

# Absolute encoders – multiturn

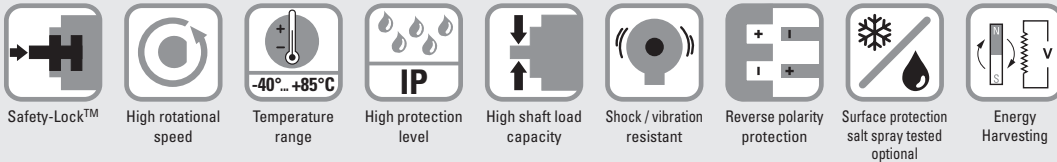
**Compact  
electronic multiturn, magnetic**

**Sendix M3663 / M3683 (shaft / hollow shaft)**

**SSI**



The Sendix M36 with Energy Harvesting Technology is an electronic multiturn encoder in miniature format, without gear and without battery. With a size of just 36 x 53 mm it offers a blind hollow shaft of up to 10 mm.



## Reliable and insensitive

- Sturdy bearing construction in Safety-Lock™ design for resistance against vibration and installation errors.
- Reduced number of components ensures magnetic insensitivity.
- IP67 protection and wide temperature range -40°C ... +85°C.
- Without gear and without battery, thanks to the Energy Harvesting technology.

## Application oriented

- Absolute accuracy  $\pm 1^\circ$ .
- Repeat accuracy  $\pm 0.2^\circ$ .
- Short control cycles, clock frequency with SSI up to 2 MHz.
- Max. resolution 38 bit (14 bit ST + 24 bit MT).

## Order code Shaft version

**8.M3663** . **XX2X** . **XXXX2**  
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, IP67,  $\varnothing$  36 mm [1.42"]
- 3 = clamping flange, IP65,  $\varnothing$  36 mm [1.42"]
- 2 = synchro flange, IP67,  $\varnothing$  36 mm [1.42"]
- 4 = synchro flange, IP65,  $\varnothing$  36 mm [1.42"]

### b Shaft ( $\varnothing \times L$ ), with flat

- 1 =  $\varnothing$  6 x 12.5 mm [0.24 x 0.49"]
- 3 =  $\varnothing$  8 x 15 mm [0.32 x 0.59"]
- 5 =  $\varnothing$  10 x 20 mm [0.39 x 0.79"]
- 2 =  $\varnothing$  1/4" x 12.5 mm [0.49"]

### c Interface / power supply

- 2 = SSI / 10 ... 30 V DC

### d Type of connection

- 1 = axial cable, 1 m [3.28'] PUR
- A = axial cable, special length PUR \*)
- 2 = radial cable, 1 m [3.28'] PUR
- B = radial cable, special length PUR \*)
- 3 = axial M12 connector, 8-pin
- 4 = radial M12 connector, 8-pin
- \*) 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.M3663.432A.G322.0030 (for cable length 3 m)

### e Code

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

### f Resolution (singleturn)

- A = 10 bit ST
- 2 = 12 bit ST
- 3 = 13 bit ST
- 4 = 14 bit ST

### g Resolution (multiturn)

- 2 = 12 bit MT
- 6 = 16 bit MT
- A = 20 bit MT
- 4 = 24 bit MT

### Optional on request

- Ex 2/22 (only for connection types 3 and 4)
- surface protection salt spray tested

