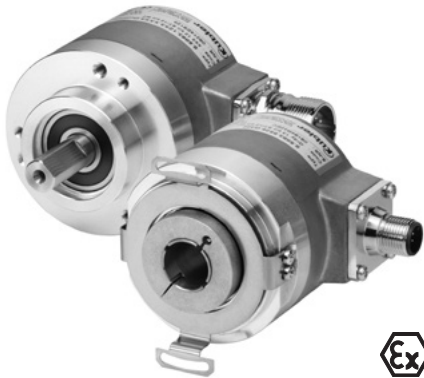


**Standard  
electronic Multiturn, optical**

**Sendix F5863 / F5883 (Shaft / Hollow shaft)**

**SSI / BiSS-C**



The Sendix F58 Multiturn with patented Intelligent Scan Technology™ is a particularly high resolution optical multiturn encoder without gears and with 100 percent magnetic insensitivity.

41 bits total resolution, through hollow shaft up to 15 mm and versions with additional SinCos or RS422 incremental track.



24 bit MT  
Multiturn Resolution



Safety-Lock™



High rotational speed



-40° +85°  
Temperature range



High protection level



High shaft load capacity



Shock / vibration resistant



Magnetic field proof



Reverse polarity protection



SinCos



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 +85°C
- Patented Intelligent Scan Technology™ with all singleturn and multiturn functions on one single OptoASIC - offering the highest reliability, a high resolution up to 41 bits and 100% magnetic field insensitivity.

## Versatile

- Available with SSI or BiSS-C interface and combined with SinCos incremental signals
- The right fixing solution or type of connection available for every application
- SET button and LED for simple start-up
- High resolution feedback in real-time via incremental outputs SinCos and RS422
- Short control cycles, clock frequency with SSI up to 2 MHz / with BiSS-C up to 10 MHz

## Order code Shaft version

**8.F5863** . XXXX . XXXX  
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.  
Qty. 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"]
- 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"]

### b Shaft (ø x L), with flat

- 1 = 6 x 10 mm [0.24 x 0.39"]<sup>1)</sup>
- 2 = 10 x 20 mm [0.39 x 0.79"]<sup>2)</sup>
- 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

### 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<sup>3)</sup>
- 6 = M12 connector, 8-pin, radial<sup>3)</sup>

### e Code

- B = SSI, Binary
- C = BiSS-C, Binary
- G = SSI, Gray

### f Resolution (Singleturn)<sup>4)</sup>

- A = 10 bit
- 1 = 11 bit
- 2 = 12 bit
- 3 = 13 bit
- 4 = 14 bit
- 7 = 17 bit

### g Resolution (Multiturn)

- 2 = 12 bit MT
- 6 = 16 bit MT
- 4 = 24 bit MT

### 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

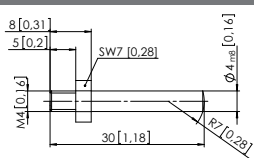
1) Preferred type only in conjunction with flange type 2  
2) Preferred type only in conjunction with flange type 1

