

Absolute encoders – multiturn

Compact electronic multiturn, magnetic	Sendix M3663 / M3683 (shaft / hollow shaft)	SSI
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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.



Safety-Lock™	High rotational speed	Temperature range -40°... +85°C	High protection level IP	High shaft load capacity	Shock / vibration resistant	Reverse polarity protection	Surface protection salt spray tested optional	Energy Harvesting

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

- Angular measurement deviation $\pm 0,5^\circ$.
- 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 8.M3663 . XX 2 X . XXX 2
Shaft version Type

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 x 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 / supply voltage
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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Order code	8.M3683	.XX2X.XXX2	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	<div style="display: flex; justify-content: space-around; font-size: 0.7em;"> abcdefg </div>	
a Flange	2 = <u>with stator coupling, IP65, ø 46 mm [1.81"]</u> 3 = with spring element, long, IP65 5 = with stator coupling, IP67, ø 46 mm [1.81"] 6 = with spring element, long, IP67	d Type of connection	f Resolution (singleturn)
b Blind hollow shaft	(insertion depth max. 18.5 mm [0.73"]) 1 = ø 6 mm [0.24"] 3 = ø 8 mm [0.32"] 4 = <u>ø 10 mm [0.39"]</u> 2 = ø 1/4"	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 = <u>radial M12 connector, 8-pin</u> *) 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)	A = 10 bit ST 2 = 12 bit ST 3 = <u>13 bit ST</u> 4 = 14 bit ST
c Interface / supply voltage	2 = <u>SSI / 10 ... 30 V DC</u>	e Code	g Resolution (multiturn)
		B = SSI, binary G = <u>SSI, gray</u>	2 = <u>12 bit MT</u> 6 = 16 bit MT A = 20 bit MT 4 = 24 bit MT
			<i>Optional on request</i> - Ex 2/22 (only for connection types 3 and 4) - surface protection salt spray tested

Mounting accessory for shaft encoders	Order no.
Coupling Bellows coupling ø 19 mm [0.75"] for shaft 8 mm [0.32"]	8.0000.1102.0808

Mounting accessory for hollow shaft encoders	Order no.
Torque pin, ø 4 mm with fixing thread for flange with spring element (flange type 3 + 6)	8.0010.4700.0000

Cables and connectors	Order no.	
Preassembled cables	M12 female connector with coupling nut, 8-pin, A coded, straight open ended 2 m [6.56'] PUR cable	05.00.6051.8211.002M
Connectors	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)	05.CMB 8181-0

Further Kübler accessories can be found at: kuebler.com/accessories
 Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

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Technical data

Mechanische Kennwerte	
Maximum speed	
shaft or blind hollow shaft version without shaft seal (IP65)	6000 min ⁻¹ 3000 min ⁻¹ (continuous)
shaft or blind hollow shaft version with shaft seal (IP67)	4000 min ⁻¹ 2000 min ⁻¹ (continuous)
Starting torque at 20 °C [68 °F]	
without shaft seal	< 0.007 Nm
with shaft seal (IP67)	< 0.01 Nm
Shaft load capacity	radial 40 N axial 20 N
Weight	ca. approx. 210 g [7.41 oz] g
Protection acc. to EN 60529	IP65 or IP67
Working temperature range	-40 °C ... +85 °C [-40 °F ... +185 °F]
Materials	shaft / hollow shaft stainless steel flange aluminum housing zinc die-cast cable PUR
Shock resistance acc. to EN 60068-2-27	2500 m/s ² , 6 ms
Vibration resistance acc. to EN 60068-2-6	300 m/s ² , 10 ... 2000 Hz

Electrical characteristics	
Supply voltage	10 ... 30 V DC
Current consumption (no load)	max. 40 mA
Reverse polarity protection of the supply voltage	yes
Short-circuit proof outputs	yes ¹⁾

SSI interface	
Output driver	RS485 transceiver type
Permissible load / channel	max. +/- 30 mA
Signal level	HIGH typ 3.8 V LOW with I _{Load} = 20 mA typ 1.3 V
Resolution singleturn	10 ... 14 bit
Angular measurement deviation ²⁾	±0,5°
Repeat accuracy	±0.2°
Number of revolutions (multiturn)	max. 24 bit
Code	binary or gray
SSI clock rate	50 kHz ... 2 MHz
Data refresh rate	2 ms
Monoflop time	≤ 15 μs
Note: 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	
Input	active HIGH
Input type	comparator
Signal level (+V = supply voltage)	HIGH min. 60 % of +V, max: +V LOW max. 30 % of +V
Input current	< 0.5 mA
Min. pulse duration (SET)	10 ms
Input delay	1 ms
New position data readable after	1 ms
Internal processing time	200 ms
<p>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. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the supply voltage must not be switched off.</p> <p>The SET function should be carried out whilst the encoder is at rest.</p> <p>The number of preset value writing cycles is limited to 10,000.</p> <p>If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.</p>	