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<b>Order code</b> <b>Hollow shaft</b>	<b>8.M3683</b> Type	<b>.XX2X.XXX2</b> 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.	<b>10 by 10</b>
<b>a Flange</b> <b>2 = with stator coupling, IP65, ø 46 mm [1.81"]</b> 3 = with spring element, long, IP65 5 = with stator coupling, IP67, ø 46 mm [1.81"] 6 = with spring element, long, IP67	<b>d Type of connection</b> 1 = axial cable, 1 m [3.28'] PUR A = axial cable, special length PUR *) 2 = radial cable, 1 m [3.28'] PUR B = radial cable, special length PUR *) 3 = axial M12 connector, 8-pin <b>4 = radial M12 connector, 8-pin</b> *) 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.M3683.242A.G322.0030 (for cable length 3 m)	<b>f Resolution (singleturn)</b> A = 10 bit ST 2 = 12 bit ST <b>3 = 13 bit ST</b> 4 = 14 bit ST  <b>g Resolution (multiturn)</b> <b>2 = 12 bit MT</b> 6 = 16 bit MT A = 20 bit MT 4 = 24 bit MT	<b>c Interface / power supply</b> <b>2 = SSI / 10 ... 30 V DC</b>	<b>e Code</b> B = SSI, binary <b>G = SSI, gray</b>  <i>Optional on request</i> - Ex 2/22 (only for connection types 3 and 4) - surface protection salt spray tested
<b>b Blind hollow shaft</b> (insertion depth max. 18.5 mm [0.73"]) 1 = ø 6 mm [0.24"] 3 = ø 8 mm [0.32"] <b>4 = ø 10 mm [0.39"]</b> 2 = ø 1/4"				

Mounting accessory for shaft encoders		Order no.
<b>Coupling</b>	Bellows coupling ø 19 mm [0.75"] for shaft 8 mm [0.32"]	<b>8.0000.1102.0808</b>
Mounting accessory for hollow shaft encoders		Order no.
<b>Cylindrical pin, long</b> for flange with spring element (flange type 3 + 6)	with fixing thread 	<b>8.0010.4700.0000</b>
Connection technology		Order no.
<b>Cordset, pre-assembled</b>	M12 female connector with coupling nut, 8-pin 2 m [6.56'] PVC cable	<b>05.00.6051.8211.002M</b>
<b>Connector, self-assembly (straight)</b>	M12 female connector with coupling nut, 8-pin	<b>05.CMB 8181-0</b>

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).

Technical data	
Mechanical characteristics	
<b>Maximum speed</b>	
shaft or blind hollow shaft version without shaft seal (IP65)	6000 min <sup>-1</sup> 3000 min <sup>-1</sup> (continuous)
shaft or blind hollow shaft version with shaft seal (IP67)	4000 min <sup>-1</sup> 2000 min <sup>-1</sup> (continuous)
<b>Starting torque at 20°C [68°F]</b>	
without shaft seal	< 0.007 Nm
with shaft seal (IP67)	< 0.01 Nm
<b>Shaft load capacity</b>	
radial	40 N
axial	20 N
Electrical characteristics	
<b>Weight</b>	approx. 0.2 kg [7.06 oz]
<b>Protection acc. to EN 60529</b>	IP65 or IP67
<b>Working temperature range</b>	-40°C ... +85°C [-40°F ... +185°F]
<b>Materials</b>	shaft / hollow shaft: stainless steel flange: aluminum housing: zinc die-cast cable: PUR
<b>Shock resistance acc. to EN 60068-2-27</b>	2500 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance acc. to EN 60068-2-6</b>	300 m/s <sup>2</sup> , 10 ... 2000 Hz

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Electrical characteristics	
<b>Power supply</b>	10 ... 30 V DC
<b>Current consumption</b> (no load)	max. 40 mA
<b>Reverse polarity protection of the power supply</b>	yes
<b>Short-circuit proof outputs</b>	yes <sup>1)</sup>
<b>e1 compliant</b> acc. to (pending)	EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637)
<b>UL approval</b>	file 224618
<b>CE compliant</b> acc. to	EMC guideline 2014/30/EU RoHS 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 with I <sub>Load</sub> = 20 mA typ 1.3 V
<b>Resolution singleturn</b>	10 ... 14 bit
<b>Absolute accuracy</b> <sup>2)</sup>	±1°
<b>Repeat accuracy</b>	±0.2°
<b>Number of revolutions</b> (multiturn)	max. 24 bit
<b>Code</b>	binary or gray
<b>SSI clock rate</b>	50 kHz ... 2 MHz
<b>Data refresh rate</b>	2 ms
<b>Monoflop time</b>	≤ 15 µs
<b>Note:</b> If the clock cycle starts within the monoflop time a second data transfer begins with the same data. If the clock cycle starts after the monoflop time the cycle begins with the new values. The update rate is dependent on the clock speed, data length and monoflop time.	

