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.

e1 pending · cULus pending · Ex 2/22 · RoHS · SSI

Safety-Lock™ · High rotational speed · Temperature range · High protection level · 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

- Absolute accuracy ±1°.
- Repeat accuracy ±0,2°.
- 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 [1)]

8.M3663	.	X	X	2	X	.	X	X	X	2
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. 10 by 10

a *Flange*
1 = clamping flange, IP67, ø 36 mm [1.42"]
3 = clamping flange, IP65, ø 36 mm [1.42"]
2 = synchro flange, IP67, ø 36 mm [1.42"]
4 = synchro flange, IP65, ø 36 mm [1.42"]

b *Shaft (ø x L), with flat*
1 = ø 6 x 12.5 mm [0.24 x 0.49"]
3 = ø 8 x 15 mm [0.32 x 0.59"]
5 = ø 10 x 20 mm [0.39 x 0.79"]
2 = ø 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
4 = radial M12 connector

*) 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

1) Series availability as from June 2015.

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

Order code Hollow shaft [1)]

8.M3683.XX2X.XXX2 (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.

10 by 10

a *Flange*
- **2 = with stator coupling, IP65, ø 46 mm [1.81"]**
- 3 = with spring element, long, IP65
- 5 = with stator coupling, IP67, ø 46 mm [1.81"]
- 6 = with spring element, long, IP67

b *Blind hollow shaft*
- 1 = ø 6 mm [0.24"]
- 3 = ø 8 mm [0.32"]
- **4 = ø 10 mm [0.39"]**
- 2 = ø 1/4"

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
- 4 = radial M12 connector

*) 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)

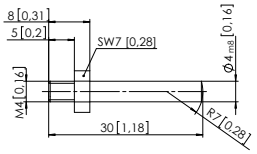
e *Code*
- B = SSI, binary
- **G = SSI, gray**

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

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 with spring element		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**
Cordset, pre-assembled	M12 female connector with coupling nut, 2 m [6.56'] PUR cable	**05.00.6051.8211.002M**

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

Technical data

Mechanical characteristics

Maximum speed		
shaft- or blind hollow shaft version without shaft seal (IP65))		6000 min^{-1} 3000 min^{-1} (continuous)
Shaft version (IP67) or blind hollow shaft version (IP65) with shaft seal		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		approx. 0.2 kg [7.06 oz]
Protection acc. to EN 60529	housing side	IP67
	shaft side	IP65 (solid shaft version opt. IP67)
Working temperature range		-40°C ... +85°C [-40°F ... +185°F]
Materials	shaft / hollow shaft	stainless steel
	flange	aluminium
	housing	aluminium
	cable	PUR
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

1) Series availability as from June 2015.

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Electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (no load)	max. 30 mA
Reverse polarity protection of the power supply	yes
Short-circuit proof outputs	yes [1]
e1 compliant acc. to (pending)	EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637)
UL approval	pending
CE compliant acc. to	EMC guideline 2004/108/EC RoHS guideline 2011/65/EU

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
Number of revolutions	max. 24 bit
Code	binary or gray
SSI clock rate	50 kHz ... 2 MHz
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.

Data refresh rate	2 ms
Status and Parity bit	on request

SET input

Input		active HIGH
Input type		comparator
Signal level (+V = power supply)	HIGH	min. 60 % of +V, max: +V
	LOW	max. 30 % of +V
Input current		10 ms
Min. pulse duration (SET)		max. 24 bit
Input delay		1 ms
New position data readable after		1 ms
Internal processing time		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.

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.

Response time (DIR input)	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)									
2	1, 2, A, B	SET, DIR	Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	⏚
			Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	shield

Interface	Type of connection	Features	M12 connector									
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. 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.
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.