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

# Absolute Encoders – Multiturn

<b>Standard electronic Multiturn, optical</b>	<b>Sendix F5863 / F5883 (Shaft / Hollow shaft)</b>	<b>SSI / BiSS-C</b>
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<b>Order code</b> Hollow shaft	<b>8.F5883</b> Type	<table border="1" style="font-size: 8px; border-collapse: collapse; width: 100%;"> <tr> <td style="text-align: center;">X</td><td style="text-align: center;">X</td><td style="text-align: center;">X</td><td style="text-align: center;">X</td> <td style="text-align: center;">X</td><td style="text-align: center;">X</td><td style="text-align: center;">X</td><td style="text-align: center;">X</td> </tr> <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><td style="text-align: center;">h</td> </tr> </table>	X	X	X	X	X	X	X	X	a	b	c	d	e	f	g	h	<p>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.</p>	
X	X	X	X	X	X	X	X													
a	b	c	d	e	f	g	h													
<p><b>a Flange</b></p> <p>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"]  <u>5 = with stator coupling, IP65 ø 63 mm [2.48"]</u>                  6 = with stator coupling, IP67 ø 63 mm [2.48"]</p> <p><b>b Hollow shaft</b></p> <p>3 = ø 10 mm [0.39"]  <u>4 = ø 12 mm [0.47"]</u>                  5 = ø 14 mm [0.55"]                  6 = ø 15 mm [0.59"] – blind hollow shaft                  8 = ø 3/8"                  9 = ø 1/2"</p>	<p><b>c Interface / Power supply</b></p> <p>1 = SSI or BiSS-C / 5 V DC  <u>2 = SSI or BiSS-C / 10 ... 30 V DC</u>                  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</p> <p><b>d Type of connection</b></p> <p>2 = radial cable, 1 m [3.28'] PVC  <u>4 = M23 connector, 12-pin, radial</u>                  6 = M12 connector, 8-pin, radial <sup>2)</sup>  <u>E = tangential cable, 1 m [3.28'] PVC</u></p>	<p><b>e Code</b></p> <p>B = SSI, Binary                  C = BiSS-C, Binary  <u>G = SSI, Gray</u></p> <p><b>f Resolution (Singleturn) <sup>1)</sup></b></p> <p>A = 10 bit                  1 = 11 bit                  2 = 12 bit  <u>3 = 13 bit</u>                  4 = 14 bit                  7 = 17 bit</p> <p><b>g Resolution (Multiturn)</b></p> <p><u>2 = 12 bit MT</u>                  6 = 16 bit MT                  4 = 24 bit MT</p>	<p><b>h Options (Service)</b></p> <p>1 = no option                  2 = Status LED  <u>3 = SET button and Status LED</u></p> <p style="font-size: 8px;">optional on request                  - Ex 2/22                  - seawater-resistant                  - special cable length</p>																	

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

Further accessories can be found in the accessories section or in the accessories area of our website at: [www.kuebler.com/accessories](http://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](http://www.kuebler.com/connection_technology)

1) Resolution, preset value and counting direction factory-programmable  
 2) Can be combined only with Interface 1 and 2

Absolute Encoders  
Multiturn

# Absolute Encoders – Multiturn

**Standard  
electronic Multiturn, optical**

**Sendix F5863 / F5883 (Shaft / Hollow shaft)**

**SSI / BiSS-C**

## Technical data

### Mechanical characteristics

<b>Max. speed, shaft version</b>	IP65 up to 70°C [158°F]	12 000 min <sup>-1</sup> , 10 000 min <sup>-1</sup> (continuous)
	IP65 up to T <sub>max</sub>	8 000 min <sup>-1</sup> , 5 000 min <sup>-1</sup> (continuous)
	IP67 up to 70°C [158°F]	11 000 min <sup>-1</sup> , 9 000 min <sup>-1</sup> (continuous)
<b>Max. speed, hollow shaft version</b>	IP67 up to T <sub>max</sub>	8 000 min <sup>-1</sup> , 5 000 min <sup>-1</sup> (continuous)
	IP65 up to 70°C [158°F]	9 000 min <sup>-1</sup> , 6 000 min <sup>-1</sup> (continuous)
	IP65 up to T <sub>max</sub>	6 000 min <sup>-1</sup> , 3 000 min <sup>-1</sup> (continuous)
<b>Max. speed, hollow shaft version</b>	IP67 up to 70°C [158°F]	8 000 min <sup>-1</sup> , 4 000 min <sup>-1</sup> (continuous)
	IP67 up to T <sub>max</sub>	4 000 min <sup>-1</sup> , 2 000 min <sup>-1</sup> (continuous)
<b>Starting torque at 20°C [68°F]</b>	IP65	< 0.01 Nm
	IP67	< 0.05 Nm
<b>Moment of inertia</b>	shaft version	3.0 x 10 <sup>-6</sup> kgm <sup>2</sup>
	hollow shaft version	6.0 x 10 <sup>-6</sup> kgm <sup>2</sup>
<b>Load capacity of shaft</b>	radial	80 N
	axial	40 N
<b>Weight</b>		approx. 0.45 kg [15.87 oz]
<b>Protection acc. to EN 60529</b>	housing side	IP67
	shaft side	IP65, opt. IP67
<b>EX approval for hazardous areas</b>		optional Zone 2 and 22
<b>Working temperature range</b>		-40°C ... +85°C [-40°F ... +185°F] <sup>1)</sup>
<b>Material</b>	shaft/hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
	cable	PVC
<b>Shock resistance acc. EN 60068-2-27</b>		2500 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance acc. EN 60068-2-6</b>		100 m/s <sup>2</sup> , 55 ... 2000 Hz

