

# Absolute Encoders – Multiturn

<b>Standard</b> ATEX, SIL2/PLd, mechanical Multiturn, optical	<b>Sendix SIL 7063FS2 (Shaft)</b>	<b>SSI / BiSS-C + SinCos</b>
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**Ex protection and Functional Safety in one device.**  
The absolute multiturn encoders 7063FS2 of the Sendix SIL family are suited for use in safety-related applications up to SIL2 acc. to EN 61800-5-2 or PLd to EN ISO 13849-1.

In addition, these devices ensure Ex protection in a compact 70 mm housing out of seawater-resistant aluminium.



Ex approval	Safety-Lock™	High rotational speed	High protection level	High shaft load capacity	Shock / vibration resistant	Magnetic field proof	Short-circuit proof	Reverse polarity protection	Optical sensor	Seawater-resistant

### Functional Safety

- Encoder with individual certificate from IFA / TÜV
- Suitable for applications up to SIL2 acc. to EN 61800-5-2
- Suitable for applications up to PLd acc. to EN ISO 13849-1
- SSI or BiSS-C interface with incremental SinCos tracks with 2048 ppr
- Certified mechanical mounting + electronic

### Explosion protection

- “Flameproof-enclosure” version
- ATEX with EC type examination certificate
- IECEX with Certificate of Conformity (CoC)

<b>Order code</b>	<b>8.7063FS2</b>	<b>. 1 X 4 X . X X 2 1 . XXXX</b>
<b>Shaft version</b>	Type	a b c d e f g h i 1)

<p><b>a Flange</b> 1 = clamping-synchronous flange, IP67, ø 70 mm [2.76"]</p> <p><b>b Shaft (ø x L)</b> 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</p> <p><b>c Interface / Power supply</b> 4 = SSI or BiSS-C + 2048 ppr SinCos / 10 ... 30 V DC</p> <p><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 &gt; 2 m [6.56'] B = radial cable, length &gt; 2 m [6.56'] preferred length see <b>i</b>, e. g.: 0100 = 10 m [32.81']</p>	<p><b>e Code</b> B = SSI, Binary C = BiSS-C, Binary G = SSI, Gray</p> <p><b>f Resolution 2)</b> A = 10 bit ST + 12 bit MT 1 = 11 bit ST + 12 bit MT 2 = 12 bit ST + 12 bit MT 3 = 13 bit ST + 12 bit MT 4 = 14 bit ST + 12 bit MT 7 = 17 bit ST + 12 bit MT</p>	<p><b>g Inputs / Outputs 2)</b> 2 = SET input</p> <p><b>h Options</b> 1 = no option</p> <p><b>i Cable length in dm 1)</b> 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']</p> <p><i>optional on request - special cable length</i></p>
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Accessories – Safety control		Order No.
<b>Safety-M, basic modules</b>	Speed and position monitoring for 1 axis	<b>8.MSP1.000</b>
	Speed and position monitoring for 2 axes (analogue inputs optional)	<b>8.MSP2.XXX</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)  
**You will find an overview of our systems and components for Functional Safety in the safety technology section or under [www.kuebler.com/safety](http://www.kuebler.com/safety)**

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

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## Technical data

Explosion protection 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 IP6x
<b>Directive 94/9/EC</b>	EN 60079-0: 2009; EN 60079-1: 2007; EN 60079-31: 2009

Explosion protection 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 IP6x
<b>IECEx</b>	IEC 60079-0:2007; IEC 60079-1:2007; IEC 60079-31:2008

Notes regarding "Functional Safety"	
These encoders are suitable for use in safety-related systems up to SIL2 acc. to EN 61800-5-2 and PLd to EN ISO 13849-1 in conjunction with controllers or evaluation units, which possess the necessary functionality. Additional functions can be found in the operating manual.	

Safety characteristics	
<b>Relevant standards</b>	EN ISO 13849-1 / EN 61800-5-2, EN 61508
<b>Classification</b>	PLd / SIL2
<b>System structure</b>	2 channel (Cat. 3 / HFT = 1)
<b>PFH<sub>d</sub> value <sup>1)</sup></b>	2.16 x 10 <sup>-8</sup> h <sup>-1</sup>
<b>Proof-test interval</b>	20 years

