

# Absolute encoders - singleturn

**Standard**  
ATEX/IECEX – zone 1/21, optical

Sendix 7053 / 7073 (shaft / hollow shaft)

SSI / BiSS



The Sendix 7053 / 7073 absolute encoders – singleturn offer Ex protection in a compact 70 mm seawater durable aluminium housing, with an SSI or BiSS interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 17 bits; they are also available with axial and radial cable outlets.



## Compact and safe

- Can be used even when space is tight.
- Minimal installation depth, diameter 70 mm.
- Compact cable outlet axial or radial.
- Can be operated in marine environments – housing and flange manufactured from seawater durable aluminium.
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns (IP67 protection).

## Explosion protection

- “Flameproof-enclosure” version.
- ATEX with EC type examination certificate.
- IECEx with certificate of conformity (CoC).

**Order code** 8.7053 . 1 X 2 X . X X 2 1 . XXXX  
**Shaft version** Type a b c d e f g h i <sup>1)</sup>

**a Flange**  
1 = clamping / synchronous flange, IP67, ø 70 mm [2.76"]

**b Shaft (ø x L)**  
2 = 10 x 20 mm [0.39 x 0.79"], with flat  
1 = 12 x 25 mm [0.47 x 0.98"], with keyway for 4 x 4 mm [0.16 x 0.16"] key

**c Interface / power supply**  
2 = SSI, BiSS / 10 ... 30 V DC

**d Type of connection**  
1 = axial cable, 2 m [6.56'] PUR  
2 = radial cable, 2 m [6.56'] PUR  
A = axial cable, length > 2 m [6.56']  
B = radial cable, length > 2 m [6.56']

**e Code**  
B = SSI, binary  
C = BiSS, binary  
G = SSI, gray

**f Resolution <sup>2)</sup>**  
A = 10 bit  
1 = 11 bit  
2 = 12 bit  
3 = 13 bit  
4 = 14 bit  
7 = 17 bit

**g Inputs / outputs <sup>2)</sup>**  
2 = SET, DIR input  
additional status output

**h Options**  
1 = no option

**i Cable length in dm <sup>1)</sup>**  
0050 = 5 m [16.40']  
0100 = 10 m [32.81']  
0150 = 15 m [49.21']

*Optional on request*  
- special cable length  
- stainless steel version  
- other resolutions

1) Not applicable with connection types 1 and 2.  
2) Resolution, preset value and counting direction factory-programmable.

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<b>Order code</b> Hollow shaft	<b>8.7073</b> Type	<b>.XX2X.XX21.XXXX</b> a b c d e f g h i <sup>1)</sup>
<b>a Flange</b> 1 = with spring element, short 5 = with stator coupling, IP67, ø 65 mm [2.56"]	<b>e Code</b> B = SSI, binary C = BiSS, binary G = SSI, gray	<b>g Inputs / outputs <sup>2)</sup></b> 2 = SET, DIR input additional status output
<b>b Blind hollow shaft</b> 1 = ø 12 mm [0.47"] 2 = ø 14 mm [0.55"]	<b>f Resolution <sup>2)</sup></b> A = 10 bit 1 = 11 bit 2 = 12 bit 3 = 13 bit 4 = 14 bit 7 = 17 bit	<b>h Options</b> 1 = no option
<b>c Interface / power supply</b> 2 = SSI, BiSS / 10 ... 30 V DC		<b>i Cable length in dm <sup>1)</sup></b> 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']
<b>d Type of connection</b> 1 = axial cable, 2 m [6.56'] PUR 2 = radial cable, 2 m [6.56'] PUR A = axial cable, length > 2 m [6.56'] B = radial cable, length > 2 m [6.56']		<i>Optional on request</i> - special cable length - stainless steel version - other resolutions

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<b>Mounting accessory for shaft encoders</b>	Order no.
<b>Coupling</b>	bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]
	<b>8.0000.1102.1010</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