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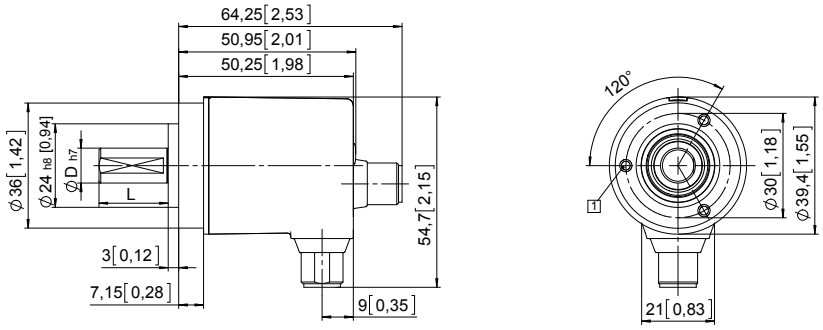
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 36 [1.42]
Flange type 1 and 3

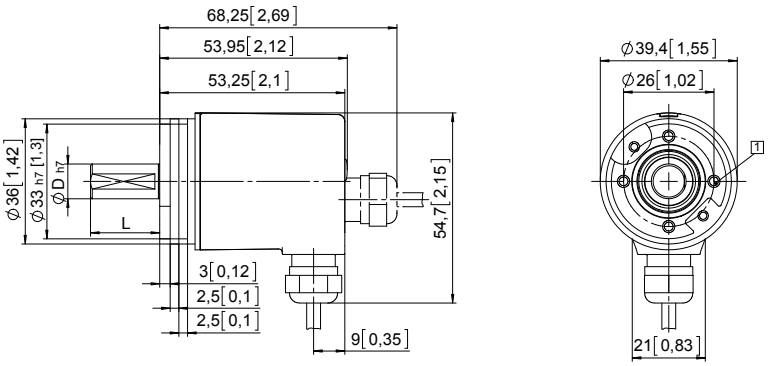
1 3 x M3, 6 [0.24] deep



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

Synchro flange, ø 36 [1.42]
Flange type 2 and 4

1 4 x M3, 6 [0.24] deep



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

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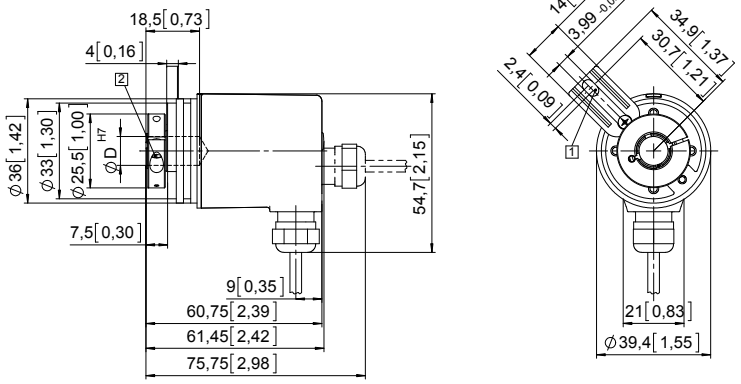
Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, long
Flange type 3 and 6

1 Torque stop slot, recommendation: cylindrical pin DIN 7, ø 4 [0.16]

2 Recommended torque for the clamping ring 0,7 Nm

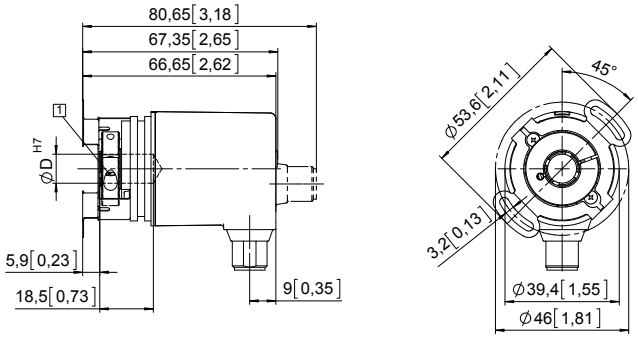


D	D1
6 [0.24]	24 [0.94]
8 [0.32]	25.5 [1.00]
10 [0.39]	25.5 [1.00]
1/4“	24 [0.94]

Insertion depth for blind hollow shaft 14.5 [0.57]

Flange with stator coupling, ø 46 [1.81]
Flange type 2 and 5

1 Recommended torque for the clamping ring 0,7 Nm



D	D1
6 [0.24]	24 [0.94]
8 [0.32]	25.5 [1.00]
10 [0.39]	25.5 [1.00]
1/4“	24 [0.94]

Insertion depth for blind hollow shaft 14.5 [0.57]