

# Absolute encoders – multiturn

Standard, ATEX/IECEX – zone 1/21  
mechanical multiturn, optical

Sendix 7068 / 7088 (shaft / hollow shaft)

PROFIBUS DP



The Sendix 7068 / 7088 absolute multiturn encoders offer Ex protection in a compact 70 mm seawater durable aluminum housing, with a Profibus interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 28 bits; they are also available with axial and radial cable outlets.



Ex approval



Mechanical drive



Safety-Lock™



High rotational speed



High protection level



High shaft load capacity



Shock / vibration resistant



Magnetic field proof



Reverse polarity protection



Optical sensor



Seawater durable

## 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 aluminum.
- 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 Shaft version

8.7068 . 1 X 3 X . 31 11 . XXXX  
Type      a b c d e      f 1)

### a Flange

1 = clamping / synchronous flange, IP67,  $\varnothing$  70 mm [2.76"]

### b Shaft ( $\varnothing \times L$ )

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

3 = PROFIBUS DP V0 / 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 Fieldbus profile

31 = PROFIBUS DP V0 encoder profile class 2

### f 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
- IP65 version for T6
- seawater resistant (stainless steel V4A)

Stainless steel V4A as standard types  
(deliverable as from 1 unit)

**V4A**  
1.4404  
8.7068.2231.3111.V4A  
8.7068.223A.3111.XXXX-V4A

1) Not applicable with connection types 1 and 2.

# Absolute encoders – multiturn

<b>Standard, ATEX/IECEX – zone 1/21 mechanical multiturn, optical</b>	<b>Sendix 7068 / 7088 (shaft / hollow shaft)</b>	<b>PROFIBUS DP</b>
---	--	--------------------

