

Absolute encoders - singleturn

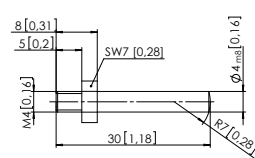
Standard optical	Sendix 5853 / 5873 (shaft / hollow shaft)	SSI / BiSS
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Order code	8.5873	.XXXX.XX2X	If for each parameter of an encoder the <u>underlined preferred option</u> is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.	10 By 10								
Hollow shaft	Type	<table border="1" style="font-size: x-small; text-align: center;"> <tr> <td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td> </tr> </table>	a	b	c	d	e	f	g	h		
a	b	c	d	e	f	g	h					

<p>a Flange</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"] 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⁾ H = with expanding coupling, IP65 ø 65 mm [2.56"] ¹⁾</p> <p>b Hollow shaft</p> <p>3 = ø 10 mm [0.39"] K = ø 10 mm [0.39"], with tapered shaft <u>4 = ø 12 mm [0.47"]</u> 5 = ø 14 mm [0.55"] 6 = ø 15 mm [0.59"] 8 = ø 3/8" 9 = ø 1/2"</p>	<p>c Interface / power supply</p> <p>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</p> <p>d Type of connection</p> <p>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⁾</p> <p>*) 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)</p>	<p>e Code</p> <p>B = SSI, binary C = BiSS, binary <u>G = SSI, gray</u></p> <p>f Resolution ³⁾</p> <p>A = 10 bit 1 = 11 bit 2 = 12 bit <u>3 = 13 bit</u> 4 = 14 bit 7 = 17 bit C = 21 bit ⁴⁾</p>	<p>g Inputs / outputs ³⁾</p> <p><u>2 = SET, DIR input</u> additional status output</p> <p>h Options (service)</p> <p>1 = no option 2 = status LED <u>3 = SET button and status LED</u></p> <p><i>Optional on request</i></p> <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
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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 torque stops	
	with fixing thread
	8.0010.4700.0000

Connection technology	Order no.
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 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 and code C.
 5) For the cable connection type, cable material PUR.

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Standard optical	Sendix 5853 / 5873 (shaft / hollow shaft)	SSI / BiSS
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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	aluminium
	housing	zinc die-cast
	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		
		yes
Short circuit proof outputs		
		yes ²⁾
UL approval		
		file 224618
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		
		10 ... 14 bit and 17 bit
Code		
		binary or gray
SSI clock rate		
		50 kHz ... 2 MHz
Data refresh rate		
	resolution ≤ 14 bit	≤ 1 μs
	resolution ≥ 15 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		
		< 1 μs
Protocol		
		BiSS-C BP3 encoder profile
Note:		
	<ul style="list-style-type: none"> - 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 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.		

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

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, power supply correctly applied.

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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.

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

DIR input	
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.	
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 Time	
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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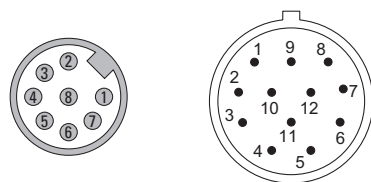
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Terminal assignment

Interface	Type of connection	Features	Cable (isolate unused wires 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
			Cable colour: WH BN GN YE GY PK BU RD BK - - - shield
1, 2	3, 4	SET, DIR, Status	M23 connector
			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 wires individually before initial start-up)
			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
5	3, 4	SET, DIR, Status sensor output	M23 connector
			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
3, 4, 7, 8	1, 2, A, B, E, F	SET, DIR, SinCos or incr. RS422	Cable (isolate unused wires individually before initial start-up)
			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
3, 4, 7, 8	3, 4	SET, DIR, SinCos or incr. RS422	M23 connector
			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
6, 9	1, 2, A, B, E, F	SinCos o. incr. RS422 sensor output	Cable (isolate unused wires individually before initial start-up)
			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
6, 9	3, 4	SinCos o. incr. RS422 sensor output	M23 connector
			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
1, 2	5, 6	SET, DIR	M12 connector
			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
- 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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Dimensions shaft version

