

Absolute encoders – singleturn

Compact, robust magnetic	Sendix M3653AR (shaft)	SSI
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The Sendix M3653AR is a magnetic singleturn encoder in compact design. It is characterized by robustness, reliability and cost-efficiency.

The "R"obust version is particularly suitable for use in harsh environments. Protected up to IP69k, resistance against shock and extreme temperature fluctuations, the Sendix M36 encoder is suitable even for demanding outdoor applications.



Safety-Lockplus™	Standard option stainless steel 1.4404	Standard option seawater resistant	High rotational speed	Temperature range -40°...+85°C	High protection level IP	High shaft load capacity	Shock / vibration resistant	Reverse polarity protection

Highest robustness

- Sturdy bearing construction in Safety-Lockplus™ design for particularly high resistance.
- Extra large bearings.
- Mechanically protected shaft seal.
- Protection level IP66, IP67 and IP69k in one device.
- Wide temperature range -40°C ... +85°C.

Application oriented

- Absolute accuracy ±1°.
- Repeat accuracy ±0.2°.
- Short control cycles, clock frequency with SSI up to 2 MHz.
- Max. resolution 14 bit.

Order code 8.M3653AR.XX2X.XX12
Shaft version Type

a Version

- 1 = standard ¹⁾
clamping flange ø 42 mm [1.65"]
- 7 = stainless steel V4A ²⁾
clamping flange ø 42 mm [1.65"]
all metal parts accessible from outside are out of stainless steel V4A

b Shaft (ø x L), with flat

- 1 = ø 6 x 12.5 mm [0.24 x 0.49"]
- 3 = ø 8 x 15 mm [0.32 x 0.59"]
- 5 = ø 10 x 20 mm [0.39 x 0.79"]
- 2 = ø 1/4" x 12.5 mm [0.49"]
- E = ø 10 x 20 mm [0.39 x 0.79"], stainless steel V4A

c Interface / supply voltage

- 2 = SSI / 10 ... 30 V DC

d Type of connection

- 2 = radial cable, 1 m [3.28'] PUR
- B = radial cable, special length PUR *)
- 4 = radial M12 connector, 8-pin

*) Available special lengths (connection type B):
2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']
order code expansion .XXXX = length in dm
ex.: 8.M3653AR.132B.G312.0030 (for cable length 3 m)

e Code

- B = SSI, binary
- G = SSI, gray

f Resolution

- A = 10 bit
- 2 = 12 bit
- 3 = 13 bit
- 4 = 14 bit

Optional on request

- Ex 2/22 (only for connection type 4)
- other shaft diameters out of V4A stainless steel

1) Not in conjunction with shaft type "E".

2) Only in conjunction with shaft type "E" + type of connection "4".

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Mounting accessory for shaft encoders			Order no.
Coupling	Bellows coupling ø 19 mm [0.75"] for shaft 8 mm [0.32"]		8.0000.1102.0808 ¹⁾
Connection technology			Order no.
Cordset, pre-assembled	M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PUR cable		05.00.6051.8211.002M ¹⁾
Connector, self-assembly	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)		05.CMB 8181-0 ¹⁾
	M12 female connector with coupling nut, 8-pin, A coded, straight (stainless steel V4A)		8.0000.5136.0000.V4A

Further Kübler accessories can be found at: kuebler.com/accessories
 Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

Technical data

Mechanical characteristics		
Maximum speed	4000 min ⁻¹ 2000 min ⁻¹ (continuous)	
Starting torque at 20°C [68°F]	< 0.01 Nm	
Shaft load capacity	radial	80 N
	axial	40 N
Weight	approx. 250 g [8.82 oz]	
Protection acc. to EN 60529/DIN 40050-9	IP66, IP67, IP69k	
Working temperature range	-40°C ... +85°C [-40°F ... +185°F]	
Materials	version "1" (standard)	version "7" (stainless steel)
	shaft	V2A
	flange	aluminum
	housing	zinc die-cast
	cable	PUR
Shock resistance acc. to EN 60068-2-27	5000 m/s ² , 4 ms	
Vibration resistance acc. to EN 60068-2-6	300 m/s ² , 10 ... 2000 Hz	

Electrical characteristics	
Supply voltage	10 ... 30 V DC
Current consumption (no load)	max. 30 mA
Reverse polarity protection of the supply voltage	yes
Short-circuit proof outputs	yes ²⁾
UL approval	File no. E224618
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

SSI interface	
Output driver	RS485 transceiver type
Permissible load / channel	max. +/- 30 mA
Signal level	HIGH typ 3.8 V
	LOW with I _{Load} = 20 mA typ 1.3 V
Resolution	10 ... 14 bit
Absolute accuracy ³⁾	±1°
Repeat accuracy	±0.2°
Code	binary or gray
SSI clock rate	50 kHz ... 2 MHz
Data refresh rate	2 ms
Monoflop time	≤ 15 µs
Note: If the clock cycle starts within the monoflop time a second data transfer begins with the same data. If the clock cycle starts after the monoflop time the cycle begins with the new values. The update rate is dependent on the clock speed, data length and monoflop time.	

SET input	
Input	active HIGH
Input type	comparator
Signal level (+V = supply voltage)	HIGH min. 60 % of +V, max: +V
	LOW max. 30 % of +V
Input current	< 0.5 mA
Min. pulse duration (SET)	10 ms
Input delay	1 ms
New position data readable after	1 ms
Internal processing time	200 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 processing time of approx. 1 ms, after which the new position data can be read via SSI. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the supply voltage must not be switched off.

The SET function should be carried out whilst the encoder is at rest. If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

1) Not for version "7" (V4A stainless steel)
 2) Short circuit proof to 0 V or to output when supply voltage correctly applied.
 3) Over the whole temperature range.

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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 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.	

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	DIR	⊥
2	2, B	SET, DIR	Core color:	WH	BN	GN	YE	GY	PK	BU	RD	shield

Interface	Type of connection	Features	M12 connector, 8-pin									
			Signal:	0 V	+V	C+	C-	D+	D-	SET	DIR	⊥
2	4	SET, DIR	Pin:	1	2	3	4	5	6	7	8	PH

- +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
- PH ⊥: Plug connector housing (shield)

Top view of mating side, male contact base



M12 connector, 8-pin

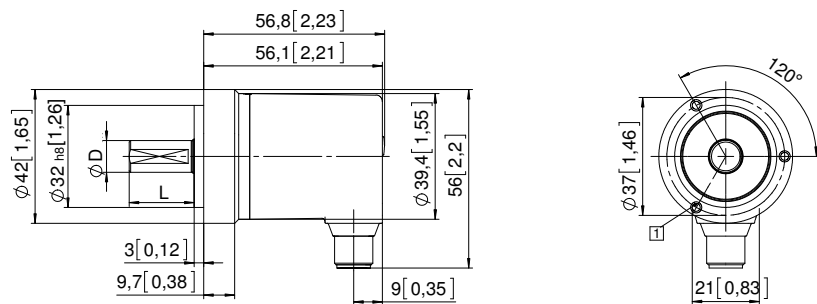
Dimensions

Dimensions in mm [inch]

Aluminum, clamping flange, ø 42 [1.65] version 1

- 1 3 x M3, 6 [0.24] deep

D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]



Stainless steel V4A clamping flange, ø 42 [1.65] version 7

- 1 4 x M4, 8 [0.31] deep

D	Fit	L
10 [0.39]	f7	20 [0.79]