### Electrical characteristics

<b>Power supply</b>		5 V DC + 5% or 10 ... 30 V DC
<b>Current consumption (no load)</b>	5 V DC	max. 60 mA
	10 ... 30 V DC	max. 30 mA
<b>Reverse polarity protection of the power supply (+V)</b>		yes (at 10 ... 30 V DC)
<b>Short circuit proof outputs</b>		yes <sup>2)</sup>
<b>CE compliant acc. to</b>		EMC guideline 2004/108/EC
<b>RoHS compliant acc. to</b>		guideline 2011/65/EU

### SSI interface

<b>Output driver</b>		RS485 transceiver type
<b>Permissible load / channel</b>		max. ± 30 mA
<b>Signal level</b>	HIGH	typ 3.8 V
	LOW at I <sub>Load</sub> = 20 mA	typ 1.3 V
<b>Short circuit proof outputs</b>		yes <sup>2)</sup>
<b>Singleturn resolution</b>		10 ... 17 bit
<b>Number of revolutions</b>		max. 24 bit
<b>Code</b>		Binary or Gray
<b>SSI clock rate</b>		50 kHz ... 2 MHz
<b>Monoflop time</b>		≤ 15 µs
<b>Note:</b> 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.	ST resolution ≤ 14 bit	≤ 1 µs
	ST resolution ≥ 15 bit	4 µs
<b>Status and parity bit</b>		on request

### BiSS-C interface

<b>Singleturn resolution</b>		10 ... 17 bit
<b>Number of revolutions</b>		max. 24 bit
<b>Code</b>		Binary
<b>BiSS-C clock rate</b>		50 kHz ... 10 MHz
<b>Max. update rate</b>		< 10 µs, depends on the clock rate and the data length
<b>Data refresh rate</b>		≤ 1 µs
<b>Note:</b>	– Bidirectional, factory programmable parameters are: resolution, code, direction, alarms and warnings	
	– CRC data verification	

### SET input

<b>Input</b>		active HIGH
<b>Input type</b>		comparator
<b>Signal level</b> (+V = power supply)	HIGH	min. 60 % of +V, max: +V
	LOW	max. 30 % of +V
<b>Input current</b>		< 0.5 mA
<b>Min. pulse duration (SET)</b>		10 ms
<b>Input Delay</b>		1 ms
<b>New position data readable after</b>		1 ms
<b>Internal processing time</b>		200 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, after which the new position data can be read via SSI or BiSS-C. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the power supply must not be switched off.

The SET function should be carried out whilst the encoder is at rest.

### Option incremental outputs (A/B), 2048 ppr

	SinCos	RS422 TTL-compatible
<b>Max. frequency -3dB</b>	400 kHz	400 kHz
<b>Signal level</b>	1 V <sub>pp</sub> (± 20%)	HIGH: min. 2.5 V
		LOW: max. 0.5 V
<b>Short circuit proof</b>	yes <sup>2)</sup>	yes <sup>2)</sup>

### Status output and LED

<b>Output driver</b>	Open Collector, internal pull up resistor 22 kOhm
<b>Permissible load</b>	max. 20 mA
<b>Signal level</b>	HIGH: +V / LOW: < 1 V
<b>Active</b>	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 0 V or to output; if power supply correctly applied

# Absolute Encoders – Multiturn

<b>Standard electronic Multiturn, optical</b>	<b>Sendix F5863 / F5883 (Shaft / Hollow shaft)</b>	<b>SSI / BiSS-C</b>
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DIR 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.	
<b>Response time (DIR input)</b>	1 ms

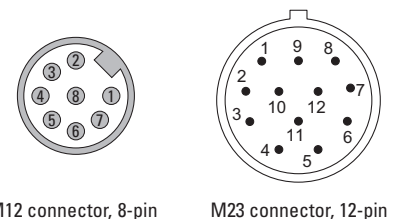
Power-ON delay	
After Power-ON the device requires a time of approx. 150 ms before valid data can be read. Hot plugging of the encoder should be avoided.	