<b>Order code</b> Hollow shaft	<table border="1" style="margin: auto;"> <tr> <td style="padding: 2px;">8.7088</td> <td style="padding: 2px;">.</td> <td style="padding: 2px;">X</td> <td style="padding: 2px;">X</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">X</td> <td style="padding: 2px;">.</td> <td style="padding: 2px;">31</td> <td style="padding: 2px;">11</td> <td style="padding: 2px;">.</td> <td style="padding: 2px;">XXXX</td> </tr> <tr> <td style="font-size: 8px;">Type</td> <td></td> <td style="font-size: 8px;">a</td> <td style="font-size: 8px;">b</td> <td style="font-size: 8px;">c</td> <td style="font-size: 8px;">d</td> <td></td> <td style="font-size: 8px;">e</td> <td></td> <td></td> <td style="font-size: 8px;">i<sup>1)</sup></td> </tr> </table>	8.7088	.	X	X	3	X	.	31	11	.	XXXX	Type		a	b	c	d		e			i <sup>1)</sup>	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top; padding: 2px;"> <b>a</b> Flange            1 = with spring element, short            5 = with stator coupling, IP67, ø 65 mm [2.56"]         </td> <td style="width: 33%; vertical-align: top; padding: 2px;"> <b>d</b> Type of connection            1 = axial cable, 2 m [6.56'] PUR            2 = radial cable, 2 m [6.56'] PUR            A = axial cable, length &gt; 2 m [6.56']            B = radial cable, length &gt; 2 m [6.56']         </td> <td style="width: 33%; vertical-align: top; padding: 2px;"> <i>Optional on request</i>            - special cable length            - IP65 version for T6            - seawater resistant (stainless steel V4A)         </td> </tr> <tr> <td style="vertical-align: top; padding: 2px;"> <b>b</b> Blind hollow shaft  <i>(insertion depth max. 41.5 mm [1.63"])</i>            1 = ø 12 mm [0.47"]            2 = ø 14 mm [0.55"]         </td> <td style="vertical-align: top; padding: 2px;"> <b>e</b> Fieldbus profile            31 = PROFIBUS DP V0 encoder profile class 2         </td> <td style="vertical-align: top; padding: 2px;"> <i>Stainless steel V4A as standard types (deliverable as from 1 unit)</i>  <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 5px;"> <b>V4A</b>  <small>1.4404</small> </div>           8.7088.2231.3111.V4A            8.7088.223A.3111.XXXX-V4A         </td> </tr> <tr> <td style="vertical-align: top; padding: 2px;"> <b>c</b> Interface / Power supply            3 = PROFIBUS DP V0 / 10 ... 30 V DC         </td> <td style="vertical-align: top; padding: 2px;"> <b>f</b> Cable length in dm<sup>1)</sup>            0050 = 5 m [16.40']            0100 = 10 m [32.81']            0150 = 15 m [49.21']         </td> <td></td> </tr> </table>	<b>a</b> Flange 1 = with spring element, short 5 = with stator coupling, IP67, ø 65 mm [2.56"]	<b>d</b> 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']	<i>Optional on request</i> - special cable length - IP65 version for T6 - seawater resistant (stainless steel V4A)	<b>b</b> Blind hollow shaft <i>(insertion depth max. 41.5 mm [1.63"])</i> 1 = ø 12 mm [0.47"] 2 = ø 14 mm [0.55"]	<b>e</b> Fieldbus profile 31 = PROFIBUS DP V0 encoder profile class 2	<i>Stainless steel V4A as standard types (deliverable as from 1 unit)</i> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 5px;"> <b>V4A</b>  <small>1.4404</small> </div> 8.7088.2231.3111.V4A 8.7088.223A.3111.XXXX-V4A	<b>c</b> Interface / Power supply 3 = PROFIBUS DP V0 / 10 ... 30 V DC	<b>f</b> Cable length in dm <sup>1)</sup> 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']	
8.7088	.	X	X	3	X	.	31	11	.	XXXX																							
Type		a	b	c	d		e			i <sup>1)</sup>																							
<b>a</b> Flange 1 = with spring element, short 5 = with stator coupling, IP67, ø 65 mm [2.56"]	<b>d</b> 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']	<i>Optional on request</i> - special cable length - IP65 version for T6 - seawater resistant (stainless steel V4A)																															
<b>b</b> Blind hollow shaft <i>(insertion depth max. 41.5 mm [1.63"])</i> 1 = ø 12 mm [0.47"] 2 = ø 14 mm [0.55"]	<b>e</b> Fieldbus profile 31 = PROFIBUS DP V0 encoder profile class 2	<i>Stainless steel V4A as standard types (deliverable as from 1 unit)</i> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 5px;"> <b>V4A</b>  <small>1.4404</small> </div> 8.7088.2231.3111.V4A 8.7088.223A.3111.XXXX-V4A																															
<b>c</b> Interface / Power supply 3 = PROFIBUS DP V0 / 10 ... 30 V DC	<b>f</b> Cable length in dm <sup>1)</sup> 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']																																

<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 7068	
ATEX	
<b>EC type-examination certificate</b>	PTB09 ATEX 1106 X
<b>Category (gas)</b>	II 2 G Ex d IIC T4 - T6 Gb
<b>Category (dust)</b>	II 2D Ex tb IIIC T135°C - T85°C Db
<b>Relevant standards</b> ATEX guideline 94/9/EC	EN 60079-0:2012; EN 60079-1:2014; EN 60079-31:2009
IECEX	
<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
<b>Relevant standards</b>	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2008

Explosion protection Sendix 7088	
ATEX	
<b>EU type-examination certificate</b>	IBExU 15 ATEX 1091 X
<b>Category (gas)</b>	II 2 G Ex db IIC T4/120°C (T4)/T6 Gb
<b>Category (dust)</b>	II 2 D Ex tb IIIC T135°C - T85°C Db
<b>Relevant standards</b> ATEX guideline 2014/34/EU	EN 60079-0:2012 + A11:2013; EN 60079-1:2014; EN 60079-31:2014
IECEX	
<b>Certificate of Conformity (CoC)</b>	IECEX IBE 15.0020 X
<b>Category (gas)</b>	Ex db IIC T4/120°C (T4)/T6 Gb
<b>Category (dust)</b>	Ex tb IIIC T135°C - T85°C Db
<b>Relevant standards</b>	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2013

