

Absolute encoders – multiturn

**Standard
mechanical multiturn, optical**

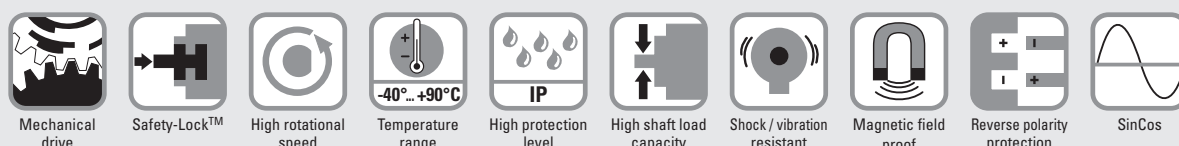
Sendix 5863 / 5883 (shaft / hollow shaft)

SSI / BiSS + incremental



The Sendix 5863 and 5883 multiturn encoders with SSI or BiSS interface and optical sensor technology can achieve a resolution of max. 29 bits.

A through hollow shaft up to 14 mm and a blind hollow shaft up to 15 mm are available, as well as versions with additional SinCos or RS422 incremental track.



Reliable

- Tried-and-tested in applications with the highest demands, such as in wind energy or mobile automation.
- Absolutely reliable operation in areas with strong magnetic fields, thanks to mechanical gear with optical sensor technology.
- Rugged die-cast housing, remains sealed even in harsh everyday use.
- -40 °C... +90 °C: use in wide temperature range and protection IP67.

Versatile

- Available with SSI or BiSS 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.

Order code Shaft version

8.5863 . XXXX . XX2X
Type a b c d e f g

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"]**
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"]

6 = servo flange, IP65 ø 63.5 mm [2.5"]¹⁾
8 = servo flange, IP67 ø 63.5 mm [2.5"]¹⁾

b Shaft (ø x L), with flat

- 1 = 6 x 10 mm [0.24 x 0.39"]²⁾**
2 = 10 x 20 mm [0.39 x 0.79"]³⁾
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-pin⁴⁾
6 = radial M12 connector, 8-pin⁴⁾

*) 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.: 8.5863.112A.G323.0030 (for cable length 3 m)

e Code

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

f Resolution⁵⁾

- A = 10 bit ST + 12 bit MT
1 = 11 bit ST + 12 bit MT
2 = 12 bit ST + 12 bit MT
3 = 13 bit ST + 12 bit MT
4 = 14 bit ST + 12 bit MT
7 = 17 bit ST + 12 bit MT
9 = 19 bit ST + 12 bit MT

g Options (service)

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

Optional on request

- Ex 2/22⁶⁾
- other singleturn resolutions
- surface protection salt spray tested
- seawater resistant (stainless steel V4A)

Salt spray tested / stainless steel V4A as standard types (deliverable as from 1 unit)



salt spray tested:
8.5863.32X6.XX22-C



stainless steel V4A:
8.5863.32X6.XX22-V4A

1) US version.

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


3) Preferred type only in conjunction with flange type 1.

4) Only in conjunction with interface type 1 and 2.

5) Resolution, preset value and counting direction factory-programmable.