Explosion protection Sendix 7053	
<b>ATEX</b>	
<b>EC type-examination certificate</b>	PTB09 ATEX 1106 X
<b>Category (gas)</b>	Ex II 2 G Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	Ex II 2D Ex tb IIIC T135°C - T85°C Db IP6x
<b>Directive 94/9/EC</b>	EN 60079-0:2009; EN 60079-1:2007; EN 60079-31:2009
<b>IECEX</b>	
<b>Certificate of Conformity (CoC)</b>	IECEX PTB 13.0026 X
<b>Category (gas)</b>	Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	Ex tb IIIC T135°C - T85°C Db IP6x
<b>IECEX</b>	IEC 60079-0:2007; IEC 60079-1:2007; IEC 60079-31:2008

Explosion protection Sendix 7073	
<b>ATEX</b>	
<b>EC type-examination certificate</b>	IBEXU 15 ATEX 1091 X
<b>Category (gas)</b>	Ex II 2 G Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	Ex II 2D Ex tb IIIC T135°C - T85°C Db
<b>Directive 94/9/EC</b>	EN 60079-0:2012; EN 60079-1:2014; EN 60079-31:2014
<b>IECEX</b>	
<b>Certificate of Conformity (CoC)</b>	IECEX IBE 15.0020 X
<b>Category (gas)</b>	Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	Ex tb IIIC T135°C - T85°C Db
<b>IECEX</b>	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2013

Electrical characteristics	
<b>Power supply</b>	10 ... 30 V DC
<b>Current consumption (no load)</b>	max. 45 mA
<b>Reverse polarity protection for power supply</b>	yes
<b>Short-circuit proof outputs</b>	yes <sup>3)</sup>
<b>CE compliant acc. to</b>	EMC guideline 2004/108/EC ATEX guideline 94/9/EC RoHS guideline 2011/65/EU

1) Not applicable with connection types 1 and 2.  
2) Resolution, preset value and counting direction factory-programmable.  
3) Short-circuit with 0 V or output, only one channel at a time, power supply correctly applied.

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Mechanical characteristics	
<b>Maximum speed</b>	6000 min <sup>-1</sup> (continuous)
<b>Starting torque - at 20°C [68°F]</b>	< 0.05 Nm
<b>Mass moment of inertia</b>	4.0 x 10 <sup>-6</sup> kgm <sup>2</sup>
<b>Load capacity of shaft</b>	radial 80 N axial 40 N
<b>Weight</b>	approx. 1.5 kg [52.91 oz]
<b>Protection acc. to EN 60529</b>	IP67
<b>Working temperature range</b>	-40°C ... +60°C [-40 ... +140°F]
<b>Material</b>	shaft stainless steel flange / housing seawater durable Al, type AlSiMgMn (EN AW-6082) cable PUR
<b>Shock resistance acc. to EN 60068-2-27</b>	2500 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance acc. to EN 60068-2-6</b>	100 m/s <sup>2</sup> , 55 ... 2000 Hz

SET input	
<b>Input</b>	HIGH active
<b>Input type</b>	comparator
<b>Signal level</b> (+V = power supply)	HIGH min. 60% of +V max. +V LOW max. 25% of +V
<b>Input current</b>	< 0.5 mA
<b>Min. pulse duration (SET)</b>	10 ms
<b>Timeout after SET signal</b>	14 ms
<b>Response time (DIR input)</b>	1 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 delay time of approximately 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approximately 15 ms before the new position data can be read.

Status output	
<b>Output driver</b>	open collector, internal pull-up resistor 22 kOhm
<b>Permissible load</b>	max. 20 mA
<b>Signal level</b>	HIGH +V LOW < 1 V
<b>Active at</b>	LOW

The status output serves to display various alarm or error messages. The status output is HIGH (open collector with internal pull-up 22 kOhm) in normal operation.

## Terminal assignment

Interface	Type of connection	Features	Cable (isolate unused wires individually before initial start-up)												
			Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	Stat	⊥	⊥	
2	1, 2, A, B	SET, DIR	Cable marking:	1	2	3	4	5	6	7	8	9	YE/GN	shield	

+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.

