

Absolute encoders - singleturn

Standard optical	Sendix 5853 / 5873 (shaft / hollow shaft)	SSI / BiSS + incremental
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The Sendix 5853 and Sendix 5873 singleturn encoders with optical sensor technology can achieve a resolution of max. 21 bits.

Easy integration in the application thanks to the BiSS interface, with electronic data sheet.

This series offers special versions for use on direct drives for the lift technology.



Electronic data sheet	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

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 $\leq 1\mu s$.
- High-resolution feedback in real-time via 21 bit fully digital or incremental outputs SinCos and RS422.
- BiSS-C BP3 encoder profile.
- Short control cycles, clock rate with SSI up to 2 MHz / with BiSS up to 10 MHz.

Order code	8.5853	.XXXX.XX2X	If for each parameter of an encoder the <u>underlined preferred option</u> 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.	
Shaft version	Type	a b c d e f g		

a Flange

- 1 = clamping flange, IP65 \varnothing 58 mm [2.28"]
- 3 = clamping flange, IP67 \varnothing 58 mm [2.28"]
- 2 = synchro flange, IP65 \varnothing 58 mm [2.28"]
- 4 = synchro flange, IP67 \varnothing 58 mm [2.28"]
- 5 = square flange, IP65 \square 63.5 mm [2.5"]
- 7 = square flange, IP67 \square 63.5 mm [2.5"]

b Shaft ($\varnothing \times L$), 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 / supply voltage

- 1 = SSI, BiSS / 5 V DC
- 2 = SSI, BiSS / 10 ... 30 V DC
- 3 = SSI, BiSS + 2048 ppr. SinCos / 5 V DC
- 4 = SSI, BiSS + 2048 ppr. SinCos / 10 ... 30 V DC
- 5 = SSI, BiSS / 5 V DC, with sensor output
- 6 = SSI, BiSS + 2048 ppr. SinCos / 5 V DC, with sensor output
- 7 = SSI, BiSS + 2048 ppr. RS422 (TTL-comp.) / 5 V DC
- 8 = SSI, BiSS + 2048 ppr. RS422 (TTL-comp.) / 10 ... 30 V DC
- 9 = SSI, BiSS + 2048 ppr. RS422 (TTL-comp.) / 5 V DC, with sensor output

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-pin³⁾
- 6 = radial M12 connector, 8-pin³⁾

*) Available special lengths (connection types A, B):
2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']
order code expansion .XXXX = length in dm
ex.: 8.5853.112A.G323.0030 (for cable length 3 m)

e Code

- B = SSI, binary
- C = BiSS, binary
- G = SSI, gray

f Resolution⁴⁾

- A = 10 bit
- 1 = 11 bit
- 2 = 12 bit
- 3 = 13 bit
- 4 = 14 bit
- 7 = 17 bit
- 9 = 19 bit
- C = 21 bit⁵⁾

g Options (service)

- 1 = no option
- 2 = status LED
- 3 = SET button and status LED

Optional on request

- Ex 2/22⁶⁾
- surface protection salt spray tested
- other resolutions

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.

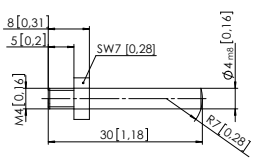
4) Resolution, preset value and counting direction factory-programmable.
5) Only in conjunction with interface 1 or 2.
6) For the cable connection type, cable material PUR.