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

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Order code Hollow shaft		8.5883 . XXXXX . XX2X Type a b c d e f g		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.	
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"] <u>5 = with stator coupling, IP65 ø 63 mm [2.48"]</u> 6 = with stator coupling, IP67 ø 63 mm [2.48"]		d Type of connection 2 = radial cable, 1 m [3.28'] PVC B = radial cable, special length PVC *) <u>E = tangential cable, 1 m [3.28'] PVC</u> F = tangential cable, special length PVC *) <u>4 = radial M23 connector, 12-pin</u> 6 = radial M12 connector, 8-pin ²⁾ *) 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.: 8.5883.542B.G323.0030 (for cable length 3 m)		e Code B = SSI, binary C = BiSS, binary <u>G = SSI, gray</u> i Resolution ¹⁾ A = 10 bit ST + 12 bit MT 1 = 11 bit ST + 12 bit MT 2 = 12 bit ST + 12 bit MT <u>3 = 13 bit ST + 12 bit MT</u> 4 = 14 bit ST + 12 bit MT 7 = 17 bit ST + 12 bit MT 9 = 19 bit ST + 12 bit MT	
b Through hollow shaft 3 = ø 10 mm [0.39"] <u>4 = ø 12 mm [0.47"]</u> 5 = ø 14 mm [0.55"] 8 = ø 3/8" 9 = ø 1/2" Blind hollow shaft (insertion depth max. 30 mm [1.18"]) 6 = ø 15 mm [0.59"]				g Options (service) 1 = no option 2 = status LED <u>3 = SET button and status LED</u>	
c Interface / supply voltage 1 = SSI, BiSS / 5 V DC <u>2 = SSI, BiSS / 10 ... 30 V DC</u> 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		Optional on request - Ex 2/22 (not for type of connection E, F) ³⁾ - other singleturn resolutions - surface protection salt spray tested - seawater resistant (stainless steel V4A)		Salt spray tested / stainless steel V4A as standard types (deliverable as from 1 unit) <div> salt spray tested: 8.5883.24X6.XX22-C 8.5883.25X6.XX22-C</div> <div><div>V4A</div><div>1.4404</div></div> stainless steel V4A: 8.5883.24X6.XX22-V4A	

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.
Cylindrical pin, long for flange with spring element (flange type 1 + 2)	with fixing thread 	8.0010.4700.0000
Connection technology		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut, 8-pin 2 m [6.56'] PVC cable	05.00.6041.8211.002M
	M23 female connector with coupling nut, 12-pin 2 m [6.56'] PVC cable	8.0000.6901.0002.0031
Connector, self-assembly (straight)	M12 female connector with coupling nut, 8-pin	05.CMB 8181-0
	M23 female connector with coupling nut, 12-pin	8.0000.5012.0000

Further accessories can be found in the accessories section or in the accessories area of our website at: kuebler.com/accessories.
 Additional connectors can be found in the connection technology section or in the connection technology area of our website at: kuebler.com/connection_technology.

1) Resolution, preset value and counting direction factory-programmable.
 2) Only in conjunction with interface type 1 and 2.
 3) 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	4.0 x 10 ⁻⁶ kgm ²
	hollow shaft version	7.0 x 10 ⁻⁶ kgm ²
Load capacity of shaft		
	radial	80 N
	axial	40 N
Weight		
		approx. 0.45 kg [15.87 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⁾
Material		
	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		
		2500 m/s ² , 6 ms
Vibration resistance acc. to 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. 80 mA
	10 ... 30 V DC	max. 50 mA
Reverse polarity protection of the supply voltage		
		yes (at 10 ... 30 V DC)
Short circuit proof outputs		
		yes ²⁾
UL approval		
		file no. E224618
CE compliant acc. to		
		EMC guideline 2014/30/EU RoHS 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
Resolution singleturn		
		10 ... 14 bit, 17 bit and 19 bit
Number of revolutions (multiturn)		
		4096 (12 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 singleturn		
		10 ... 14 bit, 17 bit and 19 bit
Number of revolutions (multiturn)		
		4096 (12 bit)
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		
	ST resolution ≤ 14 bit	≤ 1 μs
	ST resolution > 14 bit	≤ 4 μs
Note:		
	<ul style="list-style-type: none"> – bidirectional, factory programmable parameters are: resolution, code, direction, alarms and warnings – CRC data verification 	

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 22 kOhm).		
An active status output (LOW) displays:		
<ul style="list-style-type: none">– 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.		

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

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SET input or SET button		DIR input	
Input	active HIGH		
Input type	comparator		
Signal level	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.			
		Direction 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. If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.	
		Response time (DIR input)	1 ms
Power-ON			
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.			

