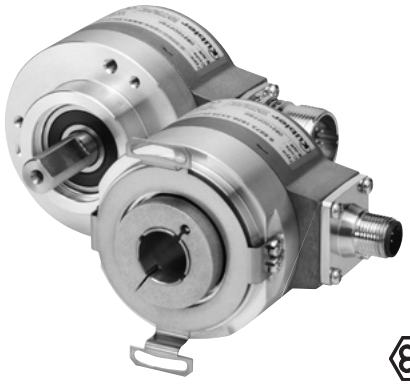
Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**



The Sendix 5853 and Sendix 5873 singleturn encoders with SSI or BiSS-C interface and optical sensor technology can achieve a resolution of max. 17 bits.

These encoders are also available with an optional SinCos output or RS422 incremental track.

Special version for attachment to direct drives in the lift technology.

Safety-Lock™ | Temperature range (-40°... +90°C) | High protection level (IP) | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | SinCos | Optical sensor | Seawater-resistant version on request

Reliable and insensitive

- Sturdy bearing construction in Safety-Lock™ Design for resistance against vibration and installation errors
- Ideal for use outdoors thanks to IP67 protection and wide temperature range from -40°C up to +90°C

Versatile

- High-precision with a data refresh rate of the position value ≤ 1µs
- High-resolution feedback in real-time via incremental outputs SinCos and RS422
- Short control cycles, clock rate with SSI up to 2 MHz / with BiSS-C up to 10 MHz

Order code Shaft version

8.5853	.	X	X	X	X	.	X	X	2	X
Type		a	b	c	d		e	f	g	h

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"]
3 = clamping flange, IP67 ø 58 mm [2.28"]
2 = synchro flange, IP65 ø 58 mm [2.28"]
4 = synchro flange, IP67 ø 58 mm [2.28"]
5 = square flange, IP65 □63.5 mm [2.5"]
7 = square flange, IP67 □63.5 mm [2.5"]

b *Shaft (ø x L), with flat*
1 = 6 x 10 mm [0.24 x 0.39"] [1]
2 = 10 x 20 mm [0.39 x 0.79"] [2]
3 = 1/4" x 7/8"
4 = 3/8" x 7/8"

c *Interface / Power supply*
1 = SSI or BiSS-C / 5 V DC
2 = SSI or BiSS-C / 10 … 30 V DC
3 = SSI or BiSS-C, 2048 ppr SinCos / 5 V DC
4 = SSI or BiSS-C, 2048 ppr SinCos / 10 ... 30 V DC
5 = SSI or BiSS-C / 5 V DC, with sensor output for monitoring the voltage on the encoder
6 = SSI or BiSS-C, 2048 ppr SinCos / 5 V DC, with sensor output for monitoring the voltage on the encoder
7 = SSI or BiSS-C and 2048 ppr incremental signals RS422 (TTL-comp.) / 5 V DC
8 = SSI or BiSS-C and 2048 ppr incremental signals RS422 (TTL-comp.) / 10 ... 30 V DC
9 = SSI or BiSS-C and 2048 ppr incremental signals RS422 (TTL-comp.) / 5 V DC, with sensor output for monitoring the voltage on the encoder

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 [3]
6 = M12 connector, 8-pin, radial [3]

e *Code*
B = SSI, Binary
C = BiSS-C, Binary
G = SSI, Gray

f *Resolution* [4]
A = 10 bit ST
1 = 11 bit ST
2 = 12 bit ST
3 = 13 bit ST
4 = 14 bit ST
7 = 17 bit ST

g *Inputs / Outputs* [4]
2 = SET, DIR input
additional status output

h *Options (Service)*
1 = no option
2 = Status LED
3 = SET button and Status LED

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

1) Preferred type only in conjunction with flange type 2
2) Preferred type only in conjunction with flange type 1
3) Can be combined only with interface 1 and 2
4) Resolution, preset value and counting direction factory-programmable

