Standard
sine wave output, SIL2/PLd, optical

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

SinCos



The incremental encoders 5814FS2 and 5834FS2 of the Sendix 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 -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 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	.	X	X	X	X	.	XXXX
Type		a	b	c	d		e

a *Flange*
1 = clamping flange, IP65, ø 58 mm [2.28"]
3 = clamping flange, IP67, 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 / supply voltage*
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)]
- surface protection salt spray

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

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Standard sine wave output, SIL2/PLd, optical	Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)	SinCos

Order code Hollow shaft

8.5834FS2	.	X	X	X	X	.	XXXX
Type		a	b	c	d		e

a *Flange*
9 = with torque stop FS, flexible, IP65
J = with torque stop FS, flexible, IP67
A = with torque stop FS, rigid, IP65 (incl. torque pin FS)
K = with torque stop FS, rigid, IP67 (incl. torque pin FS)
B = with stator coupling FS, ø 63 mm [2.48"], IP65
L = with stator coupling FS, ø 63 mm [2.48"], IP67

b *Through hollow shaft*
3 = ø 10 mm [0.39"]
4 = ø 12 mm [0.47"]
5 = ø 14 mm [0.55"]
Tapered shaft
K = ø 10 mm [0.39"]

c *Output circuit / supply voltage*
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) [1) 2)]
- surface protection salt spray [2)]

Accessories		Order no.
EMC shield terminal	for top-hat rail mounting	**8.0000.4G06.0312**
Screw retention	Loctite 243, 5 ml	**8.0000.4G05.0000**
Bellows coupling, safety-oriented	You will find an overview of our couplings for Sendix shaft encoders under kuebler.com/accessories.	
Safety modules Safety-M compact	You will find an overview of our systems and components for Functional Safety and the corresponding software under kuebler.com/safety.	

Cables and connectors		Order no.
Preassembled cables	M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PUR cable [3)]	**05.00.60E1.8211.002M**
	M12 female connector with coupling nut, 12-pin, cw single ended 2 m [6.56'] PVC cable [3)]	**8.0000.6901.0002**
Connectors	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)	**05.CMB 8181-0**
	M12 female connector with coupling nut, 12-pin, cw	**8.0000.5012.0000**

Further Kübler accessories can be found at: kuebler.com/accessories
Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

1) For the cable connection type, cable material PUR.
2) Not possible for flange type A and K.
3) Other lengths available.

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Standard
sine wave output, SIL2/PLd, optical | **Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)** | **SinCos**

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)
PFH$_d$ value [3]	2.16 x 10^{-8} h^{-1}
Mission time / Proof test interval	20 years
Relevant standards	EN ISO 13849-1:2015; EN ISO 13849-2:2012; EN 61800-5-2:2007

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, IP67
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, 5 ... 2000 Hz

Electrical characteristics

Supply voltage		5 V DC (±5 %) or 10 ... 30 V DC
Power consumption	5 V DC	max. 70 mA
(no load)	10 ... 30 V DC	max. 45 mA
Reverse polarity protection of the supply voltage		yes
Short circuit proof outputs		yes [2]

EMC

Relevant standards	EN 55011 class B:2009 / A1:2010 EN 61326-1:2013 EN 61326-3-1:2008

SinCos interface

Max. frequency -3dB	400 kHz
Signal level	1 Vpp (±10 %)
Short circuit proof	yes [2]
Pulse rate	1024 / 2048 ppr

Approvals

UL compliant in accordance with	File no. E224618
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU
ATEX Directive	2014/34/EU (for Ex 2/22 variants)
Machinery Directive	2006/42/EG
UKCA compliant in accordance with	
EMC Regulations	S.I. 2016/1091
RoHS Regulations	S.I. 2012/3032
UKEX Regulations	S.I. 2016/1107 (for Ex 2/22 variants)
Machinery (Safety) Regulations	S.I. 2008/1597

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, supply voltage correctly applied.
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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Standard
sine wave output, SIL2/PLd, optical | **Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)** | **SinCos**

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	$\overline{A}$	B	$\overline{B}$	⏚
		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	$\overline{A}$	B	$\overline{B}$	⏚
		Pin:	10	12	5	6	8	1	PH [1]

