

# Absolute encoders - singleturn

<b>Compact magnetic</b>	<b>Sendix 3651 / 3671 (shaft / hollow shaft)</b>	<b>Analog</b>
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Thanks to their different interfaces and measurement ranges, the Sendix 3651 and Sendix 3671 singleturn encoders with analog interface, in shaft and hollow shaft versions, are particularly flexible in use. A green and a red LED, acting as reference point and fault indicators, ensure easy installation and troubleshooting.

Protected up to IP69k, resistance against shock and extreme temperature fluctuations, the Sendix are suitable even for demanding outdoor applications.

These encoders have an **e1**-approval from the German Federal Motor Transport Authority.



Safety-Lockplus™	High rotational speed	Temperature range -40°... +85°C	High protection level IP	High shaft load capacity	Shock / vibration resistant	Short-circuit proof	Reverse polarity protection	Magnetic sensor	Surface protection salt spray-tested optional

### Safe operation

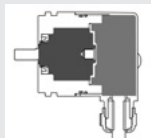
- Non-contact measuring system for long-life non-wear applications.
- Rugged die-cast-housing and protection up to IP69k for an exceptional tightness.
- High shock and vibration resistance for an exceptional robustness.

### Compact and powerful

- Outer diameter of only 36 mm.
- The hollow shaft version is fitted with a blind hole with a diameter of up to 10 mm. It can be mounted as required with either a torque stop pin or a stator coupling.
- 360° with 12 bit resolution (4096 positions).
- For use in 12 V or 24 V vehicle electrical systems.

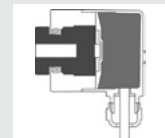
### Safety-Lockplus™

IP69k protection on the flange side, robust bearing assemblies with interlocking bearings, mechanically protected shaft seal.



### Sensor-Protect™

Fully encapsulated electronics, separate mechanical bearing assembly.



<b>Order code</b>	<b>8.3651</b>	<b>. 2XXXX . XXXXX</b>
<b>Shaft version</b>	Type	a b c d e f g h

<p><b>a Flange</b> 2 = synchro flange, <math>\varnothing</math> 36 mm [1.42"]</p> <p><b>b Shaft (<math>\varnothing</math> x L), with flat</b> 3 = <math>\varnothing</math> 6 x 12.5 mm [0.24 x 0.49"] 6 = <math>\varnothing</math> 8 x 12.5 mm [0.32 x 0.49"] 5 = <math>\varnothing</math> 1/4" x 12.5 mm [0.49"]</p> <p><b>c Output circuit <sup>1)</sup></b> 3 = current output 4 = voltage output</p>	<p><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, 5-pin 4 = radial M12 connector, 5-pin</p> <p>*) Available special lengths (connection types A, B): 2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.3651.233A.1311.0030 (for cable length 3 m)</p> <p><b>e Measuring range</b> 1 = 1 x 360° 2 = 1 x 180° 3 = 1 x 90° 4 = 1 x 45°</p>	<p><b>f Interface / power supply</b> 3 = 4 ... 20 mA / 10 ... 30 V DC 4 = 0 ... 10 V / 15 ... 30 V DC 5 = 0 ... 5 V / 10 ... 30 V DC</p> <p><b>g Option 1</b> 1 = count direction cw <sup>2)</sup> 2 = count direction ccw <sup>3)</sup></p> <p><b>h Option 2</b> 1 = IP67 2 = IP69k</p> <p style="text-align: right;"><i>Optional on request</i> - Ex 2/22 (only for type of connection 3 + 4) - surface protection salt spray tested</p>
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1) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".  
2) cw = Increasing code values when shaft turning clockwise (cw). Top view on shaft.  
3) ccw = Increasing code values when shaft turning counterclockwise (ccw). Top view on shaft.