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.</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)
UKCA compliant in accordance with	
EMC Regulations	S.I. 2016/1091
RoHS Regulations	S.I. 2012/3032
UKEX Regulations	S.I. 2016/1107 (for Ex 2/22 variants)

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

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Terminal assignment

Interface	Type of connection	Features	Cable (isolate unused cores individually before initial start-up)									
2	1, 2, A, B	SET, DIR	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	⊥
			Core 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: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder 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

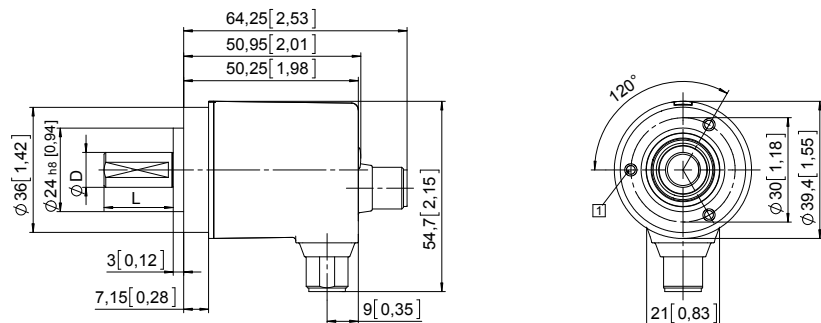
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 36 [1.42]

Flange type 1 and 3

- 1 3 x M3, 6 [0.24] deep

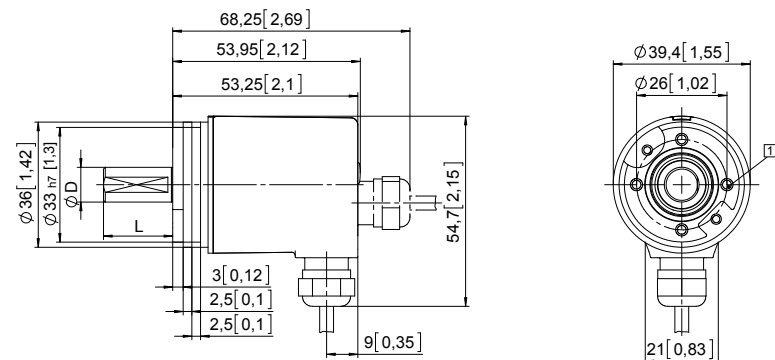


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

Synchro flange, ø 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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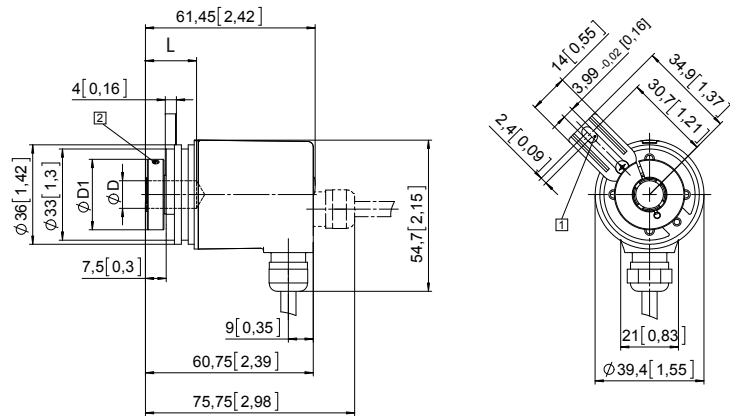
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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, long Flange type 3 and 6

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

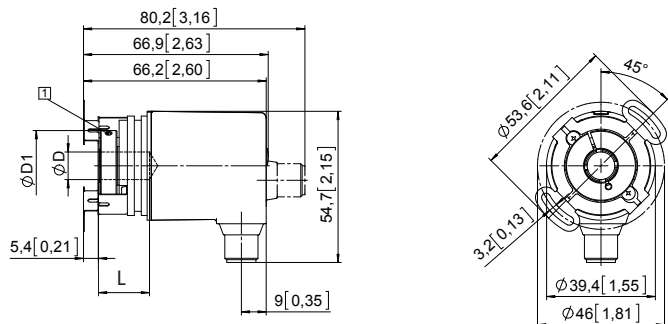


D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

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