Standard
Sine wave output, SIL3/PLe, optical

Sendix SIL 5814FS3 / 5834FS3 (Shaft / Hollow shaft) | **SinCos**

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 | 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 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 Shaft version

8.5814FS3	.	1	X	X	X	.	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.

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
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

e *Pulse rate*
1024, **2048**

optional on request
- special cable length
- Ex 2/22

Order code Hollow shaft

8.5834FS3	.	X	X	X	X	.	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.

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
E = tangential cable, 1 m [3.28'] PVC
4 = M23 connector, 12 pin, radial
6 = M12 connector, 8 pin, radial

e *Pulse rate*
1024, **2048**

optional on request
- special cable length
- Ex 2/22

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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 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.

Safety characteristics

Classification	PLe / SIL3
System structure	2 channel (Cat. 4 / HFT = 1)
PFH_d value [2]	1.09×10^{-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 intertia		
	shaft version	4.0×10^{-6} kgm^2
	hollow shaft version	7.0×10^{-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 99 %, that must be achieved with an encoder evaluation unit.
The encoder evaluation unit must meet at least the requirements for SIL3.
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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SinCos interface	
Max. frequency -3dB	400 kHz
Signal level	1 Vpp (±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	$\overline{A}$	B	$\overline{B}$	⏚
		Cable colour:	WH	BN	GN	YE	GY	PK	shield

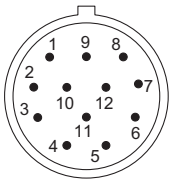
Output circuit	Type of connection	M23 connector, 12-pin							
1, 2	3, 4	Signal:	0 V	+V	A	$\overline{A}$	B	$\overline{B}$	⏚
		Pin:	10	12	5	6	8	1	PH [2]

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

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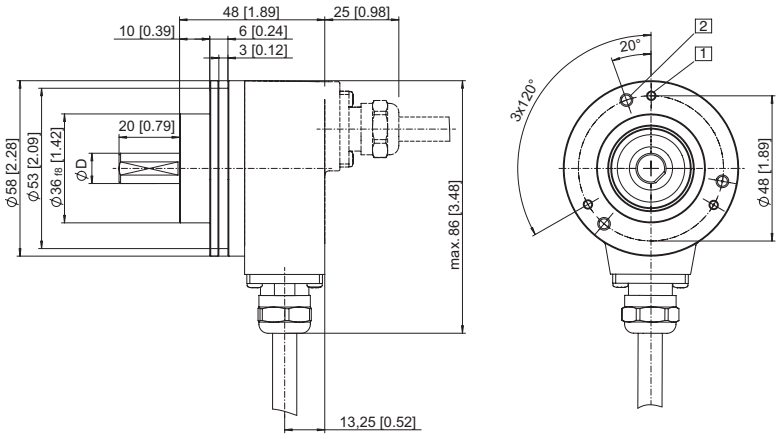
Dimensions shaft version

Dimensions in mm [inch]

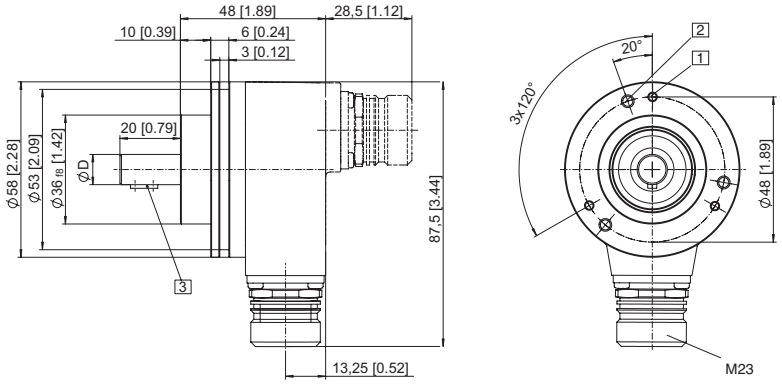
Clamping flange, ø 58 [2.28]
Flange type 1 with shaft type 2
(Drawing with cable)

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



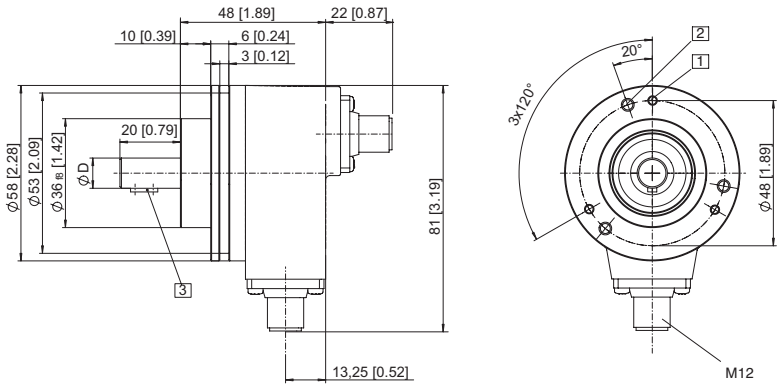
Clamping flange, ø 58 [2.28]
Flange type 1 with shaft type A
(Drawing with M23 connector)