Dimensions in mm [inch]

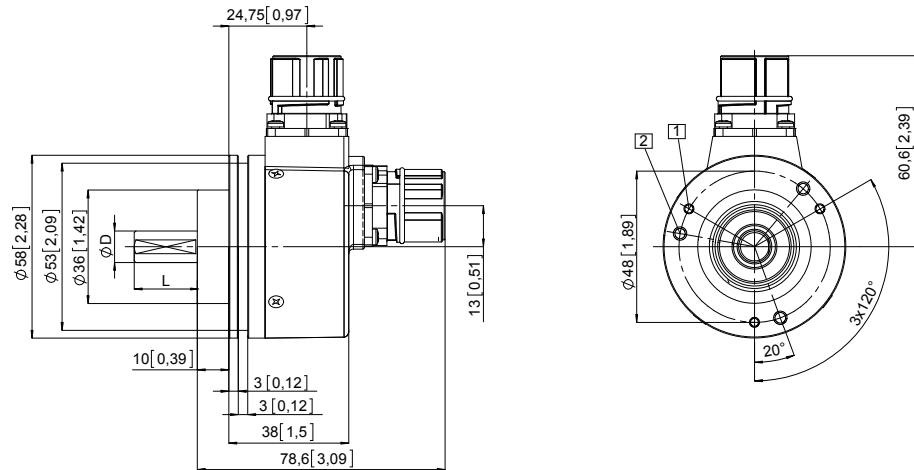
Clamping flange, \varnothing 58 [2.28]

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



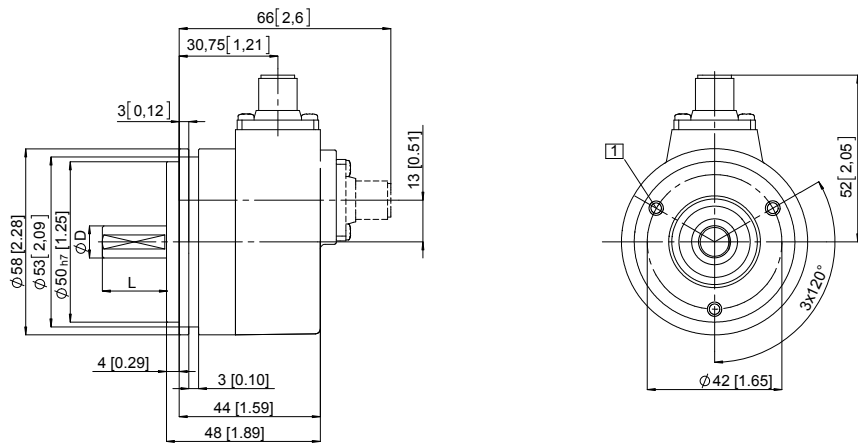
Synchro flange, \varnothing 58 [2.28]

Flange type 2 and 4

(drawing with M12 connector)