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<b>Compact magnetic</b>	<b>Sendix 3651 / 3671 (shaft / hollow shaft)</b>	<b>Analog</b>
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<b>Order code</b>	<b>8.3671</b>	<b>.XXXXX.XXXXX</b>									
<b>Hollow shaft</b>	Type	<table border="1" style="font-size: 8px; border-collapse: collapse; width: 100%;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">b</td> <td style="text-align: center;">c</td> <td style="text-align: center;">d</td> <td style="text-align: center;">e</td> <td style="text-align: center;">f</td> <td style="text-align: center;">g</td> <td style="text-align: center;">h</td> </tr> </table>	a	b	c	d	e	f	g	h	
a	b	c	d	e	f	g	h				
<b>a Flange</b>	2 = with spring element, long 5 = with stator coupling, $\varnothing$ 46 mm [1.81"]	<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, 5-pin 4 = radial M12 connector, 5-pin *) Available special lengths (connection types A, B): 2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.3671.523A.1311.0030 (for cable length 3 m)								
<b>b Blind hollow shaft</b>	(insertion depth max. 18 mm [0.71"]) 2 = $\varnothing$ 6 mm [0.24"] 4 = $\varnothing$ 8 mm [0.32"] 6 = $\varnothing$ 10 mm [0.39"] 3 = $\varnothing$ 1/4"	<b>e Measuring range</b>	1 = 1 x 360° 2 = 1 x 180° 3 = 1 x 90° 4 = 1 x 45°								
<b>c Output circuit<sup>1)</sup></b>	3 = current output 4 = voltage output	<b>f Interface / power supply</b>	3 = 4 ... 20 mA / 10 ... 30 V DC 4 = 0 ... 10 V / 15 ... 30 V DC 5 = 0 ... 5 V / 10 ... 30 V DC								
		<b>g Option 1</b>	1 = count direction cw <sup>2)</sup> 2 = count direction ccw <sup>3)</sup>								
		<b>h Option 2</b>	1 = IP67 2 = IP69k								
		<b>Optional on request</b>	- Ex 2/22 (only for type of connection 3 + 4) - surface protection salt spray tested								

Mounting accessory for shaft encoders	Order no.
<b>Coupling</b> bellows coupling $\varnothing$ 19 mm [0.75"] for shaft 6 mm [0.24"]	<b>8.0000.1102.0606</b>
Mounting accessory for hollow shaft encoders	Order no.
<b>Cylindrical pin, long</b> for flange with spring element (flange type 2)	<b>8.0010.4700.0000</b>
<div style="text-align: center;"> </div>	
Connection technology	Order no.
<b>Cordset, pre-assembled</b> M12 female connector with coupling nut, 5-pin 2 m [6.56'] PVC cable	<b>05.00.6081.2211.002M</b>
<b>Connector, self-assembly (straight)</b> M12 female connector with coupling nut, 5-pin	<b>8.0000.5116.0000</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>	6000 min <sup>-1</sup>
<b>Starting torque at 20°C [68°F]</b>	< 0.06 Nm
<b>Shaft load capacity</b>	radial 40 N axial 20 N
<b>Weight</b>	approx. 0.2 kg [7.06 oz]
<b>Protection acc. to EN 60529</b>	IP67 / IP69k
<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
General electrical characteristics	
<b>e1 compliant acc. to</b>	EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637)
<b>CE compliant acc. to</b>	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

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

2) cw = increasing code values when shaft turning clockwise (cw). Top view on shaft.  
3) ccw = increasing code values when shaft turning counterclockwise (ccw). Top view on shaft.

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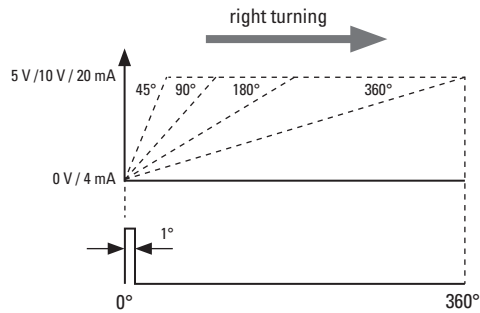
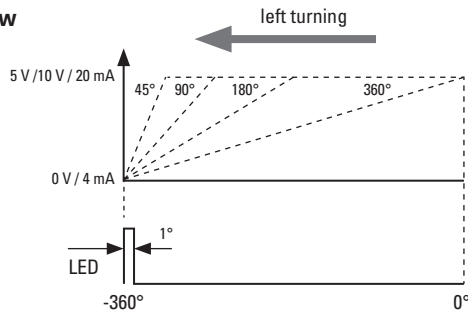
Electrical characteristics current interface 4 ... 20 mA	
<b>Sensor</b>	
Power supply	10 ... 30 V DC
Current consumption (no load)	max. 38 mA
Reverse polarity protection of the power supply	yes
Measuring range	45°, 90°, 180° or 360°
Resolution	12 bit
Absolute accuracy, 25°C [77°F]	±1°
Repeat accuracy, 25°C [77°F]	±0.2°
Status LED	red break in current loop, input load too high. green reference point display turns ON at cw: betw. 0° and 1° at ccw: betw. 0° and -1°
<b>Current loop</b>	
Output load	max. 200 Ohm at 10 V DC max. 900 Ohm at 24 V DC
Setting time	< 1 ms $R_{load} = 400 \text{ Ohm}, 25^\circ\text{C} [77^\circ\text{F}]$
<b>Short-circuit proof outputs</b> When the power supply is correctly applied. But not output to +V. Power supply and sensor output signal are not galvanically isolated.	