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



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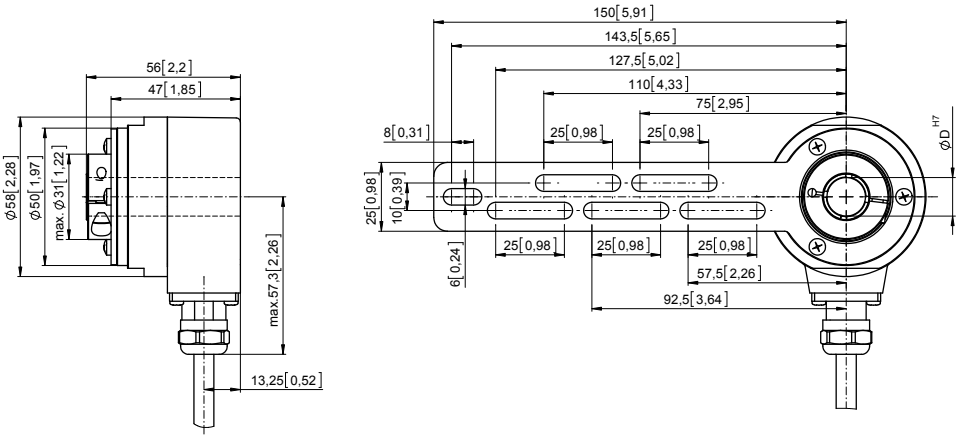
Dimensions hollow shaft version

Dimensions in mm [inch]

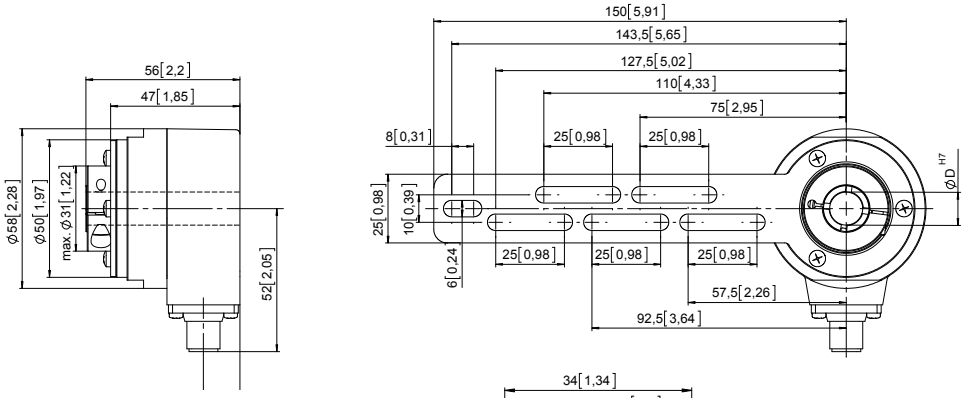
Flange with torque stop set, rigid
Flange type A
(Drawing with cable)

1 SW 3,
recommended torque for the clamping ring 2.5 Nm
D = ø 10 H7 [0.39]
ø 12 H7 [0.47]
ø 14 H7 [0.55]

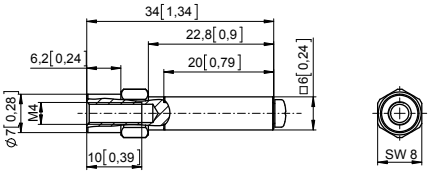


(Drawing with M12 connector)

1 SW 3,
recommended torque for the clamping ring 2.5 Nm
D = ø 10 H7 [0.39]
ø 12 H7 [0.47]
ø 14 H7 [0.55]

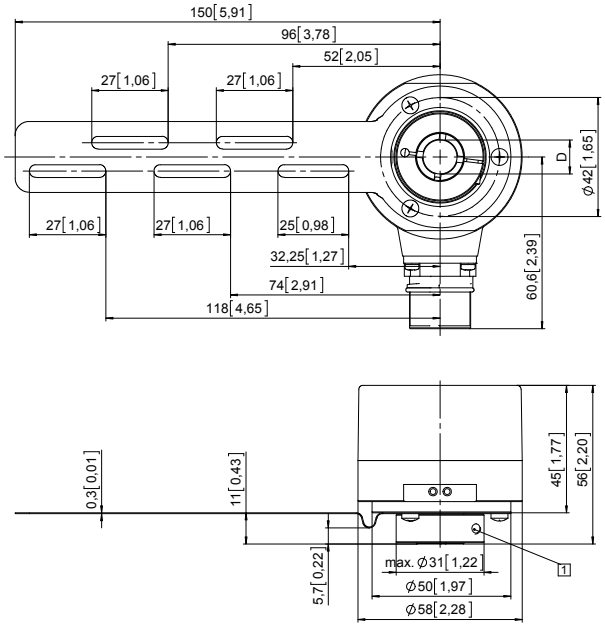


Torque pin with rectangular sleeve with M4 thread



Flange with torque stop, flexible
Flange type 9
(Drawing with M23 connector)

1 recommended torque for the clamping ring 2.5 Nm
D = ø 10 H7 [0.39]
ø 12 H7 [0.47]
ø 14 H7 [0.55]



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Dimensions hollow shaft version

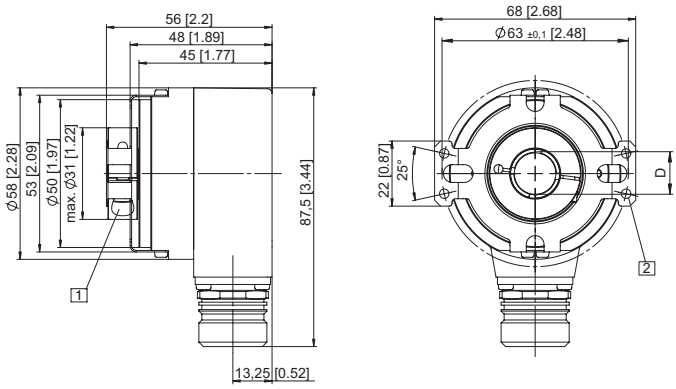
Dimensions in mm [inch]

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 H7 [0.39]
ø 12 H7 [0.47]
ø 14 H7 [0.55]



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