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Order code	8.5873	.XXXX.XX2X	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.									
Hollow shaft	Type	<table border="1" style="font-size: 8px; border-collapse: collapse; width: 100%;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">b</td> <td style="text-align: center;">c</td> <td style="text-align: center;">d</td> <td style="text-align: center;">e</td> <td style="text-align: center;">f</td> <td style="text-align: center;">g</td> </tr> </table>	a	b	c	d	e	f	g			
a	b	c	d	e	f	g						
a Flange	<ul style="list-style-type: none"> 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"] G = with stator coupling, IP65 ø 72 mm [2.83"]¹⁾ H = with expanding coupling, IP65 ø 65 mm [2.56"]¹⁾ 	c Interface / supply voltage	<ul style="list-style-type: none"> 1 = SSI, BiSS / 5 V DC 2 = SSI, BiSS / 10 ... 30 V DC 3 = SSI, BiSS + 2048 ppr. SinCos / 5 V DC 4 = SSI, BiSS + 2048 ppr. SinCos / 10 ... 30 V DC 5 = SSI, BiSS / 5 V DC, with sensor output 6 = SSI, BiSS + 2048 ppr. SinCos / 5 V DC, with sensor output 7 = SSI, BiSS + 2048 ppr. RS422 (TTL-comp.) / 5 V DC 8 = SSI, BiSS + 2048 ppr. RS422 (TTL-comp.) / 10 ... 30 V DC 9 = SSI, BiSS + 2048 ppr. RS422 (TTL-comp.) / 5 V DC, with sensor output 	e Code	<ul style="list-style-type: none"> B = SSI, binary C = BiSS, binary G = SSI, gray 	g Options (service)	<ul style="list-style-type: none"> 1 = no option 2 = status LED 3 = SET button and status LED 					
b Through hollow shaft	<ul style="list-style-type: none"> 3 = ø 10 mm [0.39"] 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" <p style="margin: 0;"><i>Tapered shaft</i></p> <ul style="list-style-type: none"> K = ø 10 mm [0.39"] 	d Type of connection	<ul style="list-style-type: none"> 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-pin²⁾ 	f Resolution³⁾	<ul style="list-style-type: none"> A = 10 bit 1 = 11 bit 2 = 12 bit 3 = 13 bit 4 = 14 bit 7 = 17 bit 9 = 19 bit C = 21 bit⁴⁾ 	<i>Optional on request</i>	<ul style="list-style-type: none"> - Ex 2/22 (not with type of connection E or F)⁵⁾ - surface protection - salt spray tested - other resolutions 					
*) Available special lengths (connection types B, F): 2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.5873.542B.G323.0030 (for cable length 3 m)												

Mounting accessory for shaft encoders	Order no.
Coupling	
bellows coupling ø 19 mm [0.75"] for shaft 6 mm [0.24"]	8.0000.1102.0606
bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]	8.0000.1102.1010

Mounting accessory for hollow shaft encoders	Order no.
Torque pin, ø 4 mm	
for flange with spring element (flange type 1)	
with fixing thread	
	8.0010.4700.0000

Cables and connectors	Order no.
Preassembled cables	
M12 female connector with coupling nut, 8-pin, A coded, straight single-ended 2 m [6.56'] PVC cable	05.00.6041.8211.002M
M23 female connector with coupling nut, 12-pin, cw single-ended 2 m [6.56'] PVC cable	8.0000.6901.0002.0031
Connectors	
M12 female connector with coupling nut, 8-pin, A coded, straight (metal)	05.CMB 8181-0
M23 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) Can be combined only with shaft K and type of connection E or F.
2) Can be combined only with interface 1 and 2.
3) Resolution, preset value and counting direction factory-programmable.

4) Only in conjunction with interface 1 or 2.
5) For the cable connection type, cable material PUR.

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Technical data

Mechanical characteristics		
Maximum speed shaft version		
IP65 up to 70 °C [158 °F]	12000 min ⁻¹ , 10000 min ⁻¹ (continuous)	
IP65 up to T _{max}	8000 min ⁻¹ , 5000 min ⁻¹ (continuous)	
IP67 up to 70 °C [158 °F]	11000 min ⁻¹ , 9000 min ⁻¹ (continuous)	
IP67 up to T _{max}	8000 min ⁻¹ , 5000 min ⁻¹ (continuous)	
Maximum speed hollow shaft version		
IP65 up to 70 °C [158 °F]	9000 min ⁻¹ , 6000 min ⁻¹ (continuous)	
IP65 up to T _{max}	6000 min ⁻¹ , 3000 min ⁻¹ (continuous)	
IP67 up to 70 °C [158 °F]	8000 min ⁻¹ , 4000 min ⁻¹ (continuous)	
IP67 up to T _{max}	4000 min ⁻¹ , 2000 min ⁻¹ (continuous)	
Starting torque at 20 °C [68 °F]		
IP65	< 0.01 Nm	
IP67	< 0.05 Nm	
Mass 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	
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. 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		
Supply voltage		
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 supply voltage		
yes		
Short circuit proof outputs		
yes ²⁾		

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	
Resolution		
10 ... 14 bit; 17, 19 and 21 bit		
Code		
binary or gray		
SSI clock rate		
50 kHz ... 2 MHz		
Data refresh rate		
ST resolution ≤ 14 bit	≤ 1 μs	
ST resolution > 14 bit	≤ 4 μs	
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.		

