Feather key DIN 6885 - A - 3x3x6
- D = 10 ^{h7} [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
- D = 10 mm ^{h7} [0.39]



Incremental Encoders

Standard
Sine wave output, SIL2/PLd, optical

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SinCos

Dimensions hollow shaft version

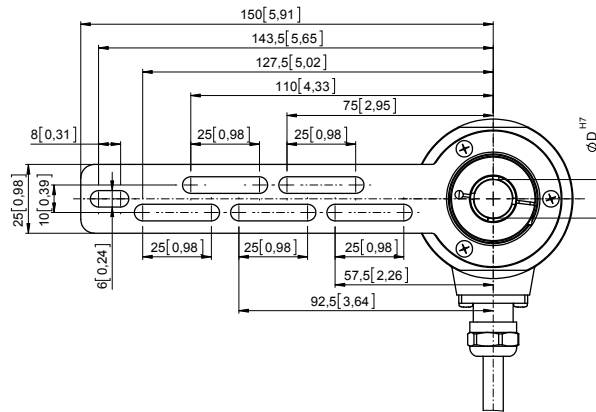
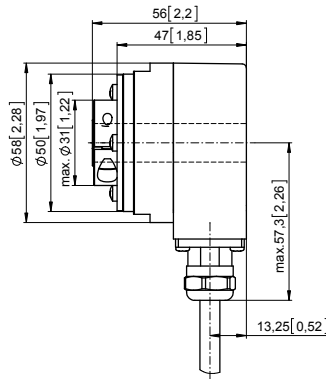
Dimensions in mm [inch]

Flange with torque stop set, rigid Flange type A

(Drawing with cable)

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

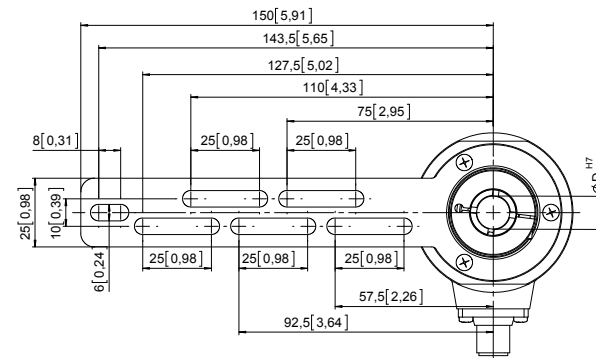
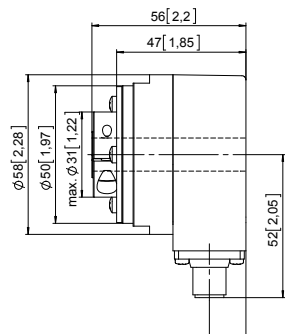
D = \varnothing 10^{H7} [0.39]
 \varnothing 12^{H7} [0.47]
 \varnothing 14^{H7} [0.55]



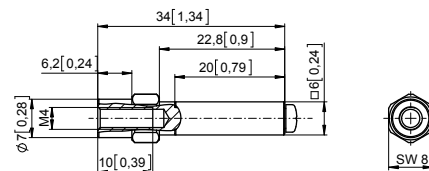
(Drawing with M12 connector)

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

D = \varnothing 10^{H7} [0.39]
 \varnothing 12^{H7} [0.47]
 \varnothing 14^{H7} [0.55]



Torque pin with rectangular sleeve with M4 thread

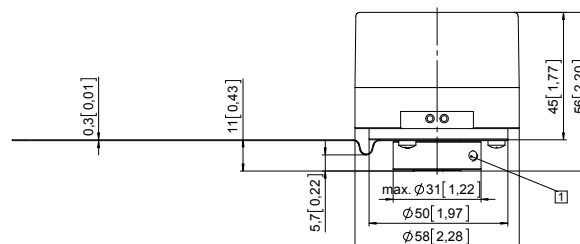
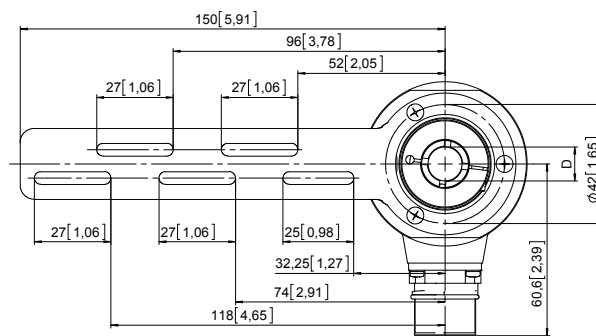


Flange with torque stop, flexible Flange type 9

(Drawing with M23 connector)

- 1 recommended torque for the clamping ring 2.5 Nm

D = \varnothing 10^{H7} [0.39]
 \varnothing 12^{H7} [0.47]
 \varnothing 14^{H7} [0.55]



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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with stator coupling, ø 63 [2.48] and hollow shaft

Flange type B

(Drawing with M23 connector)

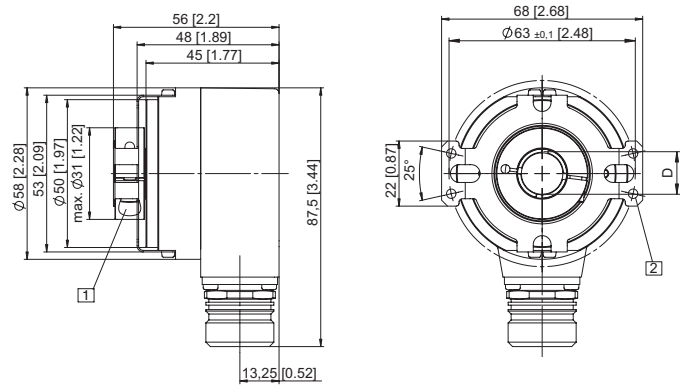
- 1 SW 3, recommended torque for the clamping ring 2.5 Nm

- 2 for (4x) M3 screw

D = ø 10^{H17} [0.39]

ø 12^{H17} [0.47]

ø 14^{H17} [0.55]



Incremental Encoders

Flange with stator coupling, ø 63 [2.48] and tapered shaft

Flange type B

(Drawing with tangential cable outlet)

- 1 for (4x) M3 screw

- 2 Status LED

- 3 SET button

- 4 SW 4

