

Absolute encoders – multiturn

**Compact
electronic multiturn, magnetic**

Sendix M3661 / M3681 (shaft / hollow shaft)

Analog



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



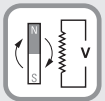
Shock / vibration resistant



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

- Current output 4 ... 20 mA.
- Voltage output 0 ... 10 V or 0 ... 5 V.
- Measuring range scalable.
- Limit switch function.

Order code Shaft version

8.M3661.XXXX.XX12
Type a b c d e f

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, 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 Output circuit ¹⁾

- 3 = current output**
- 4 = voltage 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 M12 connector, 5-pin
- 4 = radial M12 connector, 5-pin**
- C = axial M12 connector, 5-pin ²⁾
- D = radial M12 connector, 5-pin ²⁾

*) 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.M3661.433A.3112.0030 (for cable length 3 m)

e Interface / resolution / supply voltage

- 3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC**
- 4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC**
- 5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC

f Measuring range

- 1 = 16 revolutions / cw**
- 2 = 16 revolutions / ccw
- 3 = scalable up to 65,536 revolutions, with limit switch function / cw
- 4 = scalable up to 65,536 revolutions, without limit switch function / cw
- 5 = scalable up to 65,536 revolutions, with limit switch function / ccw
- 6 = scalable up to 65,536 revolutions, without limit switch function / ccw

Optional on request

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

1) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".
2) Special terminal assignment.

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Order code Hollow shaft	8.M3681 Type	.XXXX.XX12 a b c d e f	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
a Flange <u>2 = 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	b Blind hollow shaft (insertion depth max. 18.5 mm [0.73"]) 1 = ø 6 mm [0.24"] 3 = ø 8 mm [0.32"] <u>4 = ø 10 mm [0.39"]</u> 2 = ø 1/4"	c Output circuit ¹⁾ <u>3 = current output</u> <u>4 = voltage output</u>	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 M12 connector, 5-pin <u>4 = radial M12 connector, 5-pin</u> C = axial M12 connector, 5-pin ²⁾ D = radial M12 connector, 5-pin ²⁾ *) 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.M3681.243A.3112.0030 (for cable length 3 m)	f Measuring range <u>1 = 16 revolutions / cw</u> 2 = 16 revolutions / ccw 3 = scalable up to 65,536 revolutions, with limit switch function / cw 4 = scalable up to 65,536 revolutions, without limit switch function / cw 5 = scalable up to 65,536 revolutions, with limit switch function / ccw 6 = scalable up to 65,536 revolutions, without limit switch function / ccw <i>Optional on request</i> - Ex 2/22 (only for connection types 3 and 4) - surface protection salt spray tested
e Interface / resolution / supply voltage <u>3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC</u> <u>4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC</u> 5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC				

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		Dimensions in mm [inch]	Order no.
Torque pin, ø 4 mm for flange with spring element (flange type 3 + 6)	with fixing thread		8.0010.4700.0000

Cables and connectors		Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight open ended 2 m [6.56'] PVC cable	05.00.6081.2211.002M
Connectors	M12 female connector with coupling nut, 5-pin, A coded, straight (metal)	8.0000.5116.0000

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

1) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".
2) Special terminal assignment.

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Technical data

Mechanical characteristics		
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	approx. 210 g [7.41 oz]	
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	PVC
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 current interface 4 ... 20 mA		
Supply voltage	10 ... 30 V DC	
Current consumption (no load)	max. 30 mA	
Reverse polarity protection of the supply voltage	yes	
Short-circuit proof outputs	yes ¹⁾	
Measuring range	factory setting	2 ⁴ revolutions
	optionally scalable	up to 2 ¹⁶ revolutions
DA converter resolution	12 bit	
Singleturn accuracy , at 25 °C [77 °F]	±1°	
Temperature coefficient	< 100 ppm/K	
Repeat accuracy , at 25 °C [77 °F]	±0.2°	
Output load	at 10 V DC	max. 200 Ohm
	at 24 V DC	max. 900 Ohm
	at 30 V DC	max. 1200 Ohm
Setting time	< 1 ms, R _{Burden} = 900 Ohm, 25 °C [77 °F]	
LEDs (green/red)	<ul style="list-style-type: none"> - system status - current loop interruption – input load too high - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1° - status in teach mode 	
Options	<ul style="list-style-type: none"> - output signal scalable via the teach inputs - output signal scalable via the teach inputs + limit switch function 	
Teach inputs	level = +V for 1 s min.	
PowerON Time	< 1 s	
Update rate	1 ms	
E1 compliant acc. to	ECE guideline	
UL approval	File no. E224618	
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU	

Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V		
Supply voltage	output 0 ... 5 V	10 ... 30 V DC
	output 0 ... 10 V	15 ... 30 V DC
Current consumption (no load)	max. 30 mA	
Reverse polarity protection of the supply voltage	yes	
Short-circuit proof outputs	yes ¹⁾	
Measuring range	factory setting	2 ⁴ revolutions
	optionally scalable	up to 2 ¹⁶ revolutions
DA converter resolution	0 ... 10 V	12 bit
	0 ... 5 V	11 bit
Singleturn accuracy , at 25 °C [77 °F]	±1°	
Temperature coefficient	< 100 ppm/K	
Repeat accuracy , at 25 °C [77 °F]	±0.2°	
Current output	max. 10 mA	
Setting time	< 1 ms, R _{Load} = 1000 Ohm, 25 °C [77 °F]	
LEDs (green/red)	<ul style="list-style-type: none"> - system status - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1° - status in teach mode 	
Options	<ul style="list-style-type: none"> - output signal scalable via the teach inputs - output signal scalable via the teach inputs + limit switch function 	
Teach inputs	level = +V for 1 s min.	
PowerON Time	< 1 s	
Update rate	1 ms	
E1 compliant acc. to	ECE guideline	
UL approval	File no. E224618	
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU	

1) When the supply voltage is correctly applied.
But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.

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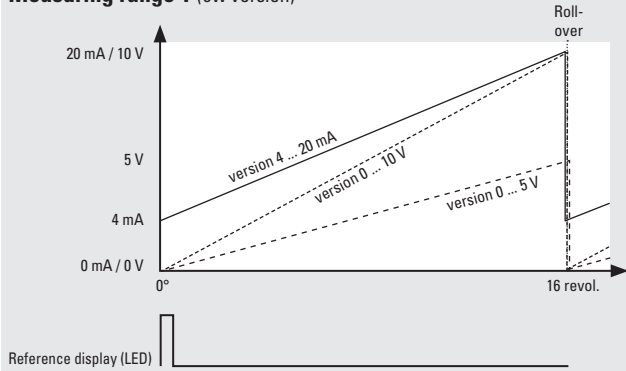
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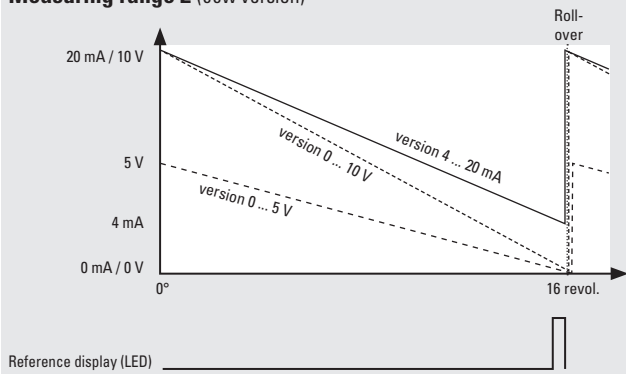
Analog

Example (output signal evolution) – factory setting

Measuring range 1 (cw version)

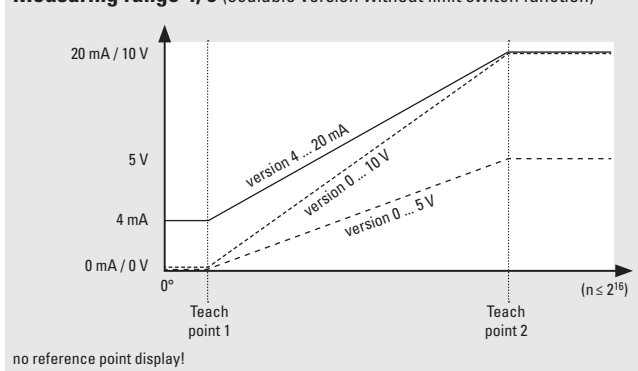


Measuring range 2 (ccw version)

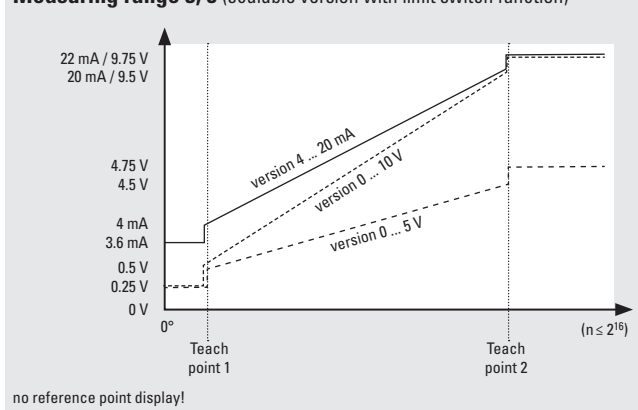


Example (output signal evolution) – option: scalable

Measuring range 4, 6 (scalable version without limit switch function)



Measuring range 3, 5 (scalable version with limit switch function)



Factory-set measuring range

2⁴ revolutions with roll-over

Limit switch function	version	0 ... 10 V	0 ... 5 V	4 ... 20 mA
limit switch low		0.25 V	0.25 V	3.6 mA
limit switch high		9.75 V	4.75 V	22.0 mA