BiSS 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	
Resolution		
10 ... 14 bit; 17, 19 and 21 bit		
Code		
binary		
Clock rate		
50 kHz ... 10 MHz		
Max. update rate		
< 15 μs, depends on the clock rate and the data length		
Data refresh rate		
ST resolution ≤ 14 bit	≤ 1 μs	
ST resolution > 14 bit	≤ 4 μs	
Protocol		
BiSS-C BP3 encoder profile		
Note:		
- Bidirectional, factory programmable parameters are: resolution, code, direction, alarms and warnings		
- CRC data verification		
- EDS (electronic data sheet)		

Status output and LED		
Output driver		
open collector, internal pull up resistor 22 kΩhm		
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 22 kΩhm).		
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 supply voltage to the device.		

Incremental outputs (A/B)		
	SinCos	RS422 TTL compatible
Max. frequency -3dB	400 kHz	400 kHz
Signal level	1 V _{pp} (±20 %)	HIGH: min. 2.5 V LOW: max. 0.5 V
Short circuit proof	yes ²⁾	yes ²⁾
Pulse rate	2048 ppr	2048 ppr

1) Cable version: -30 °C ... +75 °C [-22 °F ... +167 °F].

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

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SET input or SET button					
Input	active HIGH				
Input type	comparator				
Signal level	<table border="0"> <tr> <td style="padding-right: 10px;">HIGH</td> <td>min: 60 % of +V (supply voltage) max: +V</td> </tr> <tr> <td>LOW</td> <td>max: 25 % of +V (supply voltage)</td> </tr> </table>	HIGH	min: 60 % of +V (supply voltage) max: +V	LOW	max: 25 % of +V (supply voltage)
HIGH	min: 60 % of +V (supply voltage) max: +V				
LOW	max: 25 % of +V (supply voltage)				
Input current	< 0.5 mA				
Min. pulse duration (SET)	10 ms				
Timeout after SET signal	14 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.

If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

DIR input	
<p>Direction input: A HIGH signal switches the direction of rotation from the default cw to ccw. This inverted function can also be factory-programmed. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The status output will switch to LOW.</p> <p>If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.</p>	
Response time (DIR input)	1 ms

Power-ON	
<p>After Power-ON the device requires a time of approx. 150 ms before valid data can be read.</p>	
<p>Hot plugging of the encoder should be avoided.</p>	

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)

Absolute encoders - singleturn

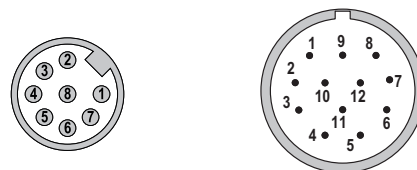
Standard optical	Sendix 5853 / 5873 (shaft / hollow shaft)	SSI / BiSS + incremental
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Terminal assignment

Interface	Type of connection	Features	Cable (isolate unused cores individually before initial start-up)
1, 2	1, 2, A, B, E, F	SET, DIR, Status	Signal: 0 V +V C+ C- D+ D- SET DIR Stat N/C N/C N/C \perp
			Core color: WH BN GN YE GY PK BU RD BK - - - shield
1, 2	3, 4	SET, DIR, Status	M23 connector, 12-pin
			Signal: 0 V +V C+ C- D+ D- SET DIR Stat N/C N/C N/C \perp
			Pin: 1 2 3 4 5 6 7 8 9 10 11 12 PH
5	1, 2, A, B, E, F	SET, DIR, Status sensor output	Cable (isolate unused cores individually before initial start-up)
			Signal: 0 V +V C+ C- D+ D- SET DIR Stat N/C 0Vsens +Vsens \perp
5	3, 4	SET, DIR, Status sensor output	Core color: WH BN GN YE GY PK BU RD BK - GY-PK RD-BU shield
			M23 connector, 12-pin
5	3, 4	SET, DIR, Status sensor output	Signal: 0 V +V C+ C- D+ D- SET DIR Stat N/C 0Vsens +Vsens \perp
			Pin: 1 2 3 4 5 6 7 8 9 10 11 12 PH
			M23 connector, 12-pin
3, 4, 7, 8	1, 2, A, B, E, F	SET, DIR, SinCos or incr. RS422	Cable (isolate unused cores individually before initial start-up)
			Signal: 0 V +V C+ C- D+ D- SET DIR A \bar{A} B \bar{B} \perp
3, 4, 7, 8	3, 4	SET, DIR, SinCos or incr. RS422	Core color: WH BN GN YE GY PK BU RD BK VT GY-PK RD-BU shield
			M23 connector, 12-pin
3, 4, 7, 8	3, 4	SET, DIR, SinCos or incr. RS422	Signal: 0 V +V C+ C- D+ D- SET DIR A \bar{A} B \bar{B} \perp
			Pin: 1 2 3 4 5 6 7 8 9 10 11 12 PH
			M23 connector, 12-pin
6, 9	1, 2, A, B, E, F	SinCos o. incr. RS422 sensor output	Cable (isolate unused cores individually before initial start-up)
			Signal: 0 V +V C+ C- D+ D- A \bar{A} B \bar{B} 0Vsens +Vsens \perp
6, 9	3, 4	SinCos o. incr. RS422 sensor output	Core color: WH BN GN YE GY PK BU RD BK VT GY-PK RD-BU shield
			M23 connector, 12-pin
6, 9	3, 4	SinCos o. incr. RS422 sensor output	Signal: 0 V +V C+ C- D+ D- A \bar{A} B \bar{B} 0Vsens +Vsens \perp
			Pin: 1 2 3 4 5 6 7 8 9 10 11 12 PH
			M23 connector, 12-pin
1, 2	5, 6	SET, DIR	M12 connector, 8-pin
			Signal: 0 V +V C+ C- D+ D- SET DIR \perp
1, 2	5, 6	SET, DIR	Pin: 1 2 3 4 5 6 7 8 PH