Absolute Encoders - Singleturn

Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**

Order code Hollow shaft

8.5873 . X X X X . X X 2 X
Type
a b c d e f g h

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 = with spring element long, IP65
2 = with spring element long, IP67
3 = with stator coupling, IP65 ø 65 mm [2.56"]
4 = with stator coupling, IP67 ø 65 mm [2.56"]
5 = with stator coupling, IP65 ø 63 mm [2.48"]
6 = with stator coupling, IP67 ø 63 mm [2.48"]
E = with stator coupling, IP65 mounting without screws [1]
F = with stator coupling, IP67 mounting without screws [1]
G = with stator coupling, IP65 ø 72 mm [2.83"] [1]

b *Hollow shaft*
3 = ø 10 mm [0.39"]
K = ø 10 mm [0.39"], with tapered shaft
4 = ø 12 mm [0.47"]
5 = ø 14 mm [0.55"]
6 = ø 15 mm [0.59"]
8 = ø 3/8"
9 = ø 1/2"

c *Interface / Power supply*
1 = SSI or BiSS-C / 5 V DC
2 = SSI or BiSS-C / 10 … 30 V DC
3 = SSI or BiSS-C, 2048 ppr SinCos / 5 V DC
4 = SSI or BiSS-C, 2048 ppr SinCos / 10 ... 30 V DC
5 = SSI or BiSS-C / 5 V DC, with sensor output for monitoring the voltage on the encoder
6 = SSI or BiSS-C, 2048 ppr SinCos / 5 V DC, with sensor output for monitoring the voltage on the encoder
7 = SSI or BiSS-C and 2048 ppr incremental signals RS422 (TTL-comp.) / 5 V DC
8 = SSI or BiSS-C and 2048 ppr incremental signals RS422 (TTL-comp.) / 10 ... 30 V DC
9 = SSI or BiSS-C and 2048 ppr incremental signals RS422 (TTL-comp.) / 5 V DC, with sensor output for monitoring the voltage on the encoder

d *Type of connection*
2 = radial cable, 1 m [3.28'] PVC
4 = M23 connector, 12-pin, radial
6 = M12 connector, 8-pin, radial [2]
E = tangential cable, 1 m [3.28'] PVC

e *Code*
B = SSI, Binary
C = BiSS-C, Binary
G = SSI, Gray

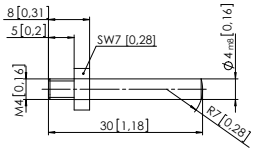
f *Resolution* [3]
A = 10 bit ST
1 = 11 bit ST
2 = 12 bit ST
3 = 13 bit ST
4 = 14 bit ST
7 = 17 bit ST

g *Inputs / Outputs* [3]
2 = SET, DIR input
additional status output

h *Options (Service)*
1 = no option
2 = Status LED
3 = SET button and Status LED

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

Mounting accessory for shaft encoders		Order No.
Coupling	Bellows coupling ø 19 mm [0.75"] for shaft 6 mm [0.24"]	**8.0000.1101.0606**
	Bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]	**8.0000.1101.1010**
Mounting accessory for hollow shaft encoders		
Cylindrical pin, long for torque stops	With fixing thread	**8.0010.4700.0000**
Connection technology		
Connector, self-assembly (straight)	M12 female connector with coupling nut	**05.CMB 8181-0**
	M23 female connector with coupling nut	**8.0000.5012.0000**
Cordset, pre-assembled	M12 female connector with coupling nut, 2 m [6.56'] PVC cable	**05.00.6041.8211.002M**
	M23 female connector with coupling nut, 2 m [6.56'] PVC cable	**8.0000.6901.0002.0031**



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

1) Can be combined only with shaft K and type of connection E
2) Can be combined only with interface 1 and 2
3) Resolution, preset value and counting direction factory-programmable

Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**

Technical data

Mechanical characteristics

Max. speed, shaft version	IP65 up to 70°C [158°F]	12 000 min^{-1}, 10 000 min^{-1} (continuous)
	IP65 up to T_{max}	8 000 min^{-1}, 5 000 min^{-1} (continuous)
	IP67 up to 70°C [158°F]	11 000 min^{-1}, 9 000 min^{-1} (continuous)
	IP67 up to T_{max}	8 000 min^{-1}, 5 000 min^{-1} (continuous)
Max. speed, hollow shaft version	IP65 up to 70°C [158°F]	9 000 min^{-1}, 6 000 min^{-1} (continuous)
	IP65 up to T_{max}	6 000 min^{-1}, 3 000 min^{-1} (continuous)
	IP67 up to 70°C [158°F]	8 000 min^{-1}, 4 000 min^{-1} (continuous)
	IP67 up to T_{max}	4 000 min^{-1}, 2 000 min^{-1} (continuous)
Starting torque at 20°C [68°F]	IP65	< 0.01 Nm
	IP67	< 0.05 Nm
Moment of inertia	shaft version	3.0 x 10^{-6} kgm^2
	hollow shaft version	6.0 x 10^{-6} kgm^2
Load capacity of shaft	radial	80 N
	axial	40 N
Weight		approx. 0.35 kg [12.35 oz]
Protection acc. to EN 60529		
	housing side	IP67
	shaft side	IP65, opt. IP67
EX approval for hazardous areas		optional Zone 2 and 22
Working temperature range		-40°C ... +90°C [1]
		[-40°F ... +194°F] [1]
Materials	shaft/hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
	cable	PVC
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

Electrical characteristics

Power supply		5 V DC + 5% or 10 ... 30 V DC
Current 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 [2]
UL approval		File 224618
CE compliant acc. to		EMC guideline 2004/108/EC
RoHS compliant acc. to		guideline 2011/65/EU

SSI interface

Output driver		RS485 transceiver type
Permissible load / channel		max. 20 mA
Signal level	HIGH	typ. 3.8 V
	LOW at I_{Load} = 20 mA	typ. 1.3 V
Singleturn resolution		10…14 bit and 17 bit [3]
Code		Binary or Gray
SSI clock rate		50 kHz ... 2 MHz
Monoflop time		≤ 15 µs

Note: If the clock starts cycling within the monoflop time, a second data transfer starts with the same data. If the clock starts cycling after the monoflop time, the data transfer starts with the new values. The update rate is dependent on the clock speed, data length and monoflop-time.

Data refresh rate	resolution ≤ 14 bit	≤ 1 µs
	resolution ≥ 15 bit	4 µs
Status and parity bit		on request

BiSS-C interface

Singleturn resolution	10…14 bit and 17 bit [3]
Code	Binary
Clock rate	50 kHz ... 10 MHz
Max. update rate	< 10 µs, depends on the clock rate and the data length
Data refresh rate	≤ 1 µs

Note:
- Bidirectional, factory programmable parameters are: resolution, code, direction, alarms and warnings
- CRC data verification

SET input or SET button

Input		active HIGH
Input type		comparator
Signal level	HIGH	min: 60 % of +V (power supply) max: +V
	LOW	max: 25 % of +V (power supply)
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Timeout after SET signal		14 ms
Response time (DIR input)		1 ms

The encoder can be set to zero at any position by means of a HIGH signal on the SET input or by pressing the optional SET button (with a pencil, ball-point pen or similar).
Other preset values can be factory-programmed. The SET input has a signal processing time of approx. 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approx. 15 ms before the new position data can be read. During this time the status output is at LOW.

Option incremental outputs (A/B), 2048 ppr

	SinCos	**RS422 TTL-compatible**
Max. frequency -3dB	400 kHz	400 kHz
Signal level	1 Vpp (± 20%)	HIGH: min. 2.5 V LOW: max. 0.5 V
Short circuit proof	yes	yes

Status output and LED

Output driver		Open Collector, internal pull up resistor 22 kOhm
Permissible load		max. 20 mA
Signal level	HIGH	+V
	LOW	< 1 V
Active		LOW

The optional LED (red) and the status output serve to display various alarm or error messages. In normal operation the LED is OFF and the status output is HIGH (Open Collector with int. pull-up 22k).

An active status output (LOW) displays:
- Sensor error, singleturn or multiturn (soiling, glass breakage etc.)
- LED fault (failure or ageing)
- over- or under-temperature

In the SSI mode, the fault indication can only be reset by switching off the power supply to the device.

