

Absolute encoders – singleturn

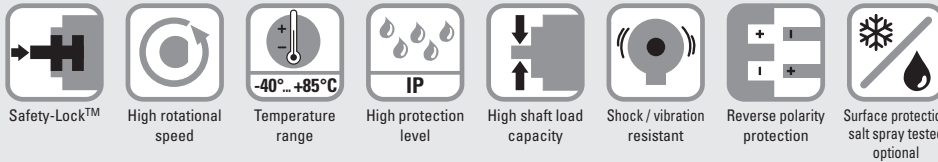
Compact magnetic

Sendix M3651A / M3671A (shaft / hollow shaft) Analog



The Sendix M3651A and Sendix M3671A singleturn encoders with analog interface and magnetic sensor technology are particularly flexible in use due to their diverse interfaces and measuring ranges.

A green LED as reference point and a red LED as error indicator simplify both installation and error diagnosis.



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.

Application oriented

- Current output 4 ... 20 mA.
- Voltage output 0 ... 10 V or 0 ... 5 V.
- Different measuring ranges.
- Set input for easy start-up.

Order code Shaft version

8.M3651A.XXXX.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.



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
- *) 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.M3651A.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 = 1 x 360°
- 2 = 1 x 180°
- 3 = 1 x 90°
- 4 = 1 x 45°

g Counting direction

- 1 = cw
- 2 = ccw

Optional on request

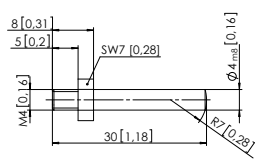
- Ex 2/22 (only for connection types 3 and 4)
- surface protection salt spray tested

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

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Order code	8.M3671A	.XXXXX.XXXX2	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	<table border="1" style="font-size: 0.7em; text-align: center; width: 100%;"> <tr> <td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td> </tr> </table>	a	b	c	d	e	f	g	
a	b	c	d	e	f	g				
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 Measuring range							
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'] 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 = <u>radial M12 connector, 5-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.M3671A.243A.3112.0030 (for cable length 3 m)	1 = 1 x 360° 2 = 1 x 180° 3 = 1 x 90° 4 = 1 x 45°							
c Output circuit ¹⁾	3 = <u>current output</u> 4 = <u>voltage output</u>	e Interface / resolution / supply voltage	g Counting direction							
		3 = <u>4 ... 20 mA / 12 bit / 10 ... 30 V DC</u> 4 = <u>0 ... 10 V / 12 bit / 15 ... 30 V DC</u> 5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC	1 = <u>cw</u> 2 = <u>ccw</u> <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.
Cylindrical pin, long for flange with spring element (flange type 3 + 6)	8.0010.4700.0000
with fixing thread 	
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".

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Technical data

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	45°, 90°, 180° or 360°	
DA converter resolution	12 bit	
Angular measurement deviation ²⁾	±0,5°	
Temperature coefficient	< 100 ppm/K	
Repeat accuracy, at 25°C [77°F]	±0.2°	
Output load	at 10 V DC at 24 V DC at 30 V DC	max. 200 Ohm max. 900 Ohm 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° 	
SET input	level = +V for 1 s minimum	
PowerON Time	< 1 s	
Update rate	1 ms	

Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V		
Supply voltage	output 0 ... 5 V output 0 ... 10 V	10 ... 30 V DC 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	45°, 90°, 180° or 360°	
DA converter resolution	0 ... 10 V 0 ... 5 V	12 bit 11 bit
Angular measurement deviation ²⁾	±0,5°	
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° 	
SET input	level = +V for 1 s minimum	
PowerON Time	< 1 s	
Update rate	1 ms	

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

SET input	
Input	active HIGH
Input type	comparator
Signal level	HIGH min. 60 % of +V, max: +V LOW max. 30 % of +V (+V = supply voltage)
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. 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>	

Approvals	
E1 compliant in accordance with	ECE guideline
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) When the supply voltage is correctly applied.
But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.
2) Over the whole temperature range.

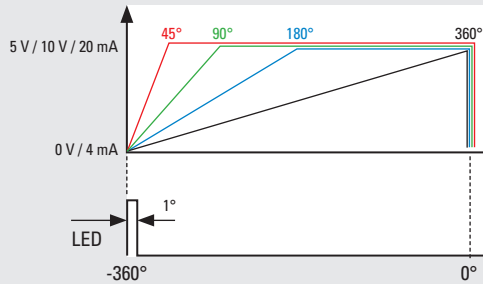
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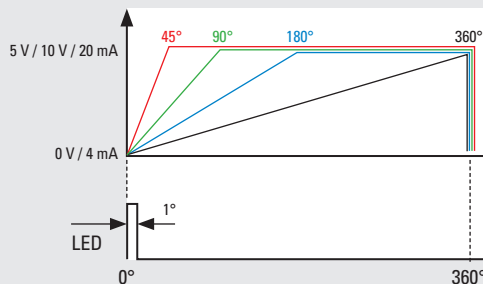
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**Example (output signal evolution)
Variante counting direction cw**