- +V: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder ground GND (0 V)
- 0 Vsens / +Vsens: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
- C+, C-: Clock signal
- D+, D-: Data signal
- A, \bar{A} : Incremental output channel A (cosine)
- B, \bar{B} : Incremental output channel B (sine)
- SET: Set input
- DIR: Direction input
- Stat: Status output
- PH \perp : Plug connector housing (shield)

Top view of mating side, male contact base



M12 connector, 8-pin

M23 connector, 12-pin

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Standard optical

Sendix 5853 / 5873 (shaft / hollow shaft)

SSI / BiSS + incremental

Dimensions shaft version

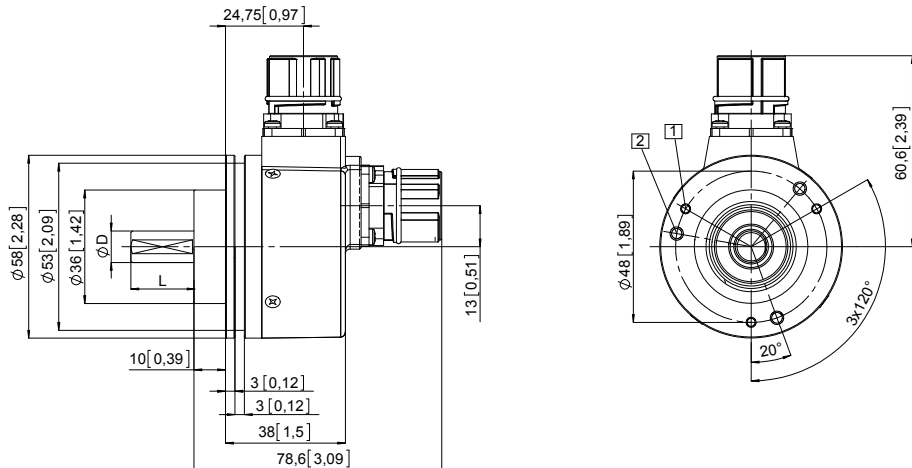
Dimensions in mm [inch]

Clamping flange, \varnothing 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



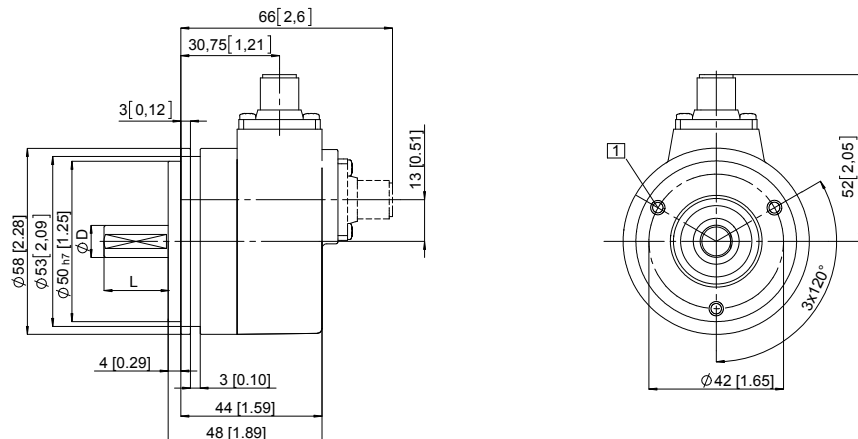
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