## 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 $\perp$
			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 $\perp$
			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 0Vsens +Vsens $\perp$
			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 0Vsens +Vsens $\perp$
			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 $\bar{A}$ B $\bar{B}$ $\perp$
			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 $\bar{A}$ B $\bar{B}$ $\perp$
			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	1, 2, E	SinCos o. incr. RS422 sensor output	Signal: 0 V +V C+ C- D+ D- A $\bar{A}$ B $\bar{B}$ 0Vsens +Vsens $\perp$
			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	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
Interface	Type of connection	Features	M12 connector
1, 2	5, 6	SET, DIR	Signal: 0 V +V C+ C- D+ D- SET DIR $\perp$
			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 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. 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  $\perp$ : Plug connector housing (Shield)

### Top view of mating side, male contact base



M12 connector, 8-pin

M23 connector, 12-pin

# Absolute Encoders – Multiturn

**Standard  
electronic Multiturn, optical**

**Sendix F5863 / F5883 (Shaft / Hollow shaft)**

**SSI / BiSS-C**

## Dimensions shaft version

Dimensions in mm [inch]

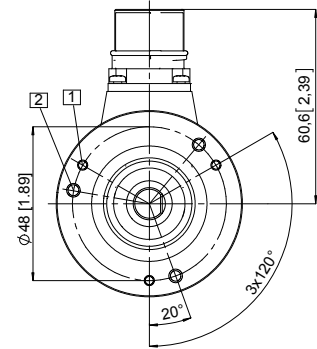
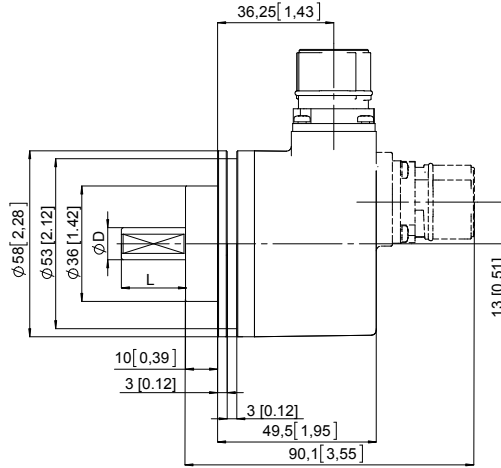
### Clamping flange, $\varnothing$ 58 [2.28]

#### 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	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



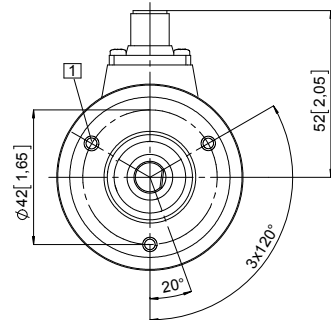
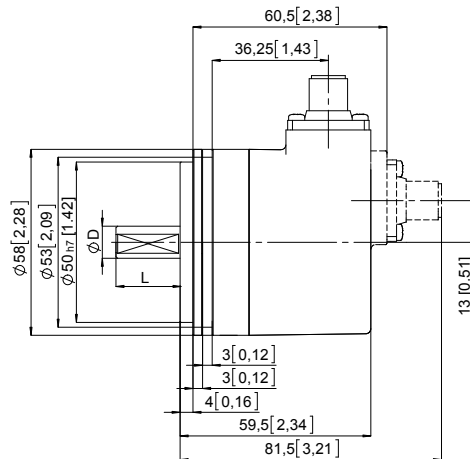
### Synchro flange, $\varnothing$ 58 [2.28]

#### Flange type 2 and 4

(Drawing with M12 connector)

- 1 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



# Absolute Encoders – Multiturn

<b>Standard electronic Multiturn, optical</b>	<b>Sendix F5863 / F5883 (Shaft / Hollow shaft)</b>	<b>SSI / BiSS-C</b>
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## Dimensions hollow shaft version

