Standard, ATEX / IECEx – mining M2
mechanical multiturn, optical

Sendix 7163 / 7183 (shaft / hollow shaft)

SSI / BiSS

The Sendix 7163 / 7183 absolute multiturn encoders in a compact 70 mm stainless-steel housing, with a an SSI or BiSS interface and optical sensor technology have an ATEX/IECEx mining M2 approval.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 29 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

Compact and safe

- Can be used even when space is tight.
- Minimal installation depth, diameter 70 mm.
- Compact cable outlet axial or radial.
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns (IP67 protection).

Explosion protection

- Mining M2 approval.
- "Flame-proof enclosure" construction.
- ATEX with EU type examination certificate.
- IECEx with certificate of conformity (CoC).

Order code Shaft version

8.7163	.	2	X	2	X	.	X	X	2	1	.	XXXX
Type		a	b	c	d		e	f	g	h		i [1]

a *Flange*
2 = clamping / synchronous flange, 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 / supply voltage*
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* [2]
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 *Inputs / outputs* [2]
2 = SET, DIR input additional status output

h *Options*
1 = no option

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

Optional on request
- special cable length
- other resolutions

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

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Standard, ATEX/IECEx – mining M2 mechanical multiturn, optical

Sendix 7163 / 7183 (shaft / hollow shaft) | **SSI/BiSS**

Order code Hollow shaft

8.7183	.	X	X	2	X	.	X	X	2	1	.	XXXX
Type		a	b	c	d		e	f	g	h		i [1]

a *Flange*
2 = with spring element, short
6 = with stator coupling, ø 65 mm [2.56"]

b *Blind hollow shaft*
(insertion depth max. 41.5 mm [1.63"])
1 = ø 12 mm [0.47"]
2 = ø 14 mm [0.55"]

c *Interface / supply voltage*
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* [2]
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 *Inputs / outputs* [2]
2 = SET, DIR input
additional status output

h *Options*
1 = no option

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

Optional on request
- special cable length
- other resolutions

Technical data

Explosion protection

ATEX

EU type-examination certificate	IBExU 15 ATEX 1057 X
Category	
Sendix 7163 – 6000 rpm	Ex I M2 Ex db I/IIC T4 Mb
Sendix 7163 – 2000 rpm	Ex I M2 Ex db I/IIC T5 Mb
Sendix 7183 – 3000 rpm	Ex I M2 Ex db I/IIC T4 Mb
Sendix 7183 – 2000 rpm	Ex I M2 Ex db I/IIC 120°C (T4) Mb
Relevant standards	EN 60079-00:2018
ATEX guideline 2014/34/EU	EN 60079-1:2014

IECEx

Certificate of Conformity (CoC)	IECEx IBE 15.0019 X
Category	
Sendix 7163 – 6000 rpm	Ex db I/IIC T4 Mb
Sendix 7163 – 2000 rpm	Ex db I/IIC T5 Mb
Sendix 7183 – 3000 rpm	Ex db I/IIC T4 Mb
Sendix 7183 – 2000 rpm	Ex db I/IIC 120°C (T4) Mb
Relevant standards	IEC 60079-0:2017 IEC 60079-1:2014

EMC

Relevant standards	EN 55011 class B EN (IEC) 61326-1

Electrical characteristics

Supply voltage	10 ... 30 V DC
Current consumption (no load)	max. 45 mA
Reverse polarity protection for supply voltage	yes
Short-circuit proof outputs	yes [3]

Mechanical characteristics

Maximum speed	shaft	6000 min^{-1} (continuous)
	hollow shaft	3000 min^{-1} (continuous)
Starting torque – at 20 °C [68 °F]		< 0.05 Nm
Mass moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial	80 N
	axial	40 N
Weight		approx. 2.8 kg [98.77 oz]
Protection acc. to EN 60529		IP67
Ambient temperature		-40 °C ... +60 °C [-40 °F ... +140 °F] Please note the specifications for temperature class in EU type-examination certificate!
Materials	shaft	stainless steel
	flange / housing	stainless steel
	cable	PUR
Shock resistance acc. to EN/IEC 60068-2-27		1000 m/s^2, 6 ms
Vibration resistance acc. to EN/IEC 60068-2-6		100 m/s^2, 55 ... 2000 Hz

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, supply voltage correctly applied.

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Standard, ATEX / IECEx – mining M2 mechanical multiturn, optical | Sendix 7163 / 7183 (shaft / hollow shaft) | SSI / BiSS

SSI interface

Output driver		RS422 transceiver type
Permissible load / channel		max. +/- 20 mA
Signal level	HIGH	typ 3.8 V
	LOW at I_{Load} = 20 mA	typ 1.3 V
Resolution singleturn		10 ... 14 bit and 17 bit
Number of revolutions (multiturn)		4096 (12 bit)
Code		binary or gray
SSI clock rate		50 kHz ... 2 MHz
Data refresh rate	ST resolution ≤ 14 bit	≤ 1 µs
	ST resolution ≥ 15 bit	4 µs
Monoflop time		≤ 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.