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Terminal assignment

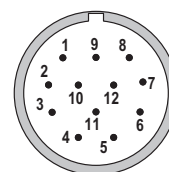
Interface	Type of connection	Features	Cable (isolate unused cores individually before initial start-up)													
1, 2	1, 2, A, B, E, F	SET, DIR, Status	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	Stat	N/C	N/C	N/C	⊥
			Core color:	WH	BN	GN	YE	GY	PK	BU	RD	BK	-	-	-	shield
Interface	Type of connection	Features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

Top view of mating side, male contact base



M12 connector, 8-pin



M23 connector, 12-pin

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Dimensions shaft version

Dimensions in mm [inch]

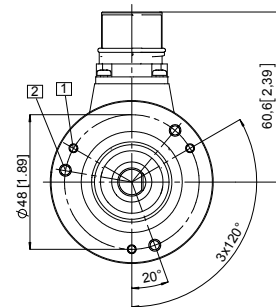
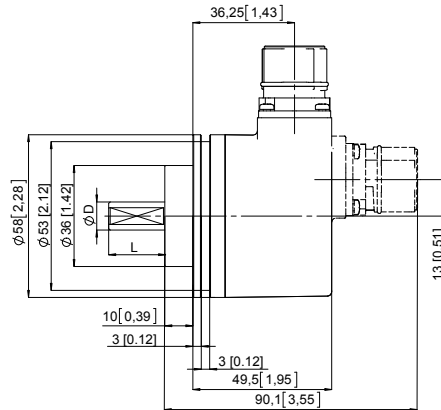
Clamping flange, $\varnothing 58$ [2.28]

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"	h7	7/8"
3/8"	h7	7/8"



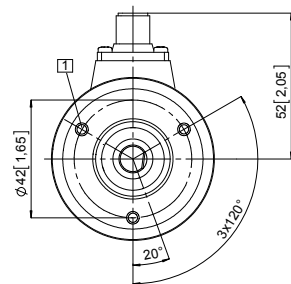
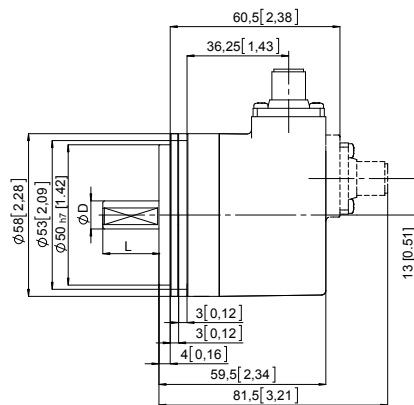
Synchro flange, $\varnothing 58$ [2.28]

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"	h7	7/8"
3/8"	h7	7/8"

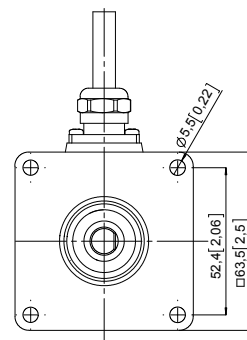
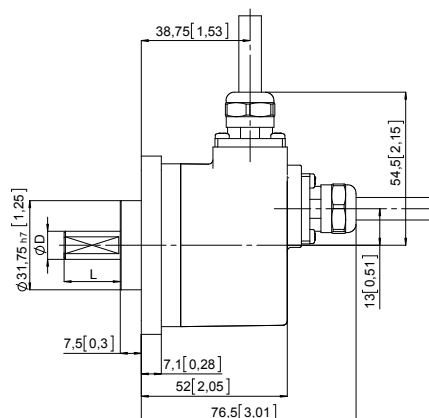


Square flange, $\square 63.5$ [2.5]

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"	h7	7/8"
3/8"	h7	7/8"



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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, long

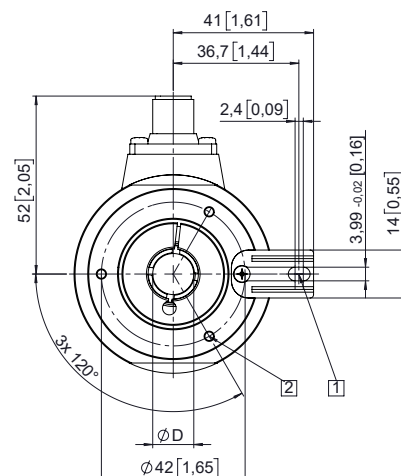
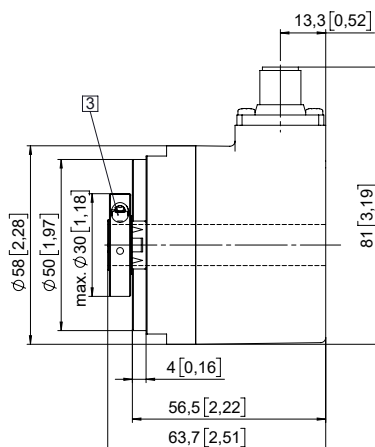
Flange type 1 and 2