Synchro flange, \varnothing 58 [2.28]

Flange type 2 and 4

(drawing with M12 connector)

- 1 3 x M4, 6 [0.24] deep

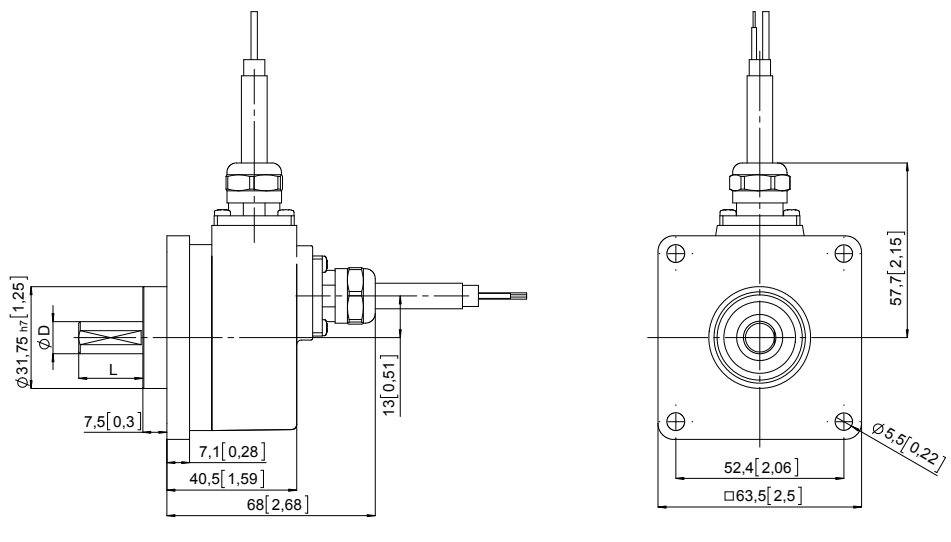


D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

Square flange, \square 63.5 [2.5]

Flange type 5 and 7

(drawing with cable)



D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

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Dimensions hollow shaft version

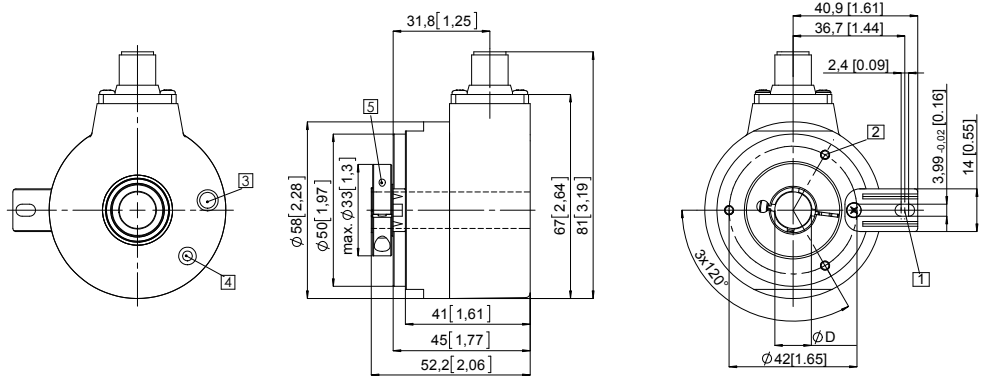
Dimensions in mm [inch]

Flange with spring element, long

Flange type 1 and 2

(drawing with M12 connector)

- 1 Slot spring element, recommendation: torque pin DIN 7, ϕ 4 [0.16]
- 2 3 x M3, 5.5 [0.22] deep
- 3 Status-LED
- 4 SET button
- 5 Recommended torque for the clamping ring 0.6 Nm



D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7
15 [0.59]	H7
3/8"	H7
1/2"	H7

