

Absolute encoders - singleturn

Standard, ATEX/IECEX – zone 1/21 SIL3/PLe, optical	Sendix 7053FS3 / 7073FS3 (shaft / hollow shaft)	SinCos
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Order code Hollow shaft	8.7073FS3 Type	.XX2X.XX21.XXXX a b c d e f g h i ¹⁾
a Flange 1 = with spring element, short 5 = with stator coupling, IP67, ø 65 mm [2.56"]	e Code B = SSI, binary C = BiSS, binary G = SSI, gray	i Cable length in dm ¹⁾ 0050 = 5 m [16.40'] 0100 = 10 m [32.81'] 0150 = 15 m [49.21']
b Blind hollow shaft (insertion depth max. 41.5 mm [1.63"]) 1 = ø 12 mm [0.47"] 2 = ø 14 mm [0.55"]	f Resolution ²⁾ A = 10 bit 1 = 11 bit 2 = 12 bit 3 = 13 bit 4 = 14 bit 7 = 17 bit	Optional on request - special cable length - other resolutions - IP65 version for T6 - seawater resistant (stainless steel V4A)
c Interface / power supply 2 = SSI, BiSS / 10 ... 30 V DC	g Inputs / outputs ²⁾ 2 = SET, DIR input additional status output	
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']	h Options 1 = no option	

Accessories		Order no.
EMC shield terminal	for top-hat rail mounting	8.0000.4G06.0312
Screw retention	Loctite 243, 5 ml	8.0000.4G05.0000
Bellows coupling, safety-oriented	You will find an overview of our couplings for Sendix shaft encoders in the accessories section or under kuebler.com/accessories .	
Safety modules Safety-M compact	You will find an overview of our systems and components for Functional Safety and the corresponding software in the safety technology section or under kuebler.com/safety .	
LED SSI display 570 / 575	Electronic position display up to 32 bit. You will find an overview in the accessories section or under kuebler.com/position_display .	

Further accessories can be found in the accessories section or in the accessories area of our website at: kuebler.com/accessories.
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: kuebler.com/connection_technology.

Technical data		Notes regarding "Functional Safety"	
Explosion protection		These encoders are suitable for use in safety-related systems up to SIL3 acc. to EN 61800-5-2 and PLe 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.	
ATEX		Safety characteristics	
EC type-examination certificate	PTB09 ATEX 1106 X		
Category (gas)	II 2 G Ex d IIC T4 - T6 Gb		
Category (dust)	II 2D Ex tb IIIC T135°C - T85°C Db	Classification	PLe / SIL3
Relevant standards	EN 60079-0:2012; EN 60079-1:2014; EN 60079-31:2009	System structure	2 channel (Cat. 4)
IECEX		PFH_d value ³⁾	1.09 x 10 ⁻⁸ h ⁻¹
Certificate of Conformity (CoC)	IECEX PTB 13.0026 X	Mission time / Proof test interval	20 years
Category (gas)	Ex d IIC T4 - T6 Gb	Relevant standards	EN ISO 13849-1:2015; EN ISO 13849-2:2012; EN 61800-5-2:2007
Category (dust)	Ex tb IIIC T135°C - T85°C Db		
Relevant standards	IEC 60079-0:2011; IEC 60079-1:2014; IEC 60079-31:2008		

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

3) The specified value is based on a diagnostic coverage of 99 %, that must be achieved with an encoder evaluation unit.
The encoder evaluation unit must meet at least the requirements for SIL3.

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SIL3/PLe, optical**

Sendix 7053FS3 / 7073FS3 (shaft / hollow shaft)

SinCos

Electrical characteristics	
Power supply	10 ... 30 V DC
Current consumption (no load)	max. 45 mA
Reverse polarity protection for power supply	yes
Short circuit proof outputs	yes ¹⁾
CE compliant acc. to	EMC guideline 2014/30/EU ATEX guideline 2014/34/EU Machinery directive 2006/42/EC RoHS guideline 2011/65/EU

EMC	
Relevant standards	EN 55011 class B:2009 / A1:2010 EN 61326-1:2013 EN 61326-3-1:2008

Mechanical characteristics	
Maximum speed	6000 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. 1.3 kg [45.86 oz]
Protection acc. to EN 60529	IP67
Ambient temperature	-40°C ... +60°C [-40 ... +140°F] Please note the specifications for temperature class in EC type-examination certificate!
Material	shaft stainless steel flange / housing seawater durable Al, type AlSiMgMn (EN AW-6082) cable PUR
Shock resistance acc. to EN 60068-2-27	500 m/s ² , 11 ms
Vibration resistance acc. to EN 60068-2-6	200 m/s ² , 5 ... 2000 Hz

SSI interface	
Output driver	RS485 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	10 ... 14 bit and 17 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	RS485 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	10 ... 14 bit and 17 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

SinCos interface	
Max. frequency -3dB	400 kHz
Signal level	1 V _{pp} (±10 %)
Short circuit proof	yes ¹⁾
Pulse rate	2048 ppr

SET input	
Input	HIGH active
Input type	comparator
Signal level (+V = Power supply)	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.