Mechanical characteristics	
<b>Max. speed</b>	continuous 6 000 min <sup>-1</sup>
<b>Starting torque – at 20°C [68°F]</b>	< 0.05 Nm
<b>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. 1.3 kg [45.86 oz]
<b>Protection acc. to EN 60529</b>	IP67
<b>Working temperature range</b>	-40°C ... +60°C [-40 ... +140°F]
<b>Materials</b>	shaft stainless steel flange / housing seawater-resistant Al, type AlSiMgMn (EN AW-6082) stainless steel on req. cable PUR
<b>Shock resistance acc. to EN 60068-2-27</b>	500 m/s <sup>2</sup> , 11 ms
<b>Vibration resistance acc. to EN 60068-2-6</b>	200 m/s <sup>2</sup> , 10 ... 150 Hz

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 (+V)</b>	yes
<b>Short circuit proof outputs</b>	yes <sup>2)</sup>
<b>CE compliant acc. to</b>	EMC guideline 2004/108/EC ATEX guideline 94/9/EC Machinery directive 2006/42/EC
<b>RoHS compliant acc. to</b>	guideline 2002/95/EC

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>Singleturn resolution</b>	10...14 bit and 17 bit <sup>3)</sup>
<b>Number of revolutions</b>	4096 (12 bit)
<b>Code</b>	Binary or Gray
<b>SSI clock rate</b>	ST resolution ≤ 14 bit 50 kHz ... 2 MHz ST resolution ≥ 15 bit 50 kHz ... 125 kHz
<b>Monoflop time</b>	≤ 15 μs
Note: 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>	ST resolution ≤ 14 bit ≤ 1 μs ST resolution ≥ 15 bit 4 μs
<b>Status and parity bit</b>	on request

BiSS-C interface	
<b>Singleturn resolution</b>	10 ... 14 bit and 17 bit <sup>3)</sup>
<b>Number of revolutions</b>	4096 (12 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

SinCos interface	
<b>Max. frequency -3dB</b>	400 kHz
<b>Signal level</b>	1 V <sub>pp</sub> (± 10%)
<b>Short circuit proof</b>	yes
<b>Pulse rate</b>	2048 ppr

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

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.

1) The specified value is based on a diagnostic coverage of 90%, that must be achieved with an encoder evaluation unit.  
The encoder evaluation unit must meet at least the requirements for SIL2.  
2) Short circuit to 0 V or to output, one channel at a time, power supply correctly applied  
3) Other options on request

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

## 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	A	$\bar{A}$	B	$\bar{B}$	$\perp$
4	1, 2, A, B	SET	Cable marking:	6	1	2	3	4	5	11	7	8	9	10	shield

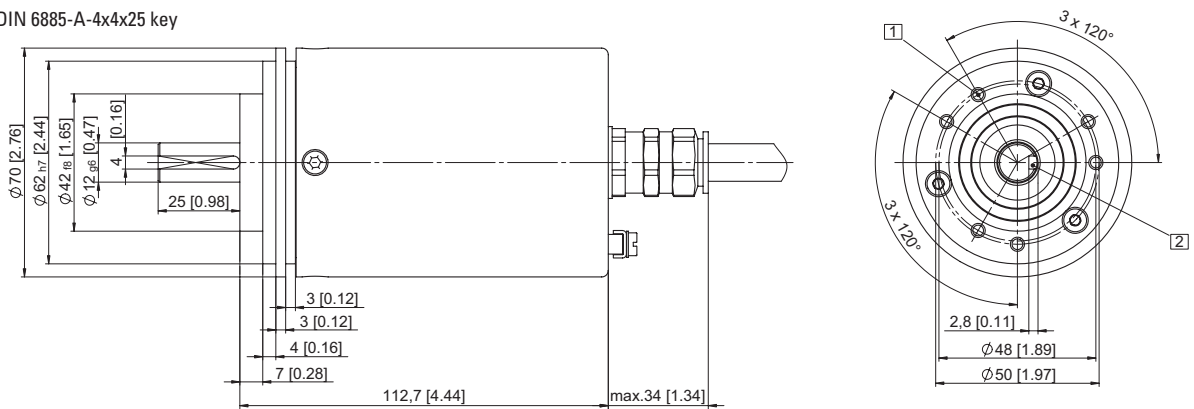
- +V: Encoder power supply +V DC
- 0 V: Encoder power supply ground GND (0 V)
- C+, C-: Clock signal
- D+, D-: Data signal
- SET: SET input. The current position becomes defined as position zero.
- A,  $\bar{A}$ : Cosine signal
- B,  $\bar{B}$ : Sine signal
- $\perp$ : Protective earth

## Dimensions

Dimensions in mm [inch]

### Clamping-synchronous flange, $\varnothing 70$ [2.76] Shaft type 1 with axial cable outlet

- 1 6 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 6 x M4, 10 [0.39] deep