BiSS interface

Output driver		RS422 transceiver type
Permissible load / channel		max. +/- 20 mA
Signal level	HIGH	typ 3.8 V
	LOW at I_{Load} = 20 mA	typ 1.3 V
Resolution singleturn		10 ... 14 bit and 17 bit
Number of revolutions (multiturn)		4096 (12 bit)
Code		binary
Clock rate		up to 10 MHz
Max. update rate		< 10 µs, depends on the clock rate and the data length
Data refresh rate	ST resolution ≤ 14 bit	≤ 1 µs
	ST resolution 17 bit	2.4 µs

Note:
– bidirectional, factory programmable parameters are: resolution, code, direction, alarms and warnings
– CRC data verification

Status output

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

SET input

Input		HIGH active
Input type		comparator
Signal level (+V = Supply voltage)	HIGH	min. 60 % of +V
		max. +V
	LOW	max. 25 % of +V
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Timeout after SET signal		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.

If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

DIR input

Direction input: A HIGH signal switches the direction of rotation from the default cw to ccw. This inverted 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.

If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

Response time (DIR input)	1 ms

Power-ON

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

Hot plugging of the encoder should be avoided.

Approvals

CE compliant in accordance with

EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU
ATEX Directive	2014/34/EU

Terminal assignment

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

+V: Supply voltage encoder +V DC
0 V: Supply voltage encoder ground GND (0 V)
C+, C-: Clock signal
D+, D-: Data signal
SET: Set input
DIR: Direction input
ERR\: Status output
⏚: Protective earth

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SSI/BiSS

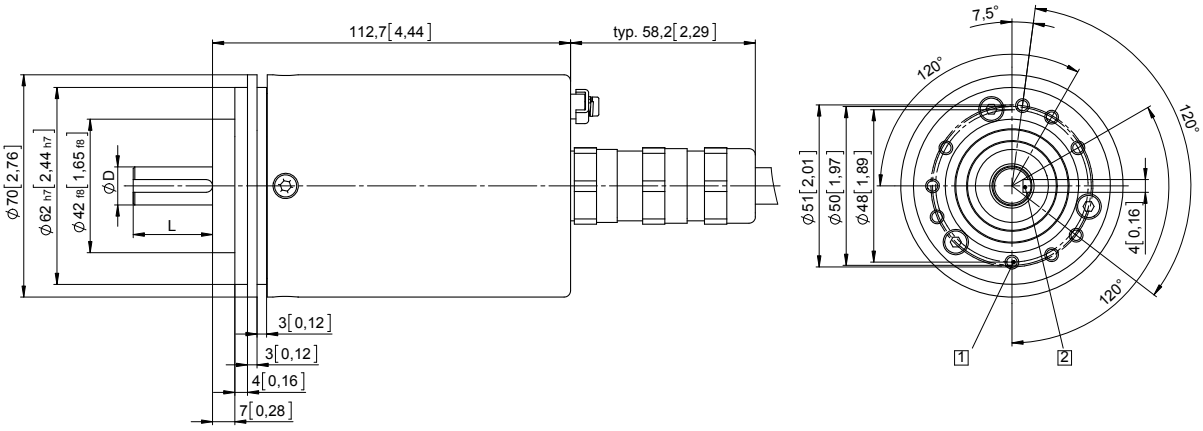
Dimensions shaft version

Dimensions in mm [inch]