1) Cable version: -30°C ... +75°C [-22°F ... +167°F]
2) Short circuit to 0V or to output, one channel at a time, power supply correctly applied
3) Other options on request

Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**

DIR input

A HIGH signal switches the direction of rotation from the default CW to CCW. This function can also be factory-programmed to be inverted. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The LED will come ON and the status output will switch to LOW.

Power-ON delay

After Power-ON the encoder requires a time of approx. 150 ms before valid data can be read.

Terminal assignment

Interface	Type of connection	Features	Cable (Isolate unused wires individually before initial start-up)													
1, 2	1, 2, E	SET, DIR, Status	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	Stat	N/C	N/C	N/C	⏚
			Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	-	-	-	shield

Interface	Type of connection	Features	M23 connector													
1, 2	3, 4	SET, DIR, Status	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	Stat	N/C	N/C	N/C	⏚
			Pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH

Interface	Type of connection	Features	Cable (Isolate unused wires individually before initial start-up)													
5	1, 2, E	SET, DIR, Status sensor output	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	Stat	N/C	0 Vsens	+Vsens	⏚
			Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	-	GY-PK	RD-BU	shield

Interface	Type of connection	Features	M23 connector													
5	3, 4	SET, DIR, Status sensor output	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	Stat	N/C	0 Vsens	+Vsens	⏚
			Pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH

Interface	Type of connection	Features	Cable (Isolate unused wires individually before initial start-up)													
3, 4, 7, 8	1, 2, E	SET, DIR, SinCos or incr. RS422	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	A	$\overline{A}$	B	$\overline{B}$	⏚
			Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY-PK	RD-BU	shield

Interface	Type of connection	Features	M23 connector													
3, 4, 7, 8	3, 4	SET, DIR, SinCos or incr. RS422	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	A	$\overline{A}$	B	$\overline{B}$	⏚
			Pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH

Interface	Type of connection	Features	Cable (Isolate unused wires individually before initial start-up)													
6, 9	1, 2, E	SinCos o. incr. RS422 sensor output	Signal:	0 V	+V	C+	C-	D+	D-	A	$\overline{A}$	B	$\overline{B}$	0 Vsens	+Vsens	⏚
			Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY-PK	RD-BU	shield

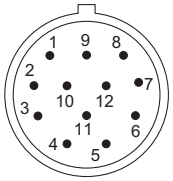
Interface	Type of connection	Features	M23 connector													
6, 9	3, 4	SinCos o. incr. RS422 sensor output	Signal:	0 V	+V	C+	C-	D+	D-	A	$\overline{A}$	B	$\overline{B}$	0 Vsens	+Vsens	⏚
			Pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH

Interface	Type of connection	Features	M12 connector										
1, 2	5, 6	SET, DIR	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	⏚	
			Pin:	1	2	3	4	5	6	7	8	PH	

+V: Encoder power supply +V DC
0 V: Encoder power supply ground GND (0 V)
0 V_{sens} / +V_{sens}: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
A, $\overline{A}$: Incremental output channel A (cosine)
B, $\overline{B}$: Incremental output channel B (sine)
C+, C-: Clock signal
D+, D-: Data signal
SET: Set input. The current position becomes defined as position zero.
DIR: Direction input: If this input is active, output values are counted backwards (decrease) when the shaft is turning clockwise.
Stat: Status output
PH ⏚: Plug connector housing (Shield)

