

Absolute Encoders - Singleturn

Standard	Sendix SIL 7053FS3 (Shaft)	SSI / BiSS + SinCos
ATEX / IECEx – Zone 1 / 21, SIL3/PLe, optical		
Accessory		Order No.
EMC shield terminal	For top-hat rail mounting	8.0000.4G06.0000
Screw retention	Loctite 243, 5 ml	8.0000.4G05.0000
Bellows coupling, safety-oriented	You will find an overview of our couplings for Sendix SIL shaft encoders in the accessories section or under www.kuebler.com/accessories .	
Safety modules Safety-M compact / modular	You will find an overview of our systems and components for Functional Safety and the corresponding software in the safety technology section or under www.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 www.kuebler.com/position_display .	

Further accessories can be found in the accessories section or in the accessories area of our website at: 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.

Technical data	
Explosion protection ATEX	
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 IP6x
Relevant standards	EN 60079-0: 2009; EN 60079-1: 2007; EN 60079-31: 2009
Explosion protection IECEx	
Certificate of Conformity (CoC)	IECEx PTB 13.0026 X
Category (gas)	Ex d IIC T4 - T6 Gb
Category (dust)	Ex tb IIIC T135°C - T85°C Db IP6x
Relevant standards	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 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.	
Safety characteristics	
Classification	PLe / SIL3
System structure	2 channel (Cat. 4 / HFT = 1)
PFH_d value ¹⁾	1.09 x 10 ⁻⁸ h ⁻¹
Proof-test interval	20 years
Relevant standards	EN ISO 13849-1:2008; EN ISO 13849-2:2013; EN 61800-5-2:2007
Electrical characteristics	
Power supply	10 ... 30 V DC
Current consumption (no load)	max. 45 mA
Reverse polarity protection	yes
Reverse polarity protection for power supply (+V)	yes
Short circuit proof outputs	yes ²⁾
CE compliant acc. to	EMC guideline 2004/108/EC ATEX guideline 94/9/EC Machinery directive 2006/42/EC
RoHS compliant acc. to	guideline 2011/65/EU
EMC	
Relevant standards	EN 55011 Class B :2009 / A1:2010 EN 61000-6-3 :2007 / A1:2011 EN 61000-6-2 :2005
Mechanical characteristics	
Max. speed	continuous 6 000 min ⁻¹
Starting torque – at 20°C [68°F]	< 0.05 Nm
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
Working temperature range	-40°C ... +60°C [-40 ... +140°F]
Material	shaft stainless steel flange / housing seawater-resistant Al, type AISiMgMn (EN AW-6082) (stainless steel on req.) 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 , 10 ... 150 Hz

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

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Standard ATEX/IECEX – Zone 1/21, SIL3/PLe, optical		Sendix SIL 7053FS3 (Shaft)	SSI/BiSS + SinCos
SSI interface			
Output driver	RS485 transceiver type		
Permissible load / channel	max. 20 mA		
Signal level	HIGH	typ 3.8 V	
	LOW at $I_{Load} = 20 \text{ mA}$	typ 1.3 V	
Singleturn resolution	10...14 bit and 17 bit ¹⁾		
Number of revolutions	4096 (12 bit)		
Code	Binary or Gray		
SSI clock rate	50 kHz ... 2 MHz		
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.			
Data refresh rate	resolution ≤ 14 bit	≤ 1 μs	
	resolution ≥ 15 bit	4 μs	
Status and parity bit	on request		
BiSS interface			
Singleturn resolution	10 ... 14 bit and 17 bit ¹⁾		
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	≤ 1 μs		
Note:	<ul style="list-style-type: none"> – 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		
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.			
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

1) Other options on request.

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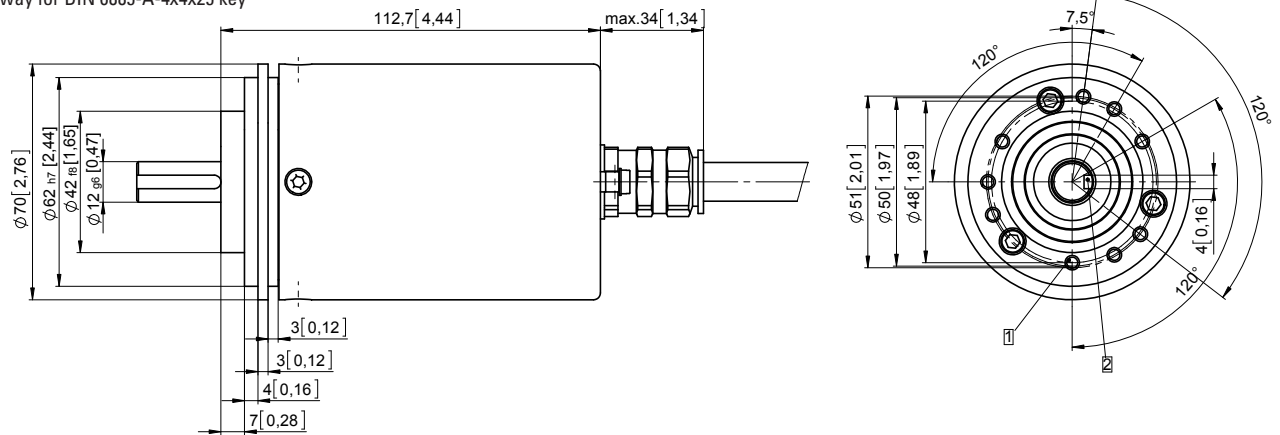
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Dimensions

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