- ① 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

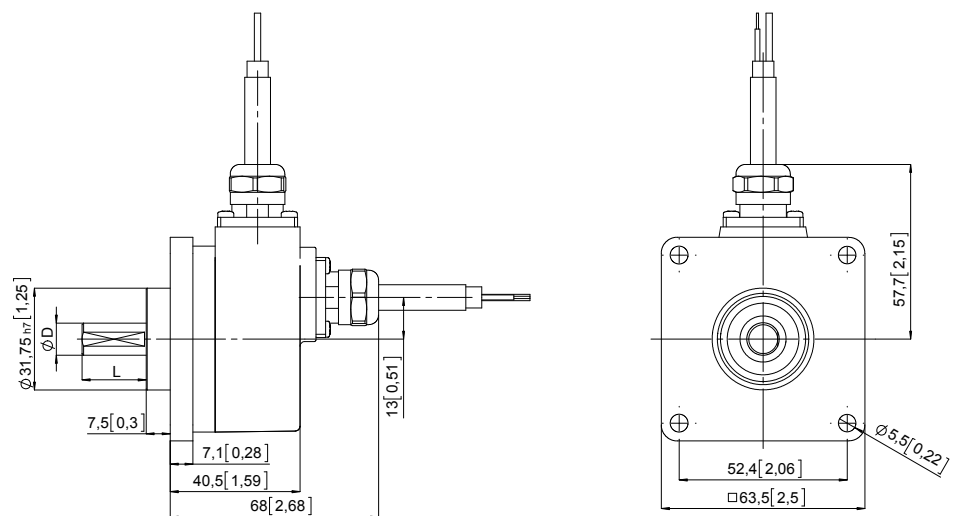


Square flange, \square 63.5 [2.5]

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



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Standard optical

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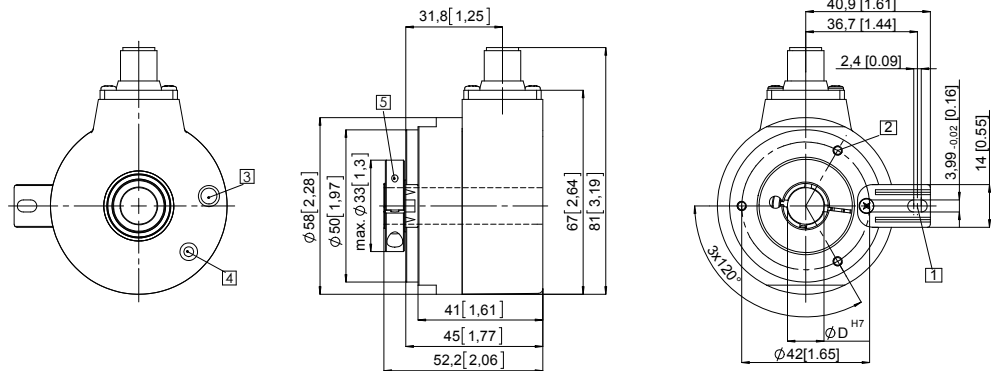
SSI / BiSS

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 3 x M3, 5.5 [0.21] deep
- 3 Status-LED
- 4 SET button
- 5 Recommended torque for the clamping ring 0.6 Nm

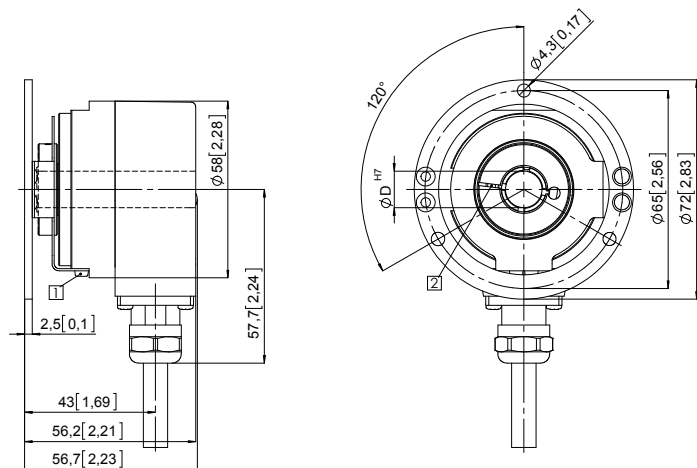


Flange with stator coupling, $\varnothing 65$ [2.56]

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

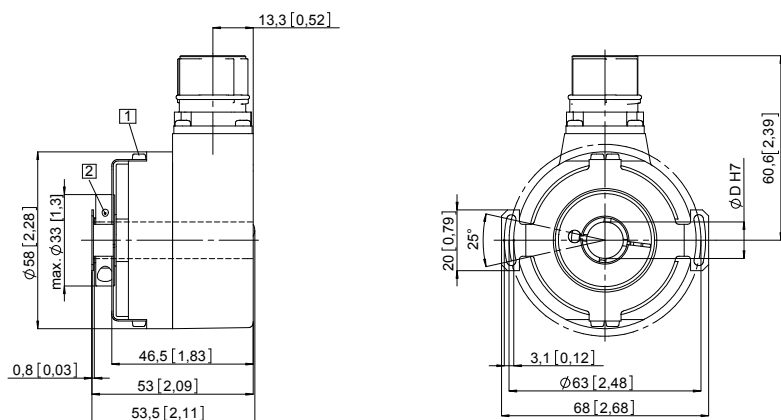


Flange with stator coupling, $\varnothing 63$ [2.48]