Top view of mating side, male contact base

M12 connector, 8-pin



M23 connector, 12-pin

Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**

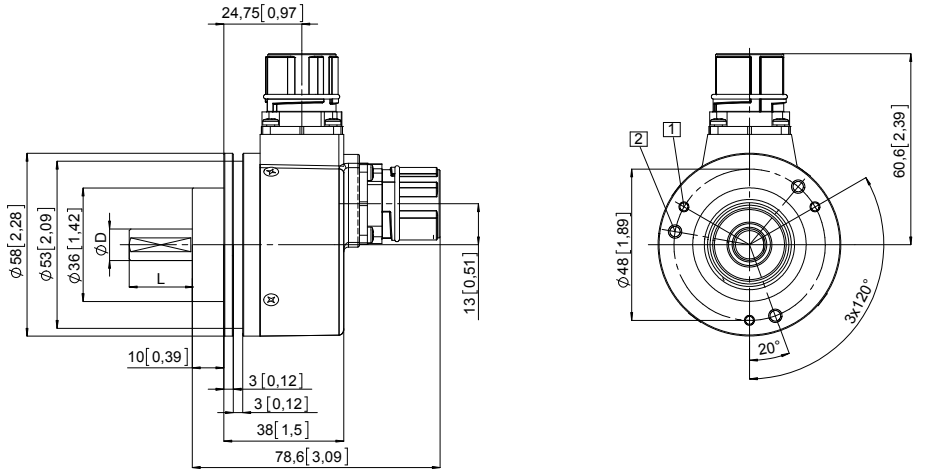
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 58 [2.28]
Flange type 1 and 3
(Drawing with M23 connector)

1 3 x M3, 6 [0.24] deep

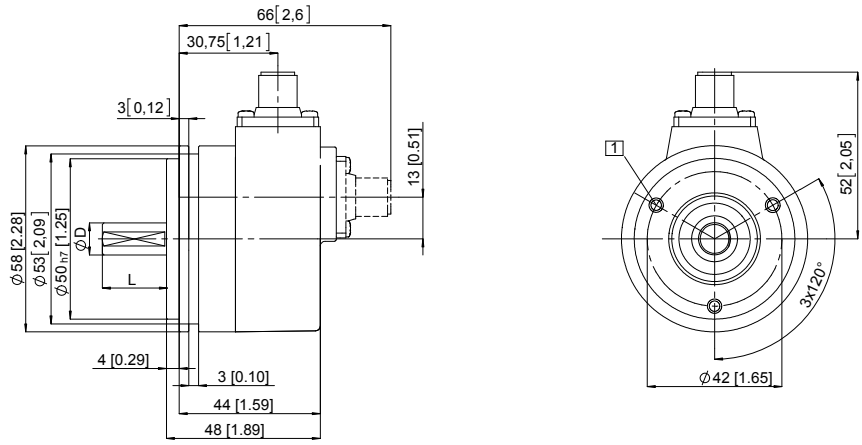
2 3 x M4, 8 [0.32] deep



D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

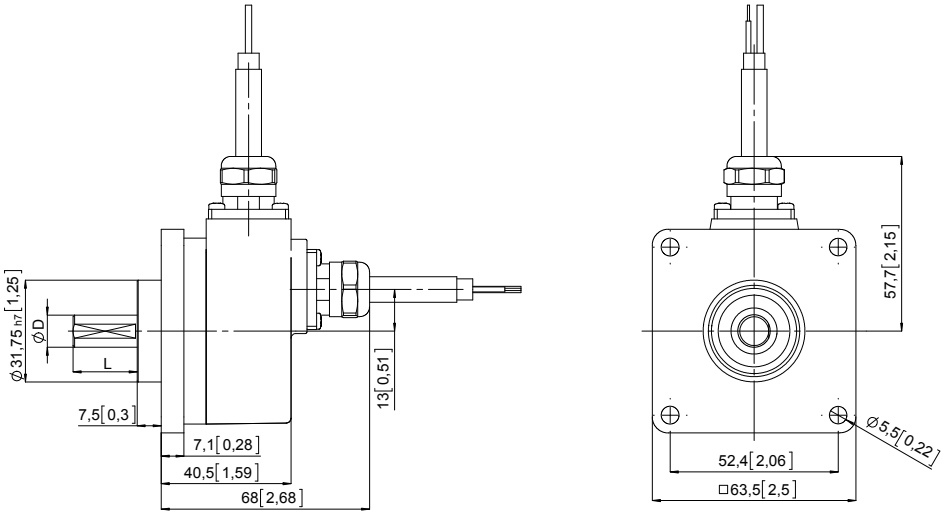
Synchro flange, ø 58 [2.28]
Flange type 2 and 4
(Drawing with M12 connector)

