Compact
Motor-Line, optical / magnetic | **Sendix S3674 (singleturn) / S3684 (multiturn)** | **RS485 + SinCos / BiSS + SinCos**

SIL2 Functional Safety PLd

The Sendix S36 encoder with optical singleturn and magnetic multiturn gear stands out with its combination of robustness and variants diversity with compact dimensions.

With a size of 36.5 x 37 mm, it features a tapered shaft or an 8 mm hub shaft. Its highly accurate optical electronics achieve a resolution of max. 23 bits. The incremental SinCos interface is available with max. 2048 ppr.

RoHS RS485 BiSS INTERFACE SinCos

Temperature range | Shock / vibration resistant | Safety-Lock™ | High shaft load capacity | SinCos | Short-circuit proof | Reverse polarity protection

Reliable and insensitive

- Robust construction for optimal functionality in the servo motor.
- Wide temperature range of -30 ... +120°C – designed specially for operation in servo motors.
- Special connector concept for fast and easy commissioning.

Performance-optimized

- Standard RS485 interface (Hiperface® [1] compatible) + SinCos for use in many standard servo motors.
- Highest performance thanks to max. 23-bit singleturn resolution and 1024 or 2048 ppr SinCos.
- Mechanically suitable for mounting on standard servo motors.

Order code

8.S36	X	4	.	X	X	X	1	.	X	X	XX	.	XXX
Type	a			b	c	d	e		f	g	h		i [2]

a *Version*
7 = singleturn
8 = multiturn (12 bits)

b *Flange*
1 = with stator coupling, ø 38 mm [1.50"]
4 = with stator coupling, ø 60 mm [2.36"]

c *Shaft*
1 = hub shaft, ø 8 mm [0.32"] [2]
2 = tapered shaft, ø 8 mm [0.32"]

d *Power supply*
1 = 7 ... 30 V DC
2 = 5 V DC

e *Type of connection*
1 = PCB connector radial

f *Digital interface*
1 = BiSS
2 = RS485 (Hiperface® [1] compatibel)

g *Incremental interface*
1 = 1024 ppr SinCos
A = none

h *Resolution singleturn*
12 = 12 bits
15 = 15 bits
16 = 16 bits
17 = 17 bits
19 = 19 bits
20 = 20 bit
21 = 21 bit [3]
23 = 23 bit [3]

i *Safety technology*
FS2 = SIL2 / PLd [2]

Optional on request
- other stator coupling
- 2048 ppr SinCos

Connection technology			Order no.
Cordsets, pre-assembled	for BiSS + SinCos	Cordset, 10-core PCB connector (female contacts) + single-ended 0.5 m single wires	**8.0000.D111.0M50**
	for RS485 + SinCos	Cordset, 8-core PCB connector (female contacts) + single-ended 0.5 m single wires	**8.0000.D112.0M50**
	for BiSS fully digital	Cordset, 6-core PCB connector (female contacts) + single-ended 0.5 m single wires	**8.0000.D113.0M50**

1) Hiperface® is a registered trademark of Sick Stegmann GmbH.
2) On request.
3) With digital interface f = 2 only available in singleturn version (a = 7), as RS485 is limited to max. 32 bits

Motor Feedback Systems for servo motors

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Technical data

Mechanical characteristics

Maximum speed		12000 min^{-1} (short-term) 9000 min^{-1} (continuous)
Starting torque at 20°C [68°F]		< 0.004 Nm
Load capacity of shaft	radial axial	40 N 20 N
Weight		approx. 0.1 kg [35.27 oz]
Protection acc. to EN 60529		IP40
Working temperature range		-30°C ... +120°C [-22°F ... +248°F]
Materials	shaft flange housing	stainless steel aluminum zinc die-cast
Shock resistance acc. EN 60068-2-27		1000 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		500 m/s^2, 10 ... 2000 Hz