Flange type 5 and 6

Pitch circle diameter for fixing screws 63 [2.48]
(drawing with M23 connector)

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



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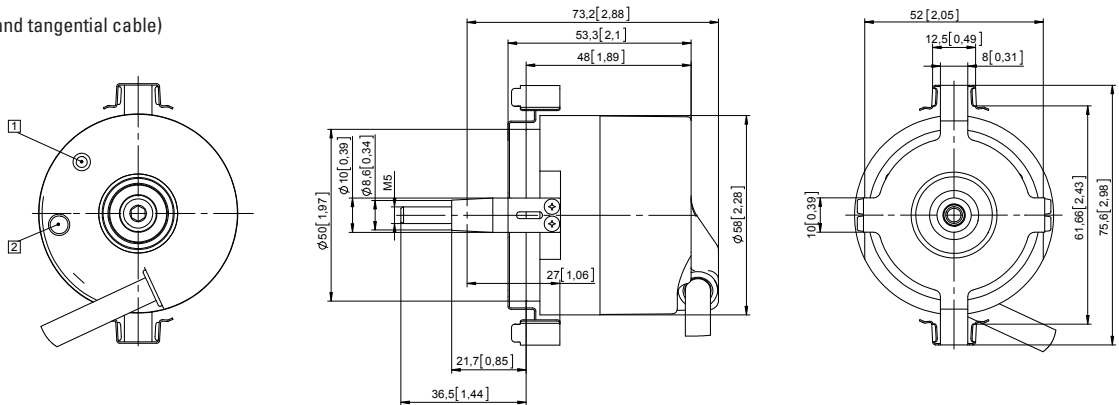
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Dimensions hollow shaft version

Dimensions in mm [inch]

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

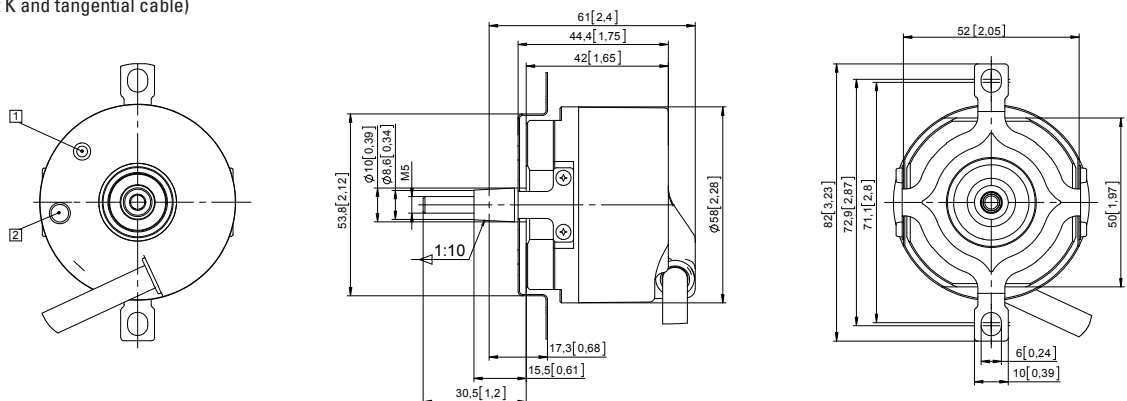


Flange with stator coupling, ø 72 [2.83]

Flange type G

(with tapered shaft K and tangential cable)

- 1 Status LED
- 2 SET Button



Flange with expanding coupling, ø 65 [2.56"]

Flange type H

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