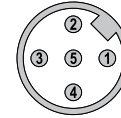
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Terminal assignment

Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
3 (current)	1, 2, A, B	Signal:	0 V	+V	+I	SET 1 ¹⁾	SET 2 ¹⁾
		Core color:	WH	BN	GN	GY	PK
Interface	Type of connection	M12 connector, 5 pin					
3 (current)	3, 4	Signal:	0 V	+V	+I	SET 1 ¹⁾	SET 2 ¹⁾
		Pin:	3	2	1	5	4
Interface	Type of connection	M12 connector, 5 pin					
3 (current)	C, D	Signal:	0 V	+V	+I	SET 1 ¹⁾	SET 2 ¹⁾
		Pin:	3	1	2	4	5
Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
4, 5 (voltage)	1, 2, A, B	Signal:	0 V	+V	+U	SET 1 ¹⁾	SET 2 ¹⁾
		Core color:	WH	BN	GN	GY	PK
Interface	Type of connection	M12 connector, 5 pin					
4, 5 (voltage)	3, 4	Signal:	0 V	+V	+U	SET 1 ¹⁾	SET 2 ¹⁾
		Pin:	3	2	1	5	4
Interface	Type of connection	M12 connector, 5 pin					
4, 5 (voltage)	C, D	Signal:	0 V	+V	+U	SET 1 ¹⁾	SET 2 ¹⁾
		Pin:	3	1	2	4	5

Top view of mating side, male contact base



M12 connector, 5-pin

+V : supply voltage encoder +V DC

+U : voltage

SET 1 : set input for teachpoint 1

0 V : supply voltage encoder ground GND (0 V)

+I : current

SET 2 : set input for teachpoint 2

1) For scalable version.

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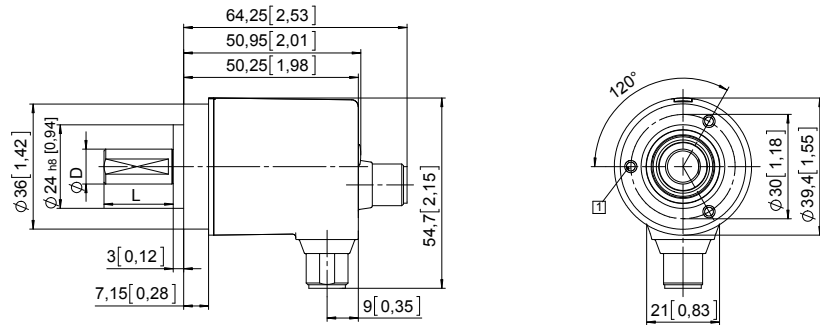
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, \varnothing 36 [1.42]

Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

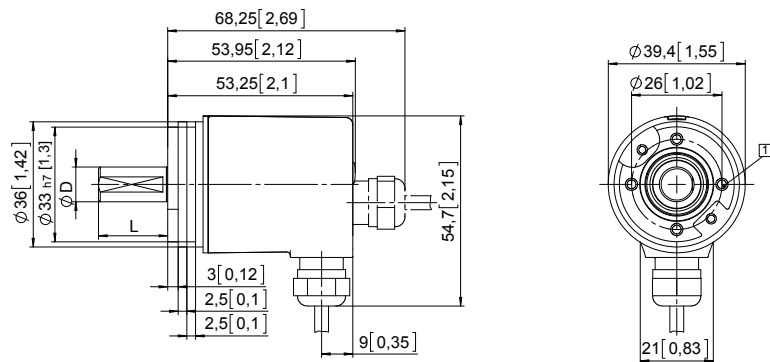


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

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

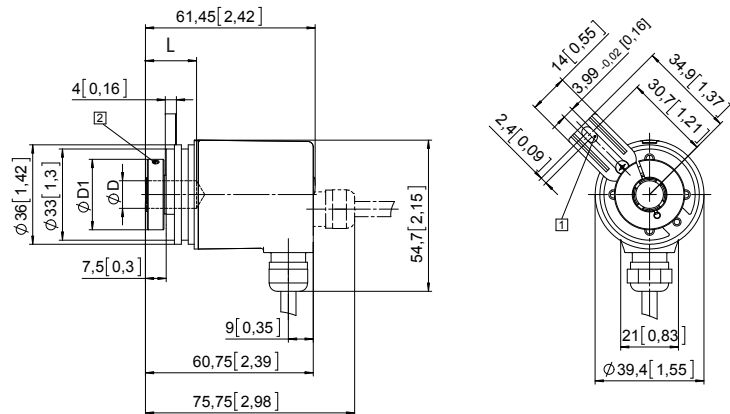
Dimensions in mm [inch]

Flange with spring element, long Flange type 3 and 6

- 1 Slot spring element, recommendation: 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