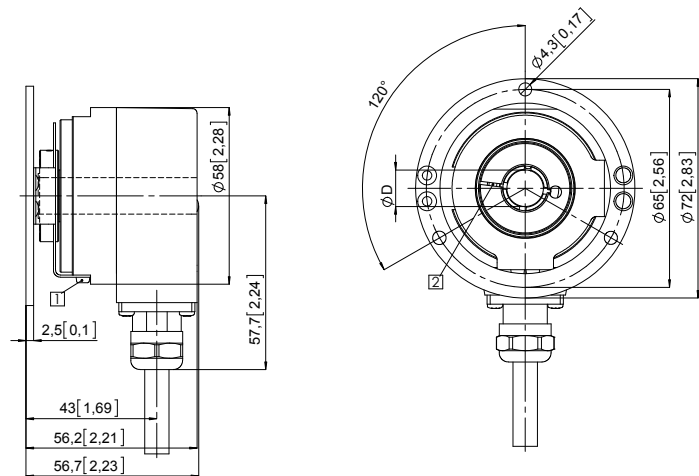
Flange with stator coupling, ϕ 65 [2.56]

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



D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7
15 [0.59]	H7
3/8"	H7
1/2"	H7

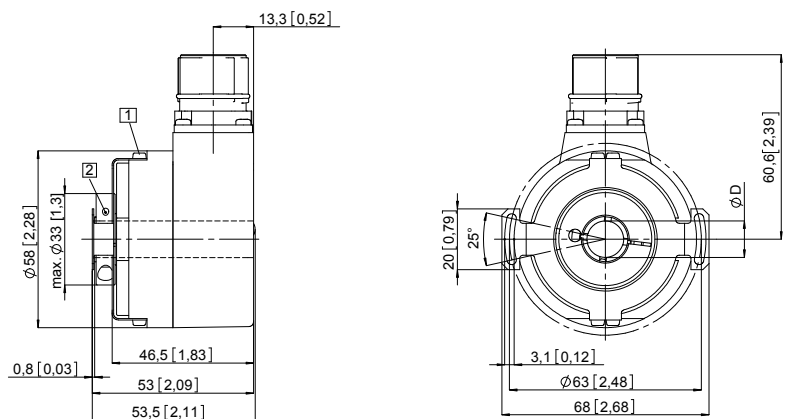
Flange with stator coupling, ϕ 63 [2.48]

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



D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7
15 [0.59]	H7
3/8"	H7
1/2"	H7

Absolute encoders - singleturn

Standard optical

Sendix 5853 / 5873 (shaft / hollow shaft)

SSI / BiSS + incremental

Dimensions hollow shaft version

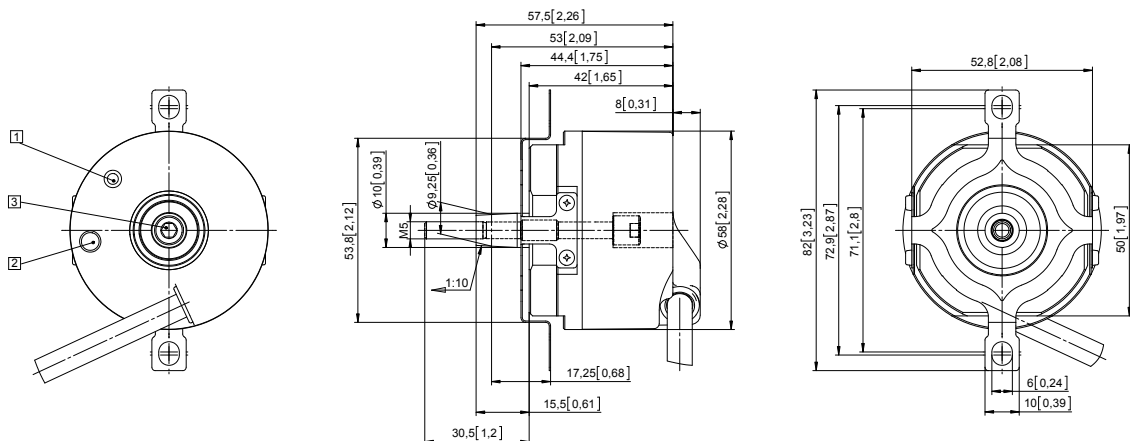
Dimensions in mm [inch]

Flange with stator coupling, \varnothing 72 [2.83]

Flange type G

(with tapered shaft K and tangential cable)

- 1 Status LED
- 2 SET Button
- 3 Recommended torque for (SW 4) tightening screw $3^{+0.5}$ Nm



Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with expanding coupling, \varnothing 65 [2.56"]

Flange type H

- 1 Status-LED
- 2 SET button
- 3 Recommended torque for (SW 4) tightening screw $3^{+0.5}$ Nm
- 4 Recommended torque for (SW 2) tightening screw 1 Nm