Mechanical characteristics	
<b>Maximum speed</b>	shaft 6000 min <sup>-1</sup> (continuous) hollow shaft 3000 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>Ambient temperature</b>	-40°C ... +60°C [-40 ... +140°F] Please note the specifications for temperature class in EC type-examination certificate!
<b>Material</b>	shaft stainless steel flange / housing seawater durable Al, type AlSiMgMn (EN AW-6082) cable PUR
<b>Shock resistance to EN/IEC 60068-2-27</b>	2500 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance to EN/IEC 60068-2-6</b>	100 m/s <sup>2</sup> , 55 ... 2000 Hz

Electrical characteristics	
<b>Power supply</b>	10 ... 30 V DC
<b>Current consumption (no load)</b>	max. 120 mA
<b>Reverse polarity protection for power supply</b>	yes
<b>CE compliant acc. to</b>	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

EMC	
<b>Relevant standards</b>	EN 55011 class B:2009 / A1:2010 EN 61000-6-2:2005 / AC:2005 EN 61000-6-3:2007 / A1:2011 EN 61326-1:2013

# Absolute encoders – multiturn

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

**Sendix 7068 / 7088 (shaft / hollow shaft)**

**PROFIBUS DP**

Interface characteristics PROFIBUS DP	
<b>Resolution singleturn</b>	1 ... 65536 (16 bit), scalable default: 8192 (13 bit)
<b>Number of revolutions (multiturn)</b>	1 ... 4096 (12 bit), scalable
<b>Total resolution</b>	1 ... 268.435.456 (28 bit), scalable default: 33.554.432 (25 bit)
<b>Interface</b>	specification according to PROFIBUS DP 2.0 / standard (DIN 19245 part 3) / RS485 driver galvanically isolated
<b>Protocol</b>	Profibus encoder profile V1.1 class 1 and class 2 with manufacturer-specific add-ons
<b>Baud rate</b>	maximum 12 Mbit/s
<b>Device address</b>	software controlled setting of the device address via the SSA-service with a CLASS 2-master, default address: 125
<b>Termination</b>	active termination can only be switched on externally

## Profibus encoder profile V1.1

The PROFIBUS DP device profile describes the functionality of the communication and the manufacturer-specific component within the PROFIBUS fieldbus system. The encoder profile applies to encoders and defines the individual objects independently of the manufacturer. In addition, the profile makes provision for additional extended functions specific to the manufacturer. The use of PROFIBUS compatible devices ensures that the systems of today are ready to meet the demands of the future.

### The following parameters can be programmed

- Direction of rotation.
- Scaling – number of steps per revolution.
- Preset value.
- Diagnostics mode.

### The following functionality is integrated

- Galvanic isolation of the bus stage with DC/DC converter.
- Line driver acc. to RS485 max. 12 MB.
- Full class 1 and class 2 functionality.
- Speed value.

## Terminal assignment

Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)								
		Signal:	0 V	+V	PB_A IN	PB_B IN	BUS_GND	BUS_VDC	PB_A OUT	PB_B OUT
3	1, 2, A, B	Core marking:	1	2	4	5	6	7	8	9

# Absolute encoders – multiturn

<b>Standard, ATEX/IECEx – zone 1/21 mechanical multiturn, optical</b>	<b>Sendix 7068 / 7088 (shaft / hollow shaft)</b>	<b>PROFIBUS DP</b>
---	--	--------------------