Electrical characteristics voltage interface	
<b>Sensor</b>	
Power supply	output 0 ... 5 V 10 ... 30 V DC output 0 ... 10 V 15 ... 30 V DC
Current consumption (no load)	max. 35 mA
Reverse polarity protection of the power supply	yes
Measuring range	45°, 90°, 180° or 360°
Resolution	12 bit
Linearity, 25°C [77°F]	±1°
Repeat accuracy, 25°C [77°F]	±0.2°
<b>Voltage output</b>	
Current output	max. 10 mA
Setting time	< 1 ms $R_{load} \geq 1 \text{ KOhm}, 25^\circ\text{C} [77^\circ\text{F}]$
<b>Short-circuit proof outputs</b> When the power supply is correctly applied. But not output to +V. Power supply and sensor output signal are not galvanically isolated.	
<b>Status LED (green)</b>	
Status LED	green reference point display turns ON at cw: betw. 0° and 1° at ccw: betw. 0° and -1°

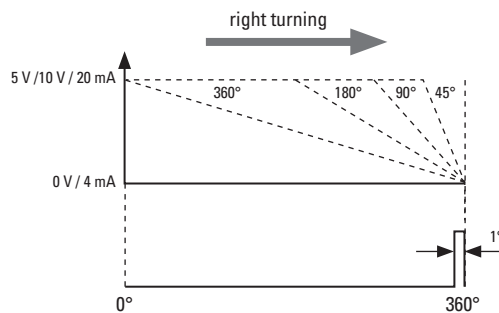
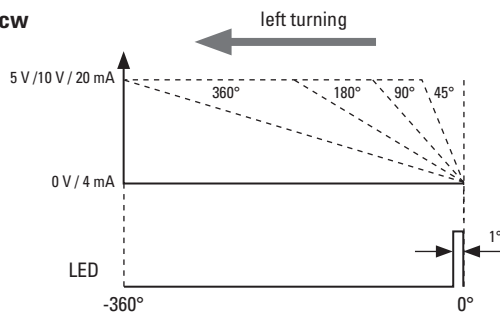
## Example (output signal profile)

Measurement range 45° / 90° / 180° / 360°

### Version cw



### Version ccw



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**Compact magnetic**

**Sendix 3651 / 3671 (shaft / hollow shaft)**

**Analog**

## 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	-I
		Core color:	WH	BN	GN	YE

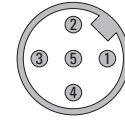
Interface	Type of connection	M12 connector, 5-pin				
3 (current)	3, 4	Signal:	0 V	+V	+I	-I
		Pin:	3	2	4	5

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	-U
		Core color:	WH	BN	GN	YE

Interface	Type of connection	M12 connector, 5-pin				
4, 5 (voltage)	3, 4	Signal:	0 V	+V	+U	-U
		Pin:	3	2	4	5

+V : Encoder power supply +V DC  
 0 V : Encoder power supply ground GND (0 V)  
 +U / -U : Voltage + / voltage -  
 +I / -I : Current + / current -