(drawing with M12 connector)

- 1 Slot spring element, recommendation: cylindrical pin DIN 7, \varnothing 4 [0.16]
- 2 3 x M3, 6 [0.24] deep
- 3 Recommended torque for the clamping ring 0.6 Nm

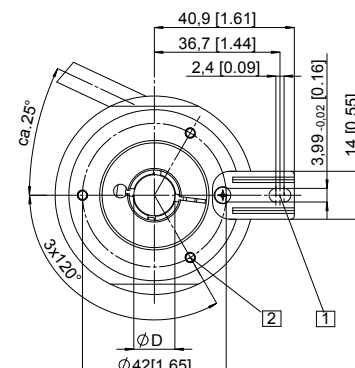
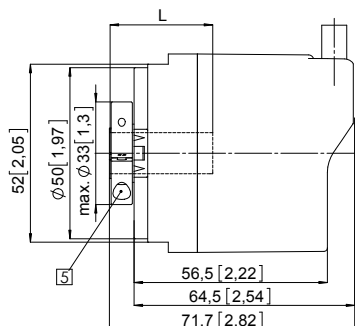
D	Fit
10 [0.39]	H7
12 [0.47]	H7
14 [0.55]	H7
15 [0.59] *)	H7
3/8"	H7
1/2"	H7

*) Blind hollow shaft, insertion depth max. = 30 mm [1.18"]



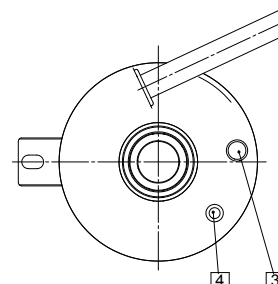
(drawing with tangential cable)

- 1 Slot spring element, recommendation: cylindrical pin DIN 7, \varnothing 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

*) Blind hollow shaft, insertion depth max. = 30 mm [1.18"]



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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with stator coupling, \varnothing 63 [2.48]

Flange type 5 and 6

Pitch circle diameter for fixing screws

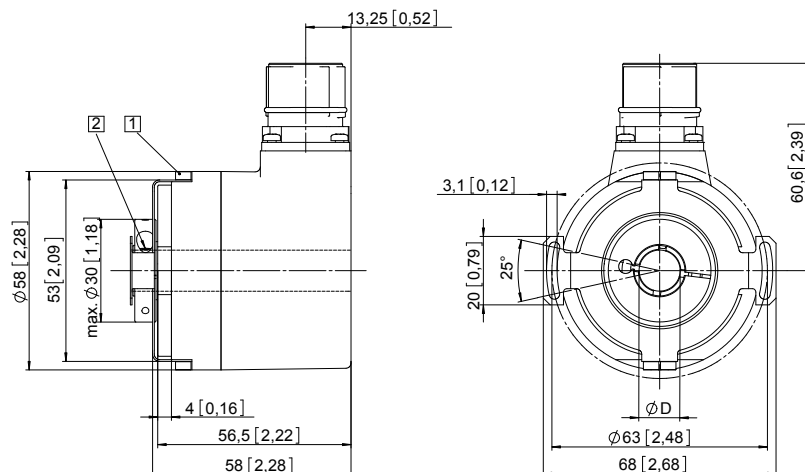
63 [2.48]

(drawing with M23 connector)

- 1 Fixing screws DIN 912 M2,5 x 6
(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

*) Blind hollow shaft,
insertion depth max. = 30 mm [1.18"]



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

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

*) Blind hollow shaft,
insertion depth (L) max. = 30 mm [1.18"]