1 3 x M4, 6 [0.24] deep



D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

Square flange, □63.5 [2.5]
Flange type 5 and 7
(Drawing with cable)



D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

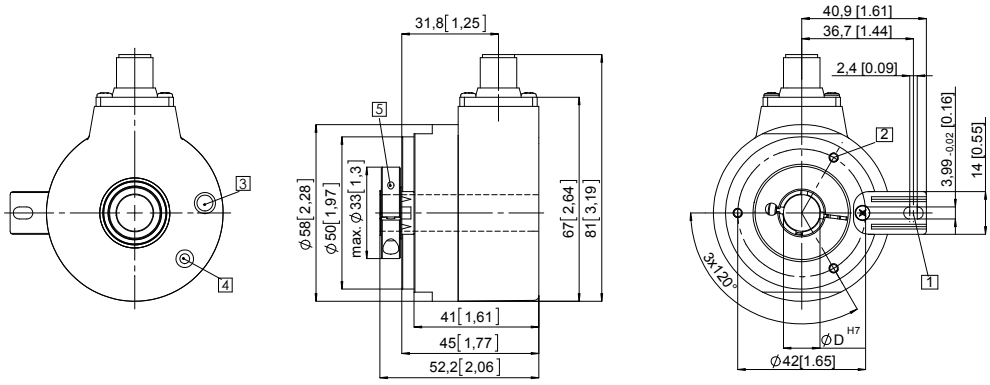
Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**

Dimensions hollow shaft version

Dimensions in mm [inch]

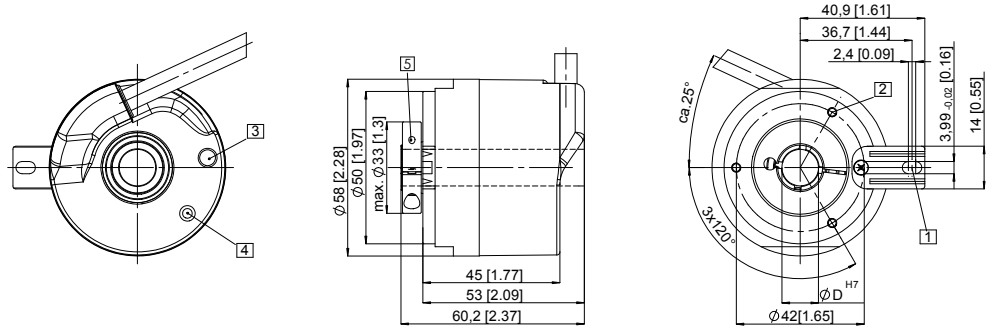
Flange with spring element long
Flange type 1 and 2
(drawing with M12 connector)

1 Torque stop slot, Recommendation: Cylindrical pin DIN 7, ø 4 [0.16]
2 3 x M3, 5.5 [0.21] deep
3 Status-LED
4 SET button
5 Recommended torque for the clamping ring 0.6 Nm



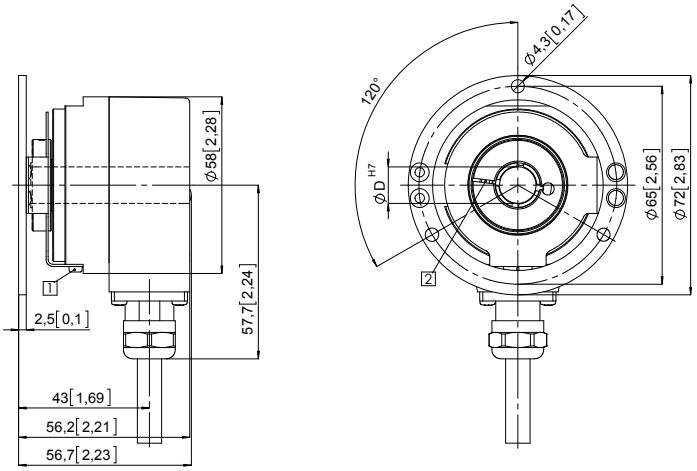
Flange with spring element long
Flange type 1 and 2
(drawing with tangential cable)

