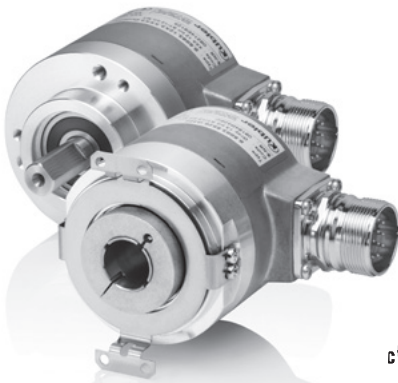


# Absolute Encoders – Multiturn

Functional Safety, optical

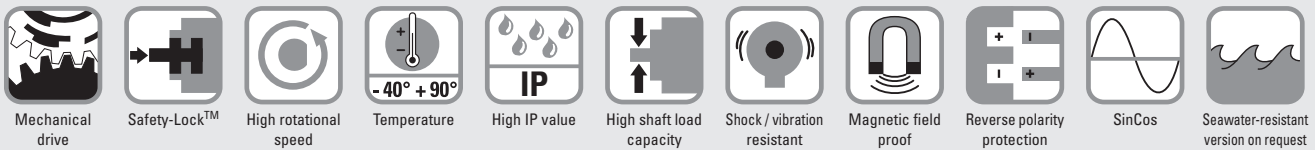
Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)

SSI / BiSS-C + SinCos



The absolute multiturn encoders Sendix 5863 SIL and 5883 SIL are perfectly suited for use in safety-related applications up to SIL3 according to DIN EN ISO 61800-5-2 or PLe to DIN EN ISO 13849.

The extra strong Safety-Lock™ Design interlocked bearings, the high integration density of the components based on OptoASIC technology and the rugged die-cast housing make these devices ideal also for demanding applications outdoors.



## Certified Safety

- Certified by the BGIA - Institute for Occupational Safety and Health
- Suitable for SIL3 applications acc. to DIN EN ISO 61800-5-2
- Suitable for PLe applications acc. to DIN EN ISO 13849
- SSI or BiSS-C interface with incremental SinCos tracks

## Flexible

- Shaft and Hollow shaft versions
- Cable and connector variants
- Various mounting options available

## Order code Shaft version

8.5863SIL . 1 X X X . X X 2 X  
Type a b c d e f g h

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, ø 58 mm, IP65

**b Shaft (ø x L)**  
2 = 10 x 20 mm, with flat  
A = 10 x 20 mm, with feather key

**c Output circuit / Power supply**  
3 = SSI/BiSS-C + 2048 ppr SinCos track / 5 V DC  
4 = SSI/BiSS-C + 2048 ppr SinCos track / 10 ... 30 V DC

**d Type of connection**  
1 = axial cable (1 m PVC)  
2 = radial cable (1 m PVC)  
3 = M23 connector, 12-pin, axial  
4 = M23 connector, 12-pin, radial

**e Code**  
B = SSI, Binary  
C = BiSS-C, Binary  
G = SSI, Gray

**f Resolution <sup>1)</sup>**  
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

**g Input / output <sup>1)</sup>**  
2 = SET, DIR inputs

**h Options (Service)**  
1 = no Option  
2 = status-LED  
3 = SET button and status LED

*optional on request*  
- seawater-resistant  
- special cable length

## Order code Hollow shaft

8.5883SIL . X X X X . X X 2 X  
Type a b c d e f g h

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**  
A = with torque stop set, IP65  
B = with stator coupling, IP65

**b Hollow shaft**  
3 = ø 10 mm  
4 = ø 12 mm  
5 = ø 14 mm  
K = ø 10 mm, tapered shaft

**c Output circuit / Power supply**  
3 = SSI/BiSS-C + 2048 ppr SinCos track / 5 V DC  
4 = SSI/BiSS-C + 2048 ppr SinCos track / 10 ... 30 V DC

**d Type of connection**  
2 = radial cable (1 m PVC)  
4 = M23 connector, 12-pin, radial  
E = tangential cable outlet  
cable length 1 m (PVC cable)

**e Code**  
B = SSI, Binary  
C = BiSS-C, Binary  
G = SSI, Gray

**f Resolution <sup>1)</sup>**  
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

**g Input / output <sup>1)</sup>**  
2 = SET, DIR inputs

**h Options (Service)**  
1 = no Option  
2 = status-LED  
3 = SET button and status LED

*optional on request*  
- seawater-resistant  
- special cable length

<sup>1)</sup> Resolution, preset value and count direction are factory-programmable