Clamping / synchronous flange, ø 70 [2.76]
Shaft type 1 with axial cable outlet

1 9 x M4, 10 [0.39] deep

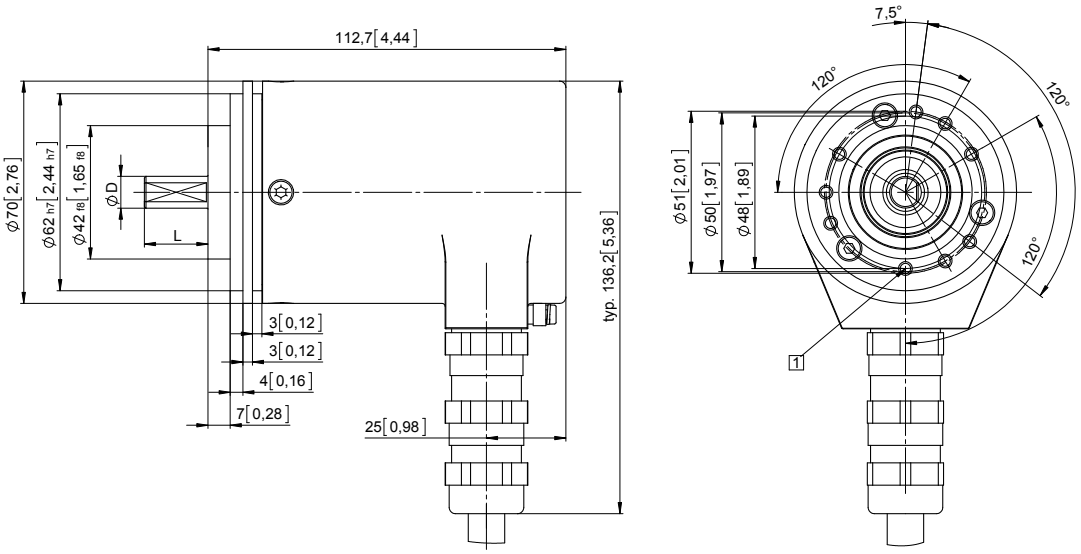
2 Keyway for DIN 6885-A-4x4x25 key



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

Clamping / synchronous flange, ø 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]

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Dimensions hollow shaft version

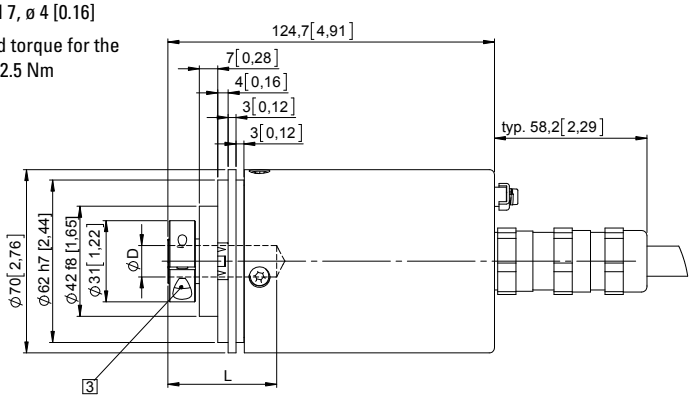
Dimensions in mm [inch]

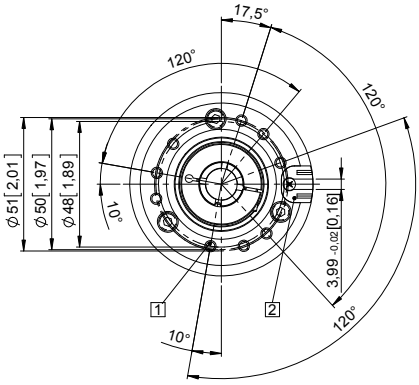
Flange with spring element, short
Flange type 2

1 9 x M4, 10 [0.39] deep

2 Slot spring element, recommendation: torque pin DIN 7, ø 4 [0.16]

3 Recommended torque for the clamping ring 2.5 Nm

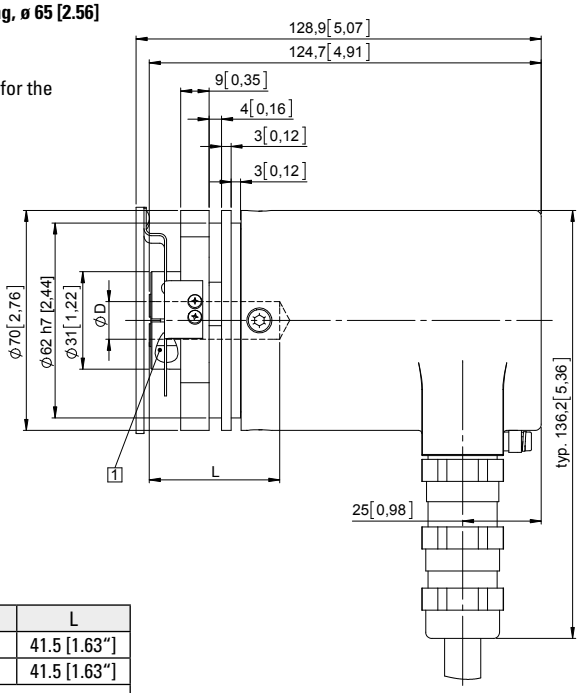


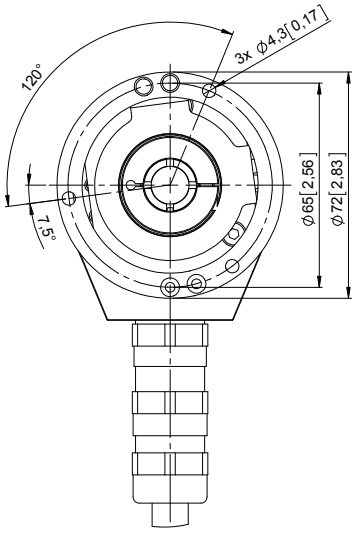


D	Fit	L
12 [0.47]	H7	41.5 [1.63“]
14 [0.55]	H7	41.5 [1.63“]
L = insertion depth max. blind hollow shaft		

Flange with stator coupling, ø 65 [2.56]
Flange type 6

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		

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