1 Torque stop slot, Recommendation: Cylindrical pin DIN 7, ø 4 [0.16]
2 3 x M3, 5.5 [0.21] deep
3 Status-LED
4 SET button
5 Recommended torque for the clamping ring 0.6 Nm



Flange with stator coupling, ø 65 [2.56]
Flange type 3 and 4
Pitch circle diameter for fixing screws 65 [2.56]
(Drawing with cable)

1 Fixing screws DIN 912 M3 x 8 (Washer included in delivery)
2 Recommended torque for the clamping ring 0.6 Nm



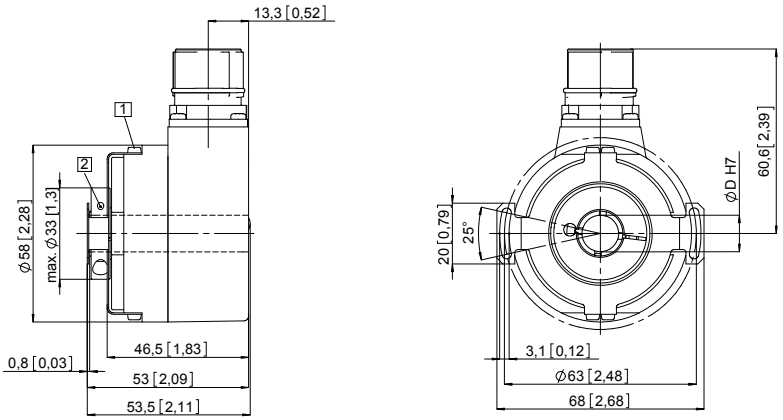
Standard Optical | **Sendix 5853 / 5873 (Shaft / Hollow shaft)** | **SSI / BiSS-C**

Dimensions hollow shaft version

Dimensions in mm [inch]

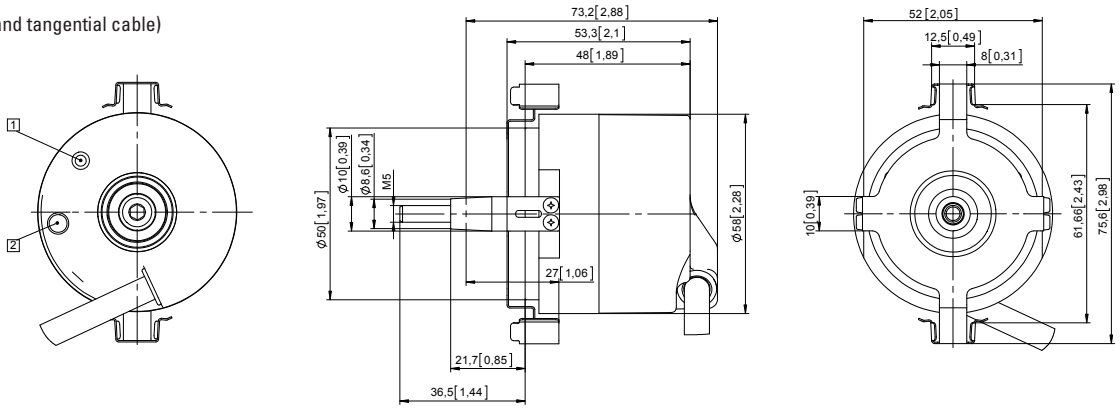
Flange with stator coupling, ø 63 [2.48]
Flange type 5 and 6
Pitch circle diameter for fixing screws 63 [2.48]
(Drawing with M23 connector)

1 Fixing screws DIN 912 M3 x 8 (Washer included in delivery)
2 Recommended torque for the clamping ring 0.6 Nm



Flange with stator coupling, mounting without screws
Flange type E and F
(with tapered shaft K and tangential cable)

1 Status LED
2 SET Button



Flange with stator coupling, ø 72 [2.83]
Flange type G
(with tapered shaft K and tangential cable)

1 Status LED
2 SET Button