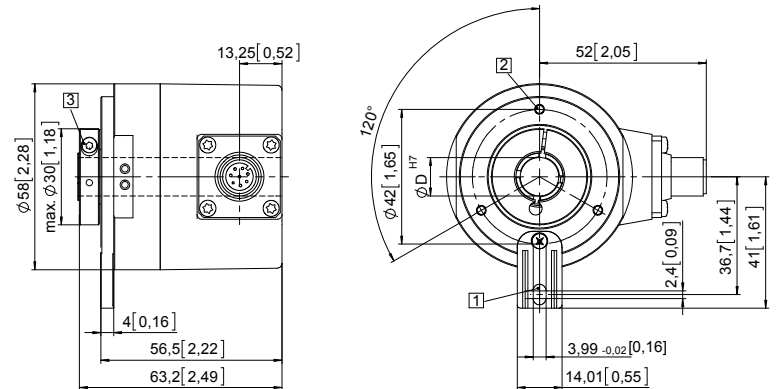
Dimensions in mm [inch]

### Flange with spring element long

#### Flange type 1 and 2

(drawing with M12 connector)

- 1 Torque stop slot,  
Recommendation:  
Cylindrical pin DIN 7,  $\varnothing$  4 [0.16]
- 2 M3, 6 [0.24] deep
- 3 Recommended torque for the  
clamping ring 0.6 Nm

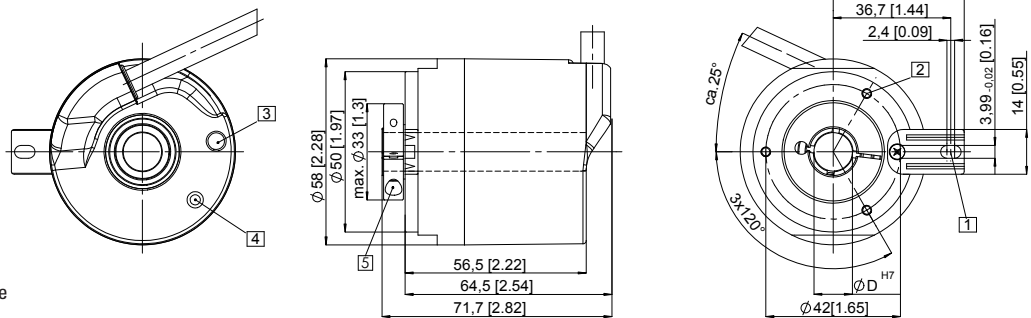


### Flange with spring element long

#### Flange type 1 and 2

(drawing with tangential cable)

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



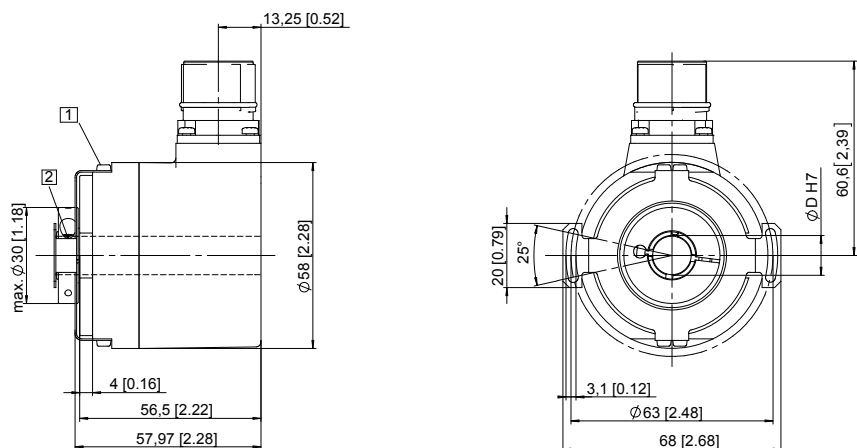
### Flange with stator coupling, $\varnothing$ 63 [2.48]

#### Flange type 5 and 6

Pitch circle diameter for fixing screws 63 mm [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, $\varnothing$ 65 [2.56]

#### Flange type 3 and 4

Pitch circle diameter for fixing screws 65 [2.56]

(Drawing with cable)

- 1 Recommended torque for the  
clamping ring 0.6 Nm