Direction of rotation left

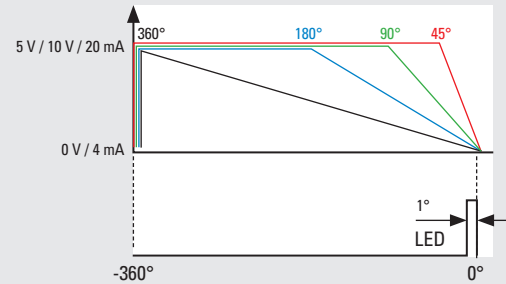


Direction of rotation right

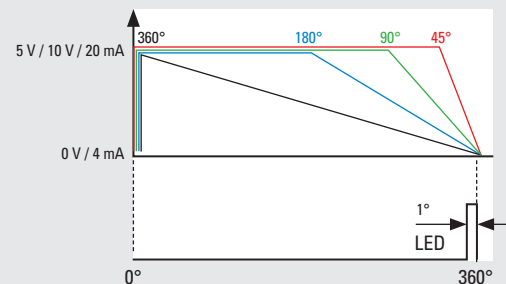


**Example (output signal evolution)
Variante counting direction ccw**

Direction of rotation left



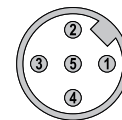
Direction of rotation right



Terminal assignment

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

Top view of mating side, male contact base



M12 connector, 5-pin

- +V: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder ground GND (0 V)
- +U: Voltage
- +I: Current
- SET: Set input

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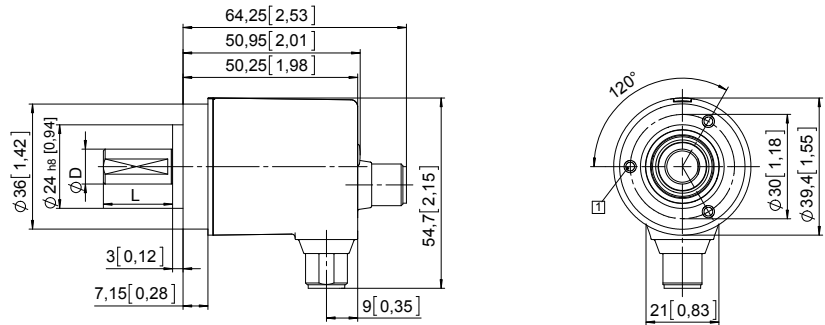
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 36 [1.42]

Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

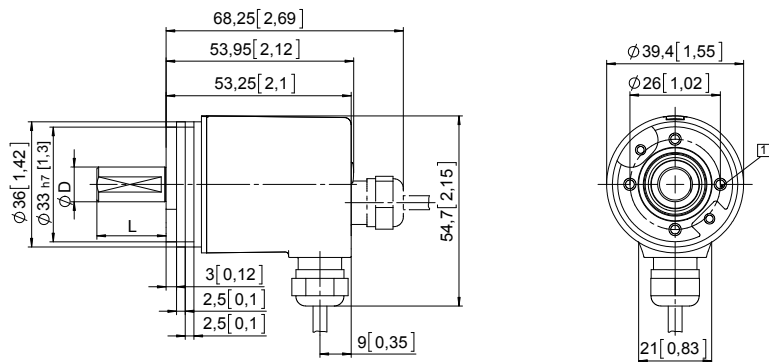


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

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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Dimensions hollow shaft version

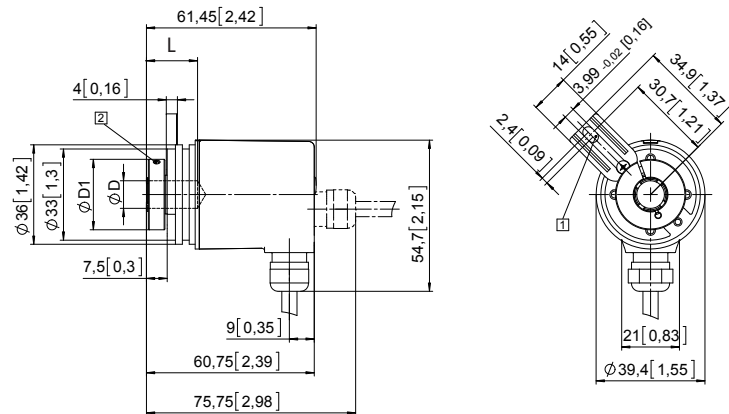
Dimensions in mm [inch]

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