# Absolute Encoders – Multiturn

<b>Functional Safety, optical</b>	<b>Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)</b>	<b>SSI / BiSS-C + SinCos</b>
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Connection Technology		
<b>Connector, self-assembly</b> (straight)	M23	<b>8.0000.5012.0000</b>
<b>Cordset, pre-assembled with 2 m PVC cable</b>	M23	<b>8.0000.6901.0002.0031</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 under [www.kuebler.com/safety](http://www.kuebler.com/safety)**

**Notes regarding “Functional Safety”**  
 These encoders are suitable for use in safety-related systems up to SIL3 to DIN EN ISO 61800-5-2 and PLe to DIN EN ISO 13849 in conjunction with controllers or evaluation units, which possess the necessary functionality. Additional functions can be found in the operating manual.

Mechanical characteristics	
<b>Max. speed, shaft version</b>	
without shaft seal (IP65) up to 70°C	12 000 min <sup>-1</sup> , 10 000 min <sup>-1</sup> (continuous)
without shaft seal (IP65) up to T <sub>max</sub>	8 000 min <sup>-1</sup> , 5 000 min <sup>-1</sup> (continuous)
with shaft seal (IP67) up to 70°C	11 000 min <sup>-1</sup> , 9 000 min <sup>-1</sup> (continuous)
with shaft seal (IP67) up to T <sub>max</sub>	8 000 min <sup>-1</sup> , 5 000 min <sup>-1</sup> (continuous)
<b>Max. speed, hollow shaft version</b>	
without shaft seal (IP65) up to 70°C	9 000 min <sup>-1</sup> , 6 000 min <sup>-1</sup> (continuous)
without shaft seal (IP65) up to T <sub>max</sub>	6 000 min <sup>-1</sup> , 3 000 min <sup>-1</sup> (continuous)
with shaft seal (IP67) up to 70°C	8 000 min <sup>-1</sup> , 4 000 min <sup>-1</sup> (continuous)
with shaft seal (IP67) up to T <sub>max</sub>	4 000 min <sup>-1</sup> , 2 000 min <sup>-1</sup> (continuous)
<b>Starting torque, shaft version</b>	
without shaft seal (IP65)	< 0.01 Nm
with shaft seal (IP67)	< 0.05 Nm
<b>Starting torque, hollow shaft version</b>	
without shaft seal (IP65)	< 0.03 Nm
<b>Moment of inertia</b>	
Shaft version	4.0 x 10 <sup>-6</sup> kgm <sup>2</sup>
Hollow shaft version	7.0 x 10 <sup>-6</sup> kgm <sup>2</sup>
<b>Load capacity of shaft</b>	radial / axial 80 N / 40 N
<b>Weight</b>	approx. 0.45 kg
<b>Protection EN 60 529</b>	housing side IP67 shaft side IP65, opt. IP67
<b>Working temperature range</b>	-40°C ... +90°C <sup>1)</sup>
<b>Materials</b>	shaft/hollow shaft stainless steel flange aluminium housing zinc die-cast housing cable PVC
<b>Shock resistance</b> acc. EN 60068-2-27	2500 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance</b> acc. EN 60068-2-6	100 m/s <sup>2</sup> , 55 ... 2000 Hz

Electrical characteristics	
<b>Supply voltage</b>	5 V DC ± 5% or 10 ... 30 V DC
<b>Current consumption</b>	5 V DC max. 80 mA (w/o output load) 10 ... 30 V DC max. 50 mA
<b>Reverse polarity protection of the power supply (U<sub>B</sub>)</b>	yes
<b>UL certified</b>	File 224618
<b>Conforms to CE requirements</b> acc. to	EN 61000-6-2, EN 61000-6-4, EN 61000-6-3
<b>RoHS compliant</b> acc. to	EU-guideline 2002/95/EG

General Interface characteristics	
<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>Short circuit proof outputs</b>	yes <sup>2)</sup>

SSI Interface	
<b>Singleturn resolution</b>	10 ... 14 bits 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>	≤ 14 bit 50 kHz ... 2 MHz ≥ 15 bit 50 kHz ... 125 kHz
<b>Monoflop time</b>	≤ 15 μs
Note: If the clock starts cycling within the monoflop time, a second data transfer starts with the same data. If the clock starts cycling after the monoflop time, the data transfer starts with the new values. The update rate is dependent on the clock speed, data length and monoflop-time.	
<b>Data refresh rate</b>	≤ 14 bit < 1 μs 15 ... 17 bit 4 μs
<b>Status and Parity bit</b>	optional 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

Output SinCos (A / B) 2048 ppr (Optional incremental track)	
<b>Max. frequency -3dB</b>	400 kHz
<b>Signal level</b>	1 V <sub>pp</sub> (± 20%)
<b>Short circuit proof</b>	yes

**DIR input**  
 A HIGH signal switches the direction of rotation from the default CW to CCW. This function can also be factory-programmed to be inverted. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The LED will come ON and the status output will switch to LOW.