SSI interface	
<b>Output driver</b>	RS485 transceiver type
<b>Permissible load / channel</b>	max. +/- 20 mA
<b>Signal level</b>	HIGH typ 3.8 V LOW at I <sub>Load</sub> = 20 mA typ 1.3 V
<b>Resolution</b>	10 ... 14 bit and 17 bit
<b>Code</b>	binary or gray
<b>SSI clock rate</b>	50 kHz ... 2 MHz
<b>Monoflop time</b>	≤ 15 μs
<b>Note:</b> if clock starts cycling within monoflop time a second data transfer starts with the same data. If clock starts cycling after monoflop time, the data transfer starts with updated values. The update rate depends on clock speed, data length and monoflop time.	
<b>Data refresh rate</b>	resolution ≤ 14 bit < 1 μs resolution ≥ 15 bit 4 μs

BiSS interface	
<b>Resolution</b>	10 ... 14 bit and 17 bit
<b>Code</b>	binary
<b>Clock rate</b>	up to 10 MHz
<b>Max. update rate</b>	< 10 μs, depends on the clock rate and the data length
<b>Data refresh rate</b>	≤ 1 μs
<b>Note:</b> – bidirectional, factory programmable parameters are: resolution, code, direction, alarms and warnings – CRC data verification	

**DIR input**  
 A High signal switches the direction of rotation from the default CW to CCW. The reverse function can also be factory-programmed. If DIR is reversed when the device is already switched on, this will be interpreted as an error. The status output switches to LOW.

**Power-ON time**  
 After Power-ON, the device requires a time of approximately 150 ms before valid data can be read.

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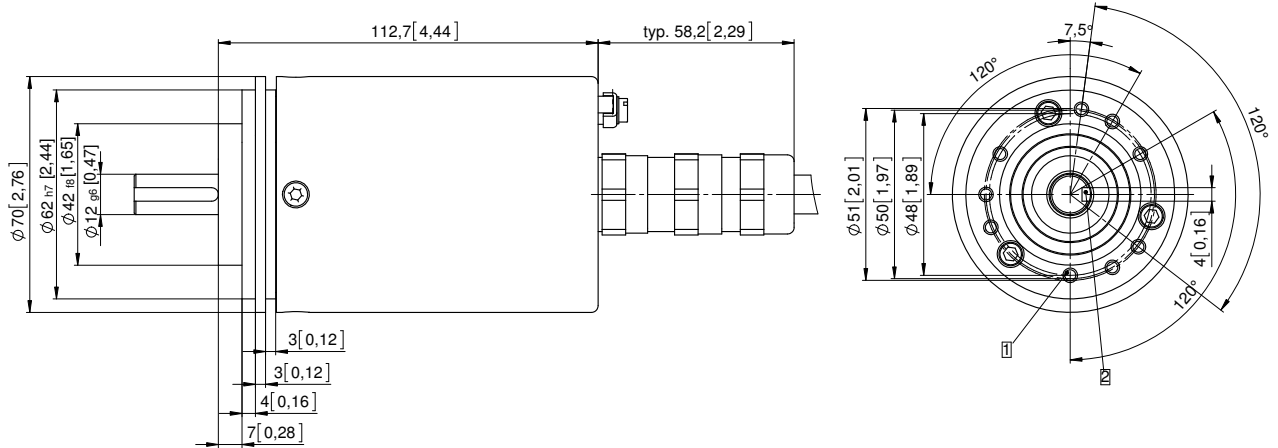
## Dimensions shaft version

Dimensions in mm [inch]