Top view of mating side, male contact base



M12 connector, 5-pin

## Dimensions shaft version

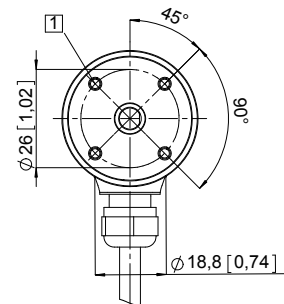
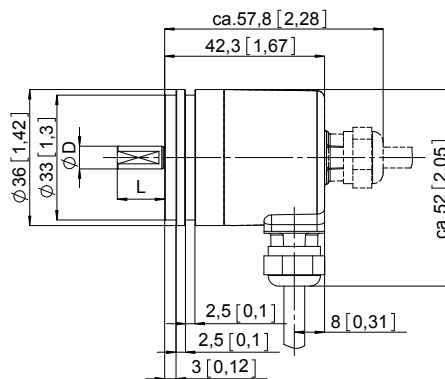
Dimensions in mm [inch]

### Synchro flange, ø 36 [1.42]

#### Flange type 2

(drawing with cable)

□ 4 x M3, 6 [0.24] deep



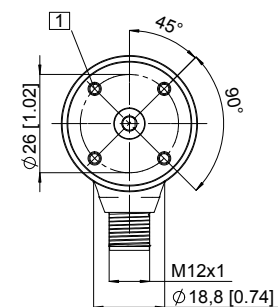
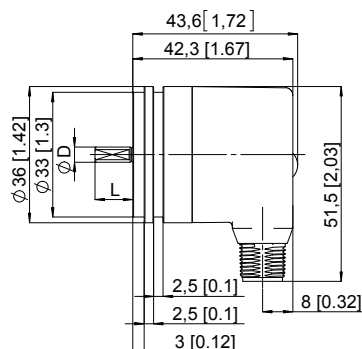
D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	12.5 [0.49]
1/4"	h7	12.5 [0.49]

### Synchro flange, ø 36 [1.42]

#### Flange type 2

(drawing with M12 connector)

□ 4 x M3, 6 [0.24] deep



D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	12.5 [0.49]
1/4"	h7	12.5 [0.49]

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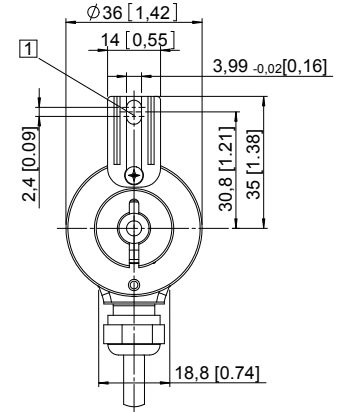
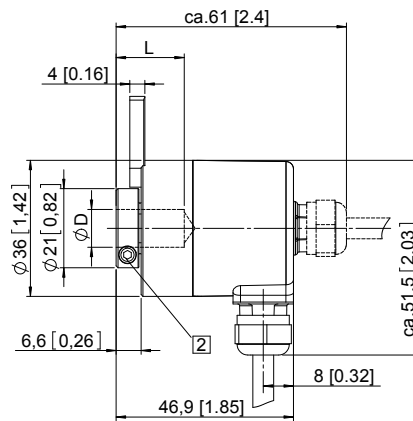
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## Dimensions hollow shaft version

Dimensions in mm [inch]

### Flange with spring element, long Flange type 2

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

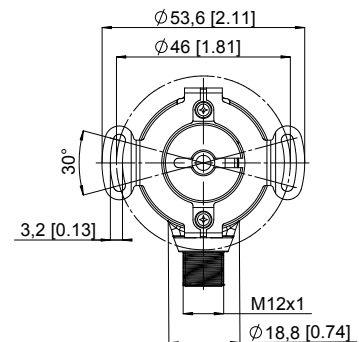
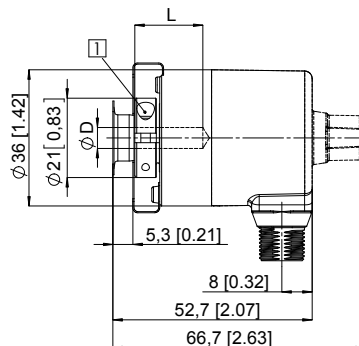


D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
10 [0.39]	H7	18 [0.71]
1/4"	H7	18 [0.71]

L = insertion depth blind hollow shaft

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

- 1 Recommended torque for the clamping ring 0.7 Nm



D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
10 [0.39]	H7	18 [0.71]
1/4"	H7	18 [0.71]

L = insertion depth blind hollow shaft