Electrical characteristics

Power supply	7 ... 30 V DC	5 V DC
Current consumption (no load)	max. 90 mA	max. 150 mA
Reverse polarity protection of the power supply	yes	
Short circuit proof outputs	yes [2]	
Absolute accuracy	±45 arcseconds [3]	
Repetition accuracy	±7 arcseconds [3]	
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU	

BiSS interface

Output driver		RS485 transceiver type
Permissible load / channel		max. +/- 30 mA
Signal level	HIGH LOW at I_{Last} = 20 mA	min. 2.4 V max. 0.4 V
Resolution singleturn		12 ... 19 bit
Number of revolutions (multiturn)		12 bit
Code		binary
Clock rate BiSS		50 kHz ... 10 MHz
Max. update rate		< 10 µs, depends on the clock rate and the data length

RS485 interface (Hiperface® [1] compatible)

Output driver		RS485 transceiver type
Permissible load / channel		max. +/- 30 mA
Signal level	HIGH LOW at I_{Last} = 20 mA	min. 2.4 V max. 0.4 V
Resolution singleturn		12 ... 23 bit
Number of revolutions (multiturn)		12 bit
Code		binary

Incremental outputs SinCos (A/B)

Max. frequency -3dB	400 kHz
Signal level	1 Vpp (± 20%)
Short circuit proof	yes [2]
Pulse rate	1024 ppr

For variants with safety technology:

Notes regarding "Functional Safety"

These encoders are suitable for use in safety-related systems up to SIL2 acc. to EN 61800-5-2 and PLd 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	PLd / SIL2
System structure	2 channel (Cat. 3)
PFH_d value [4]	tbd
Mission time / Proof test interval	20 years
Relevant standards	EN ISO 13849-1:2008; EN ISO 13849-2:2013; EN 61800-5-2:2007

Achievable safety subfunctions

Safe Standstill	SS1, SS2, SOS
Safe Motion	SLS, SSR, SDI, SLA, SAR
Safe Monitoring	SSM

1) Hiperface® is a registered trademark of Sick Stegmann GmbH.
2) Short circuit proof to 0 V or to output when power supply correctly applied.
3) Error limits for evaluation of SinCos signals (with relaxed torque stop).
4) The specified value is based on a diagnostic coverage of 90 %, that must be achieved with an encoder evaluation unit.
The encoder evaluation unit must meet at least the requirements for SIL2.

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Terminal assignment

Digital interface	Incremental interface	Type of connection	PCB connector (male contact), 10-pin										
1 (BiSS)	1 (SinCos)	1	Signal:	0 V	+V	D+	D-	C+	C-	A	$\overline{A}$	B	$\overline{B}$
			Pin:	1	2	3	4	5	6	7	8	9	10
suitable pre-assembled cordset, 10-core (8.0000.D111.0M50)			Core color:	BU	RD	GY	GN	YE	VT	PK	BK	WH	BN

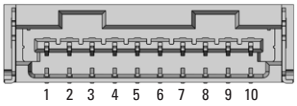
Digital interface	Incremental interface	Type of connection	PCB connector (male contact), 10-pin										
2 (RS485)	1 (SinCos)	1	Signal:	0 V	+V	D+	D-	–	–	A	$\overline{A}$	B	$\overline{B}$
			Pin:	1	2	3	4	5	6	7	8	9	10
suitable pre-assembled cordset, 8-core (8.0000.D112.0M50)			Core color:	BU	RD	GY	GN	–	–	PK	BK	WH	BN

Digital interface	Incremental interface	Type of connection	PCB connector (male contact), 10-pin										
1 (BiSS)	A (without)	1	Signal:	0 V	+V	D+	D-	C+	C-	–	–	–	–
			Pin:	1	2	3	4	5	6	7	8	9	10
suitable pre-assembled cordset, 6-core (8.0000.D113.0M50)			Core color:	BU	RD	GY	GN	YE	VT	–	–	–	–