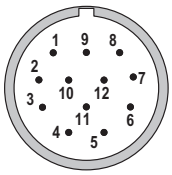
Output circuit	Type of connection	M12 connector, 8-pin							
1, 2	5, 6	Signal:	0 V	+V	A	$\overline{A}$	B	$\overline{B}$	⏚
		Pin:	1	2	3	4	5	6	PH [1]

+V: Supply voltage encoder +V DC
0 V: Supply voltage encoder ground GND (0 V)
A, $\overline{A}$: Cosine signal
B, $\overline{B}$: Sine signal
PH ⏚: Plug connector housing (shield)

Top view of mating side, male contact base



M12 connector, 8-pin



M23 connector, 12-pin

1) PH = shield is attached to connector housing.

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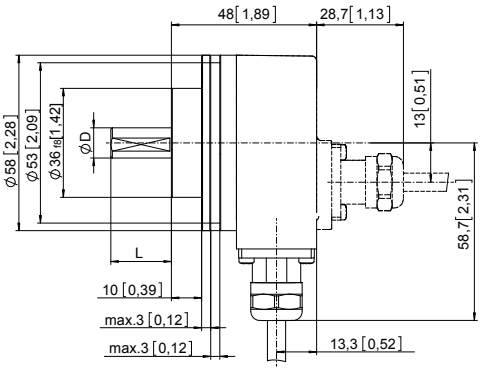
Standard
sine wave output, SIL2/PLd, optical | **Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)** | **SinCos**

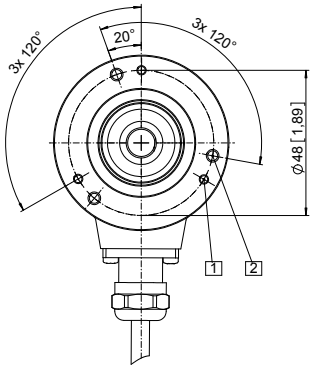
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 58 [2.28]
Flange type 1 + 3 with shaft type 2
(drawing with cable)

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

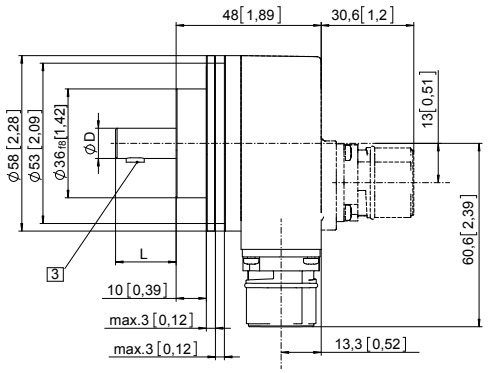


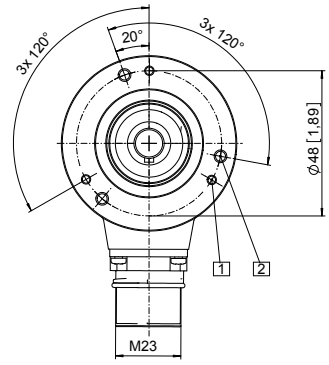


D	Fit	L
10 [0.39]	f7	20 [0.79]

Clamping flange, ø 58 [2.28]
Flange type 1 + 3 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

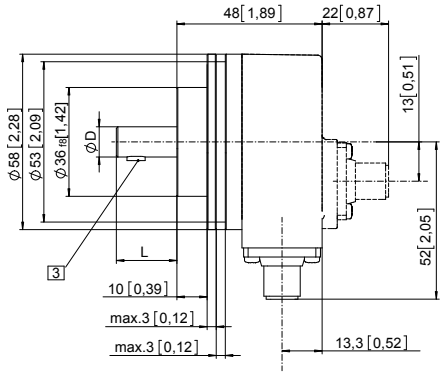


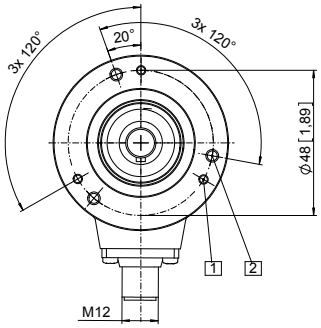


D	Fit	L
10 [0.39]	f7	20 [0.79]