### Clamping / synchronous flange, $\varnothing$ 70 [2.76]

#### Shaft type 1 with axial cable outlet

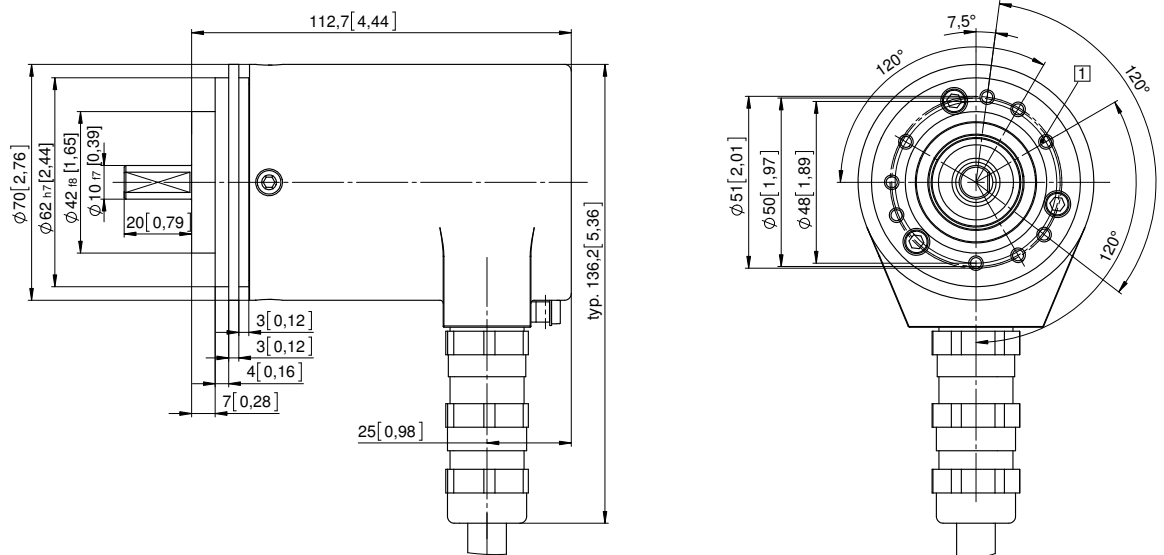
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



### Clamping / synchronous flange, $\varnothing$ 70 [2.76]

#### Shaft type 2 with radial cable outlet

- 1 9 x M4, 10 [0.39] deep



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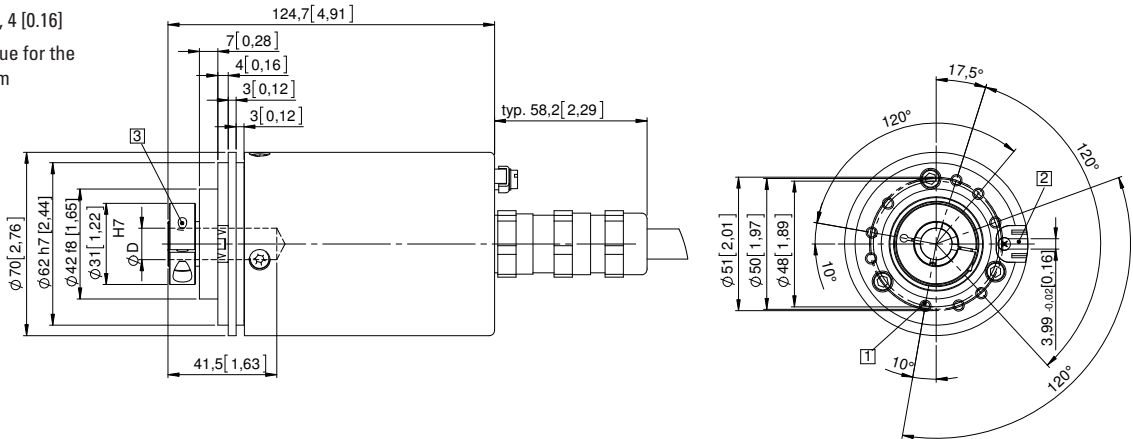
SSI / BiSS

## Dimensions hollow shaft version

Dimensions in mm [inch]

### Flange with spring element, short Flange type 1

- 1 9 x M4, 10 [0.39] deep
- 2 Torque stop slot, recommendation: cylindrical pin DIN7, 4 [0.16]
- 3 Recommended torque for the clamping ring 2,5 Nm



### Flange with stator coupling, $\varnothing 65$ [2.56] Flange type 5

- 1 Recommended torque for the clamping ring 2,5 Nm