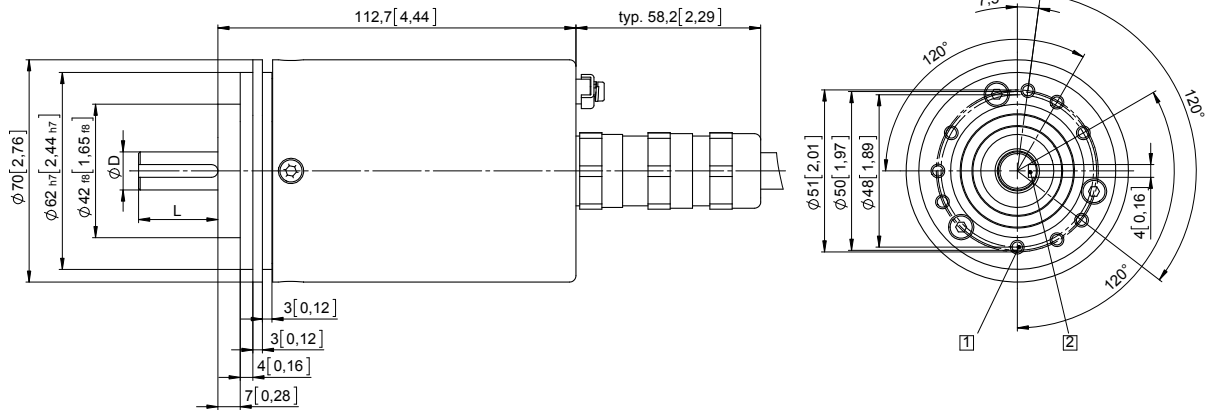
## Dimensions shaft version

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

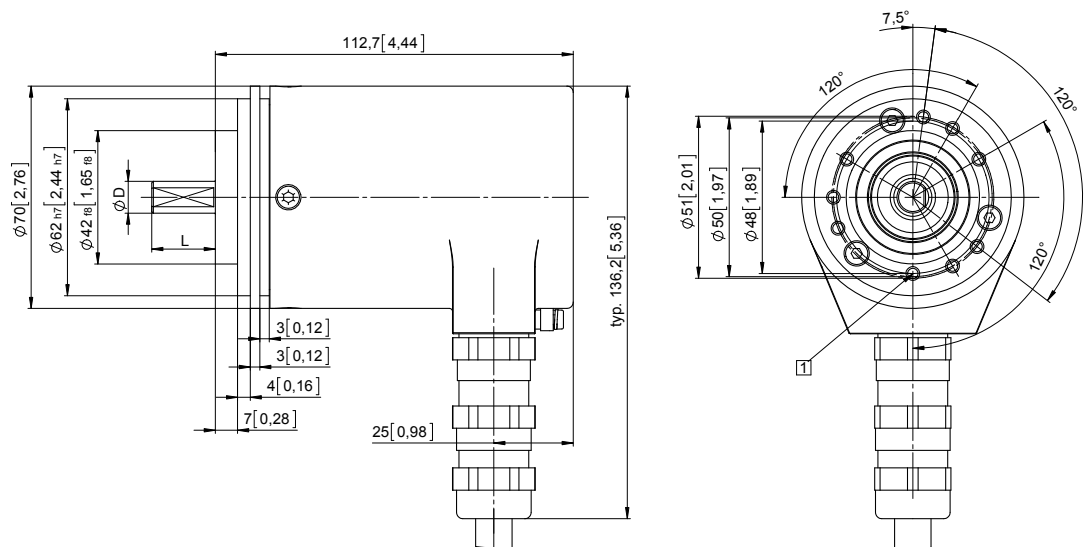


D	Fit	L
12 [0.47]	g6	25 [0.98]

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

#### Shaft type 2 with radial cable outlet

- 1 9 x M4, 10 [0.39] deep



D	Fit	L
10 [0.39]	f7	20 [0.79]