(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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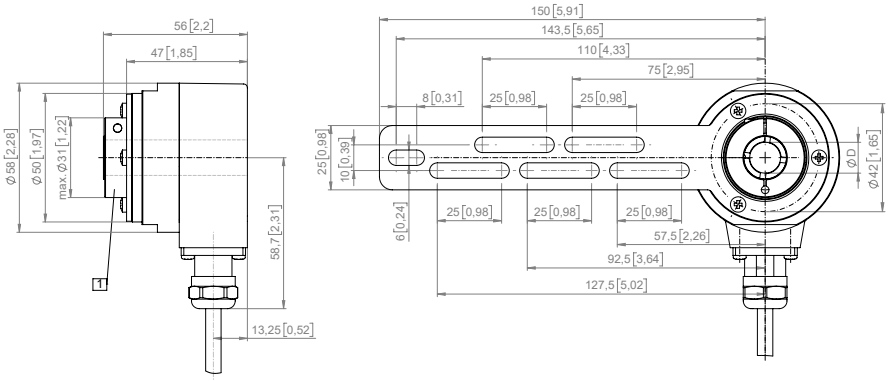
Standard
sine wave output, SIL2/PLd, optical | **Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)** | **SinCos**

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with torque stop FS, rigid
Flange type A + K
Through hollow shaft
(drawing with cable)

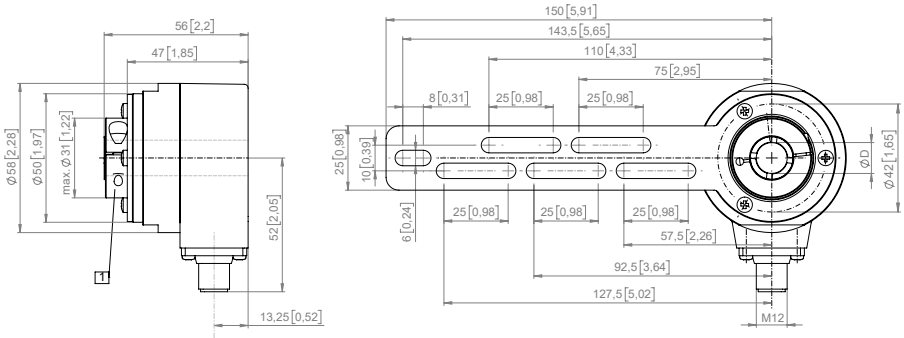
1 SW 3, recommended torque for the clamping ring 2.5 Nm



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

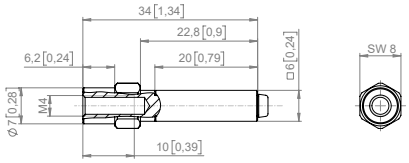
(drawing with M12 connector)

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 FS
with rectangular sleeve and M4 thread
(included in scope of delivery)



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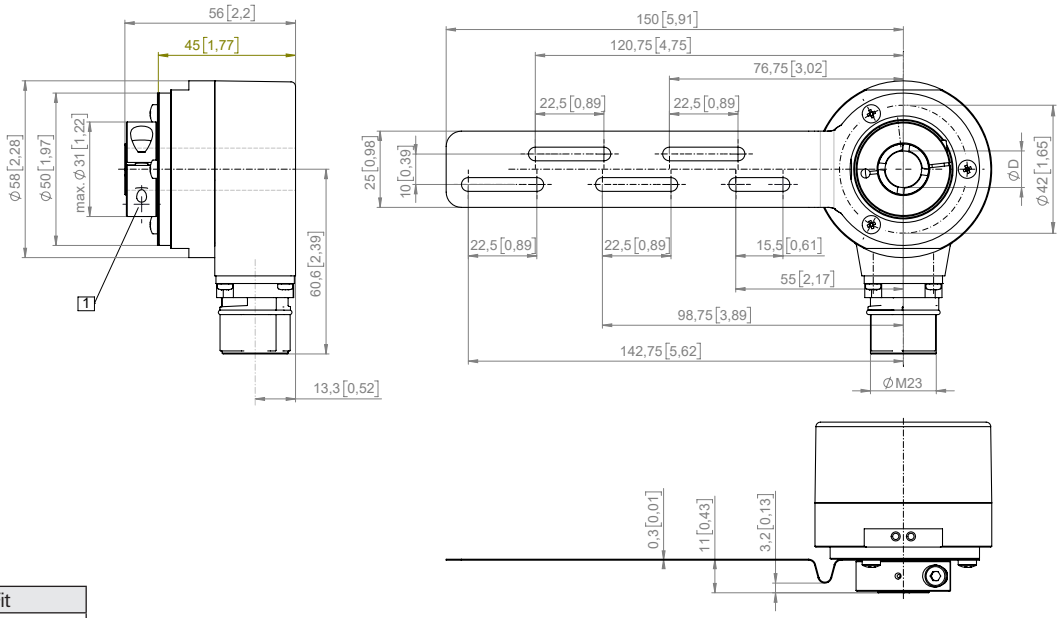
Standard
sine wave output, SIL2/PLd, optical | **Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)** | **SinCos**