1) Cable version: -30°C ... +90°C  
 2) Short circuit to 0V or to output, one channel at a time, supply voltage correctly applied  
 3) Other options upon request

# Absolute Encoders – Multiturn

<b>Functional Safety, optical</b>	<b>Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)</b>	<b>SSI / BiSS-C + SinCos</b>
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SET input or SET button	
<b>Input</b>	active high
<b>Input type:</b>	comparator
<b>Signal level</b>	high min: 60 % of +V, max: +V low max: 25 % of +V (Supply voltage)
<b>Input current</b>	< 0.5 mA
<b>Min. pulse duration (SET)</b>	10 ms
<b>Timeout after SET signal</b>	14 ms
<b>Reaction 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 or by pressing the optional SET button (with a pencil, ball-point pen or similar). Other preset values can be factory-programmed. The SET input has a signal delay time of approx. 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approx. 15 ms before the new position data can be read. During this time the LED is ON.

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

**LED**  
The optional LED (red) serves to display various alarm or error messages. In normal operation the LED is OFF.  
If the LED is ON this indicates:  
- Sensor error, singleturn or multiturn (soiling, glass breakage etc.)  
- LED error, failure or ageing  
- Over- or under-temperature  
In the SSI mode, the fault indication can only be reset by switching off the power-supply to the device.

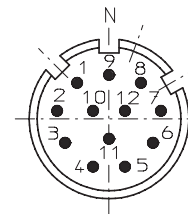
### Terminal assignment

Interface	Type of connection	Features	Cable													
3, 4	1, 2, E	SET, DIR	Signal:	GND	+V	+C	-C	+D	-D	SET	DIR	A	$\bar{A}$	B	$\bar{B}$	PE
			Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY-PK	RD-BU	Shield

Interface	Type of connection	Features	M23 connector													
3, 4	3, 4	SET, DIR	Signal:	GND	+V	+C	-C	+D	-D	SET	DIR	A	$\bar{A}$	B	$\bar{B}$	PE
			M23 connector:	1	2	3	4	5	6	7	8	9	10	11	12	PH

- +V: Encoder Power Supply +V DC
- GND: Encoder Power Supply Ground (0V)
- +C, -C: Clock signal
- +D, -D: Data signal
- SET: Set input. The current position is set to zero
- DIR: Direction input: If this input is active, the output values are counted backwards (decrease) when the shaft is turning clockwise.
- PE: Protective earth
- PH: Plug connector housing (shield)
- A,  $\bar{A}$ : Sine output (incremental)
- B,  $\bar{B}$ : Cosine output (incremental)

Top view of mating side, male contact base



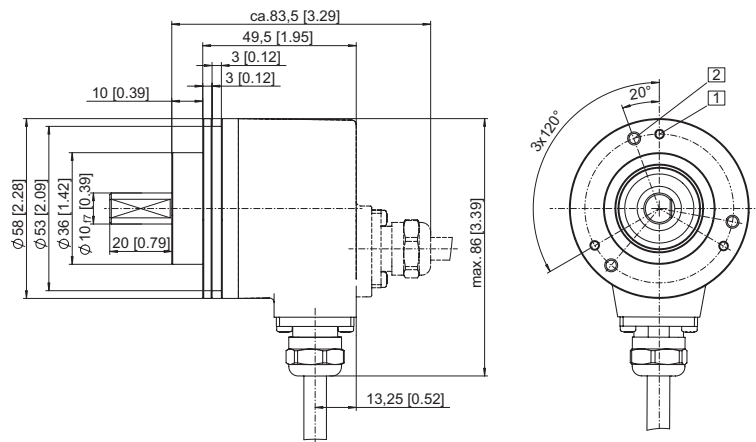
M23 connector, 12-pin

# Absolute Encoders – Multiturn

**Functional Safety, optical**      **Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)**      **SSI / BiSS-C + SinCos**

## Dimensions shaft version

**Clamping flange**  
**Flange type 1 with shaft type 2**  
 (Drawing with cable)



**Flange type 1 with shaft type A**  
 (Drawing with M23 connector)

- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep

