

Absolute encoders – singleturn

Compact magnetic	Sendix M3653A / M3673A (shaft / hollow shaft)	SSI
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The Sendix M36 is a magnetic singleturn encoder in compact design. It is characterized by robustness, reliability and cost-efficiency.



Safety-Lock™	High rotational speed	Temperature range -40°... +85°C	High protection level IP	High shaft load capacity	Shock / vibration resistant	Reverse polarity protection	Surface protection salt spray tested optional

Reliable and insensitive

- Sturdy bearing construction in Safety-Lock™ design for resistance against vibration and installation errors.
- Reduced number of components ensures magnetic insensitivity.
- IP67 protection and wide temperature range -40 °C ... +85 °C.

Application oriented

- Angular measurement deviation $\pm 0,5^\circ$.
- Repeat accuracy $\pm 0.2^\circ$.
- Short control cycles, clock frequency with SSI up to 2 MHz.
- Max. resolution 14 bit.

Order code	8.M3653A	.XX2X.XX12
Shaft version	Type	a b c d e f

- a Flange**
- 1 = clamping flange, IP67, \varnothing 36 mm [1.42"]
 - 3 = clamping flange, IP65, \varnothing 36 mm [1.42"]
 - 2 = synchro flange, IP67, \varnothing 36 mm [1.42"]
 - 4 = synchro flange, IP65, \varnothing 36 mm [1.42"]**

- b Shaft (\varnothing x L), with flat**
- 1 = \varnothing 6 x 12.5 mm [0.24 x 0.49"]
 - 3 = \varnothing 8 x 15 mm [0.32 x 0.59"]**
 - 5 = \varnothing 10 x 20 mm [0.39 x 0.79"]
 - 2 = \varnothing 1/4" x 12.5 mm [0.49"]

- c Interface / supply voltage**
- 2 = SSI / 10 ... 30 V DC**

- d Type of connection**
- 1 = axial cable, 1 m [3.28'] PUR
 - A = axial cable, special length PUR *)
 - 2 = radial cable, 1 m [3.28'] PUR
 - B = radial cable, special length PUR *)
 - 3 = axial M12 connector, 8-pin
 - 4 = radial M12 connector, 8-pin**
- *) Available special lengths (connection types A, 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.M3653A.432A.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 types 3 and 4)
 - surface protection salt spray tested

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Technical data

Mechanical characteristics

Maximum speed		
shaft or blind hollow shaft version without shaft seal (IP65)		6000 min ⁻¹ 3000 min ⁻¹ (continuous)
shaft or blind hollow shaft version with shaft seal (IP67)		4000 min ⁻¹ 2000 min ⁻¹ (continuous)
Starting torque at 20°C [68°F]		
	without shaft seal	< 0.007 Nm
	with shaft seal (IP67)	< 0.01 Nm
Shaft load capacity	radial	40 N
	axial	20 N
Weight		approx. 210 g [7.41 oz]
Protection acc. to EN 60529		IP65 or IP67
Working temperature range		-40 °C ... +85 °C [-40 °F ... +185 °F]
Materials	shaft / hollow shaft	stainless steel
	flange	aluminum
	housing	zinc die-cast
	shaft seal	PUR
Shock resistance acc. to EN 60068-2-27		2500 m/s ² , 6 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. 40 mA
Reverse polarity protection of the supply voltage		yes
Short-circuit proof outputs		yes ¹⁾

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
Angular measurement deviation ²⁾		±0,5°
Repeat accuracy		±0.2°
Number of revolutions (multiturn)		max. 24 bit
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	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. The number of preset value writing cycles is limited to 10,000. If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

DIR input

Response time (DIR input)		1 ms
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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

UL compliant in accordance with		File no. E224618
CE compliant in accordance with	EMC Directive	2014/30/EU
	RoHS Directive	2011/65/EU
	ATEX Directive	2014/34/EU (for Ex 2/22 variants)

1) Short circuit proof to 0 V or to output when supply voltage correctly applied.
2) Over the whole temperature range.

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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	⊥
			Core color:	WH	BN	GN	YE	GY	PK	BU	RD	shield

Interface	Type of connection	Features	M12 connector, 8-pin									
2	3, 4	SET, DIR	Signal:	0 V	+V	C+	C-	D+	D-	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

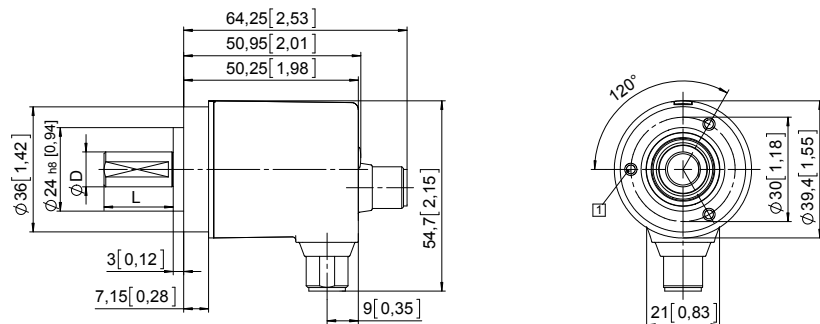
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 36 [1.42]

Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

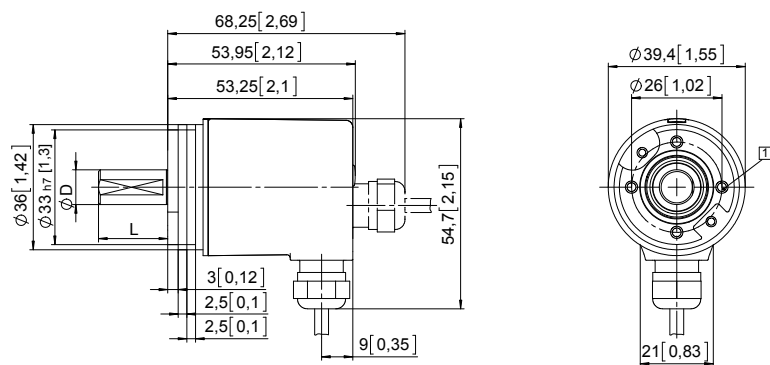


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

Synchro flange, ø 36 [1.42]

Flange type 2 and 4

1 4 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]

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Dimensions hollow shaft version

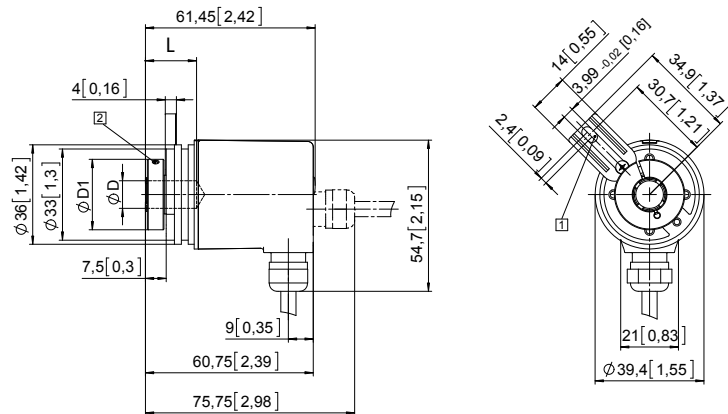
Dimensions in mm [inch]

Flange with spring element, long Flange type 3 and 6

- 1 Slot spring element, recommendation: torque pin DIN 7, \varnothing 4 [0.16]
- 2 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

L = insertion depth max. blind hollow shaft



Flange with stator coupling, \varnothing 46 [1.81] Flange type 2 and 5

- 1 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

L = insertion depth max. blind hollow shaft