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with torque stop FS, flexible
Flange type 9 + J
Through hollow shaft
(drawing with M23 connector)

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

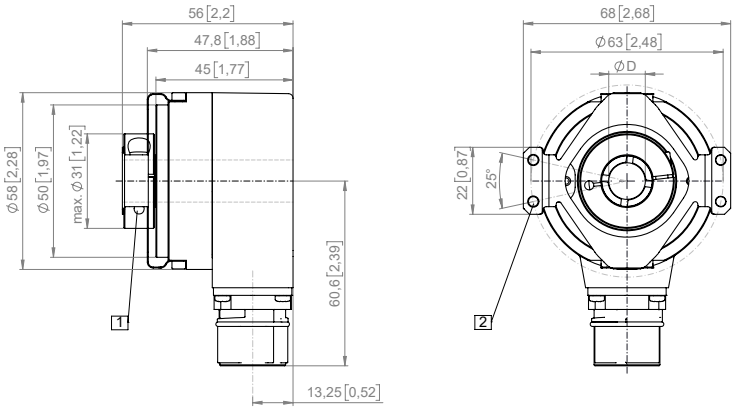


D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7

Flange with stator coupling FS, ø 63 [2.48]
Flange type B + L
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

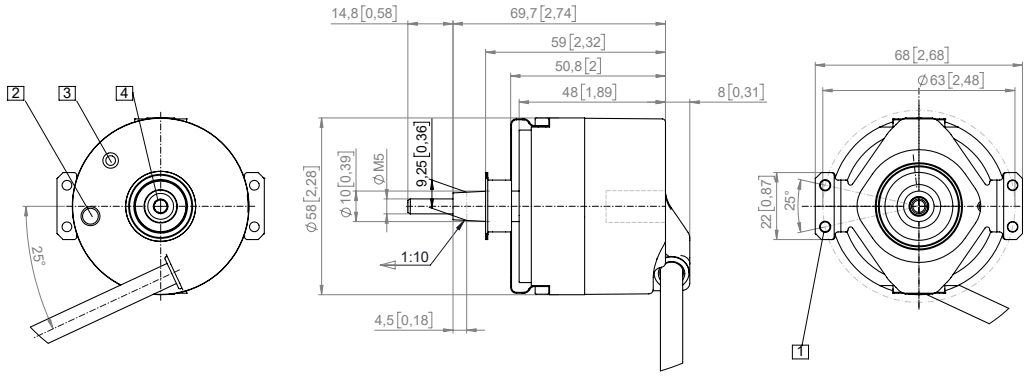
Standard
sine wave output, SIL2/PLd, optical | **Sendix 5814FS2 / 5834FS2 (shaft / hollow shaft)** | **SinCos**

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with stator coupling FS, ø 63 [2.48]
Flange type B + L
Tapered shaft
(drawing with tangential cable outlet)

1 For (4x) M3 screw
2 Status-LED
3 SET button
4 Recommended torque for central screw M5 (SW 4) 3.0 $^{+0.5}$ Nm (tapered shaft)



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