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.	

¹⁾ Short circuit to 0 V or to output, one channel at a time, power supply correctly applied.

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Terminal assignment

Interface	Type of connection	Features	Cable (isolate unused cores 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	Core 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

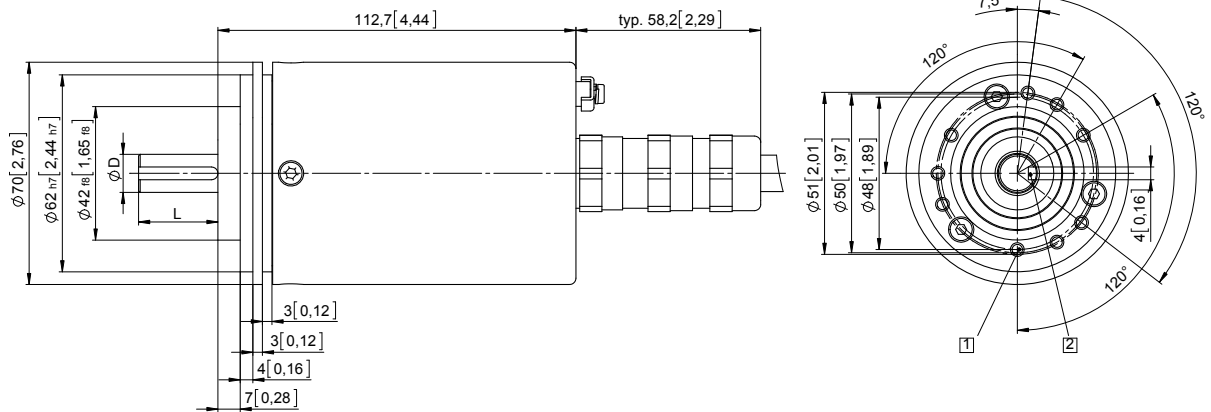
SET: SET input
 A, \bar{A} : Cosine signal
 B, \bar{B} : Sine signal
 \perp : Protective earth

Dimensions shaft version

Dimensions in mm [inch]

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

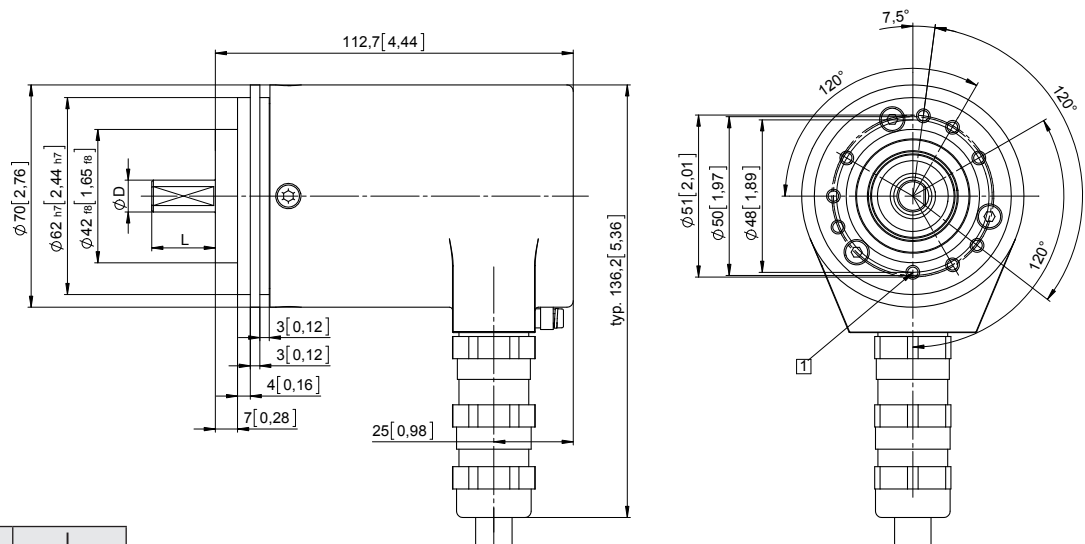
- 1 9 x M4, 10 [0.39] deep
- 2 Keyway for DIN 6885-A-4x4x25 key



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]