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</b> (SET)	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. 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. 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. The number of preset value writing cycles is limited to 10,000. 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 this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.	
<b>Response time</b> (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.	

## Terminal assignment

Interface	Type of connection	Features	Cable (isolate unused wires individually before initial start-up)									
2	1, 2, A, B	SET, DIR	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	⊥
			Cable color:	WH	BN	GN	YE	GY	PK	BU	RD	shield
Interface	Type of connection	Features	M12 connector, 8-pin									
2	3, 4	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)  
C+, C-: Clock signal  
D+, D-: Data signal  
SET: Set input  
DIR: Direction input  
PH ⊥: Plug connector housing (shield)

## Top view of mating side, male contact base



M12 connector, 8-pin

1) Short circuit proof to 0 V or to output when power supply correctly applied.  
2) Over the whole temperature range.

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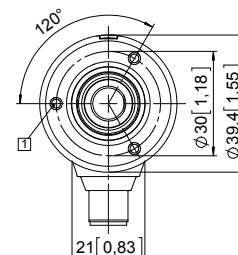
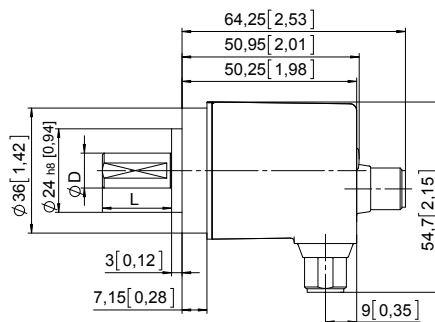
## Dimensions shaft version

Dimensions in mm [inch]

### Clamping flange, $\varnothing 36$ [1.42]

Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

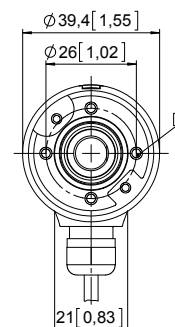
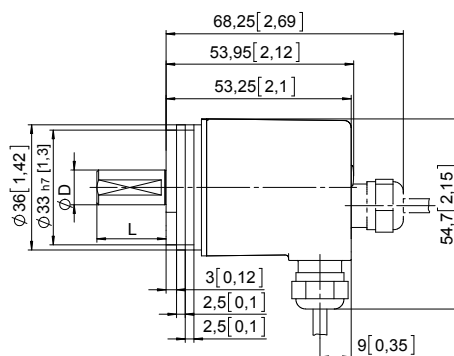


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

### Synchro flange, $\varnothing 36$ [1.42]

Flange type 2 and 4

1 4 x M3, 6 [0.24] deep



D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

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### Dimensions hollow shaft version

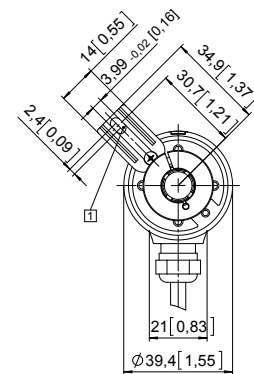
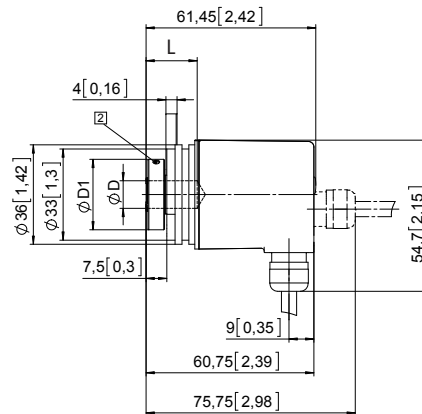
Dimensions in mm [inch]

#### Flange with spring element, long Flange type 3 and 6

- 1 Slot spring element, recommendation: cylindrical pin DIN 7,  $\varnothing 4$  [0.16]
- 2 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

L = insertion depth max. blind hollow shaft



#### Flange with stator coupling, $\varnothing 46$ [1.81] Flange type 2 and 5

- 1 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

L = insertion depth max. blind hollow shaft