# Absolute encoders – multiturn

**Standard, ATEX/IECEx – zone 1/21  
mechanical multiturn, optical**

**Sendix 7068 / 7088 (shaft / hollow shaft)**

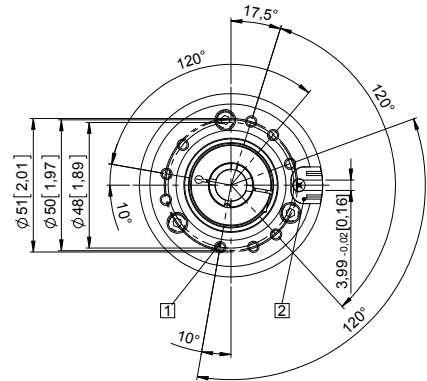
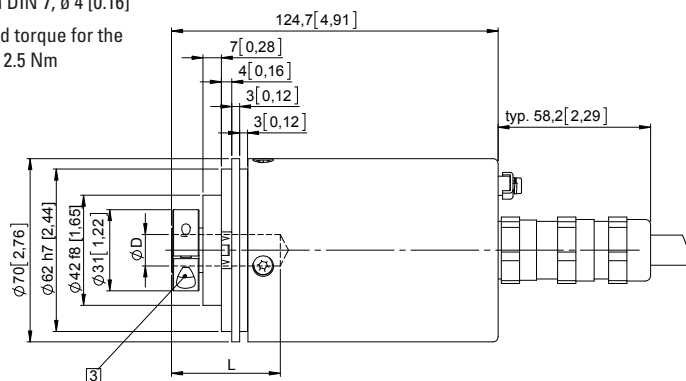
**PROFIBUS DP**

## 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 Slot spring element, recommendation: cylindrical pin DIN 7,  $\varnothing$  4 [0.16]
- 3 Recommended torque for the clamping ring 2.5 Nm



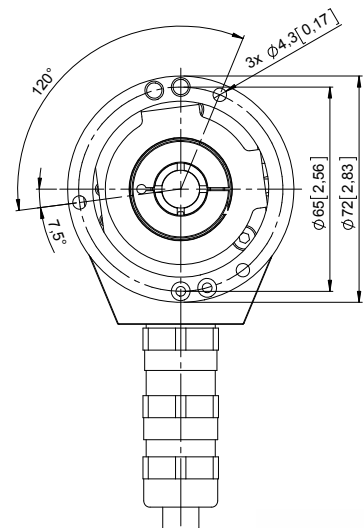
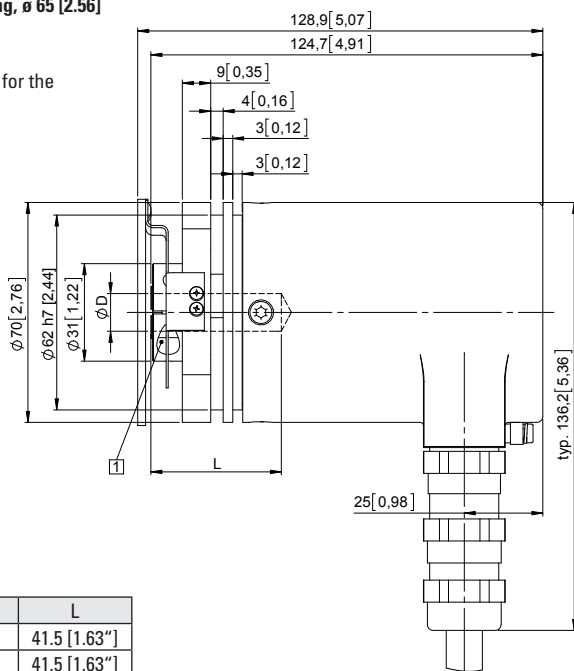
D	Fit	L
12 [0.47]	H7	41.5 [1.63"]
14 [0.55]	H7	41.5 [1.63"]

L = insertion depth max. blind hollow shaft

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

#### Flange type 5

- 1 Recommended torque for the clamping ring 2.5 Nm



D	Fit	L
12 [0.47]	H7	41.5 [1.63"]
14 [0.55]	H7	41.5 [1.63"]

L = insertion depth max. blind hollow shaft