+V: Encoder power supply +V DC
0 V: Encoder power supply ground GND (0 V)
D+, D-: Data signal
C+, C-: Clock signal
A, $\overline{A}$: Incremental output channel A (cosine)
B, $\overline{B}$: Incremental output channel B (sine)

Top view of mating side, male contact base

Type of connection 1
Molex IllumiMate™ (male contact)
single row, 10-pin (104091-1020)



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Dimensions

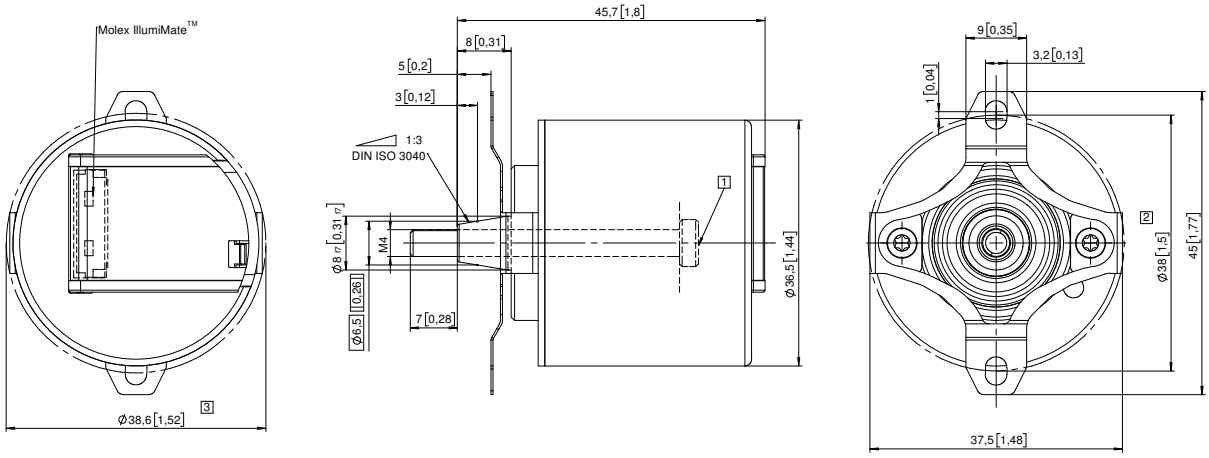
Dimensions in mm [inch]

Flange with stator coupling, ø 38 [1.50]
Flange type 1
(with tapered shaft 2 and PCB connector)

1 Recommended torque (SW 2.5)
typ. 1 Nm

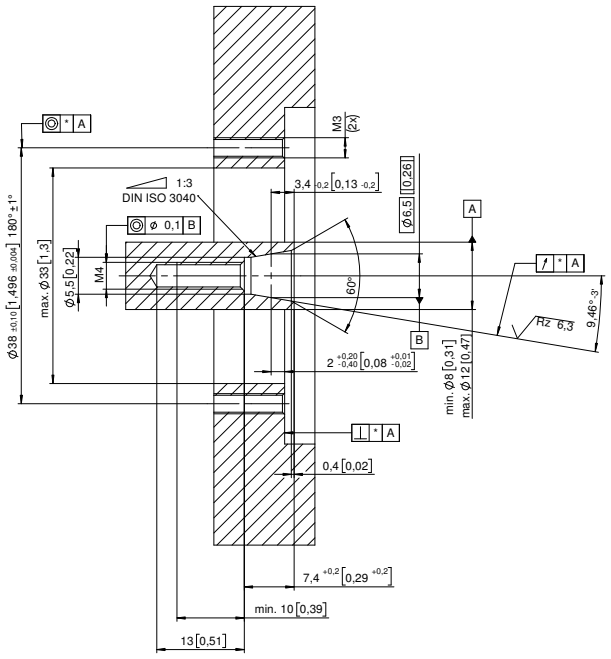
2 Pitch circle diameter

3 Envelope circle diameter



Mounting suggestion

* The tolerance size reduces the permissible shaft movement (see technical data).
General tolerances according to DIN ISO 2768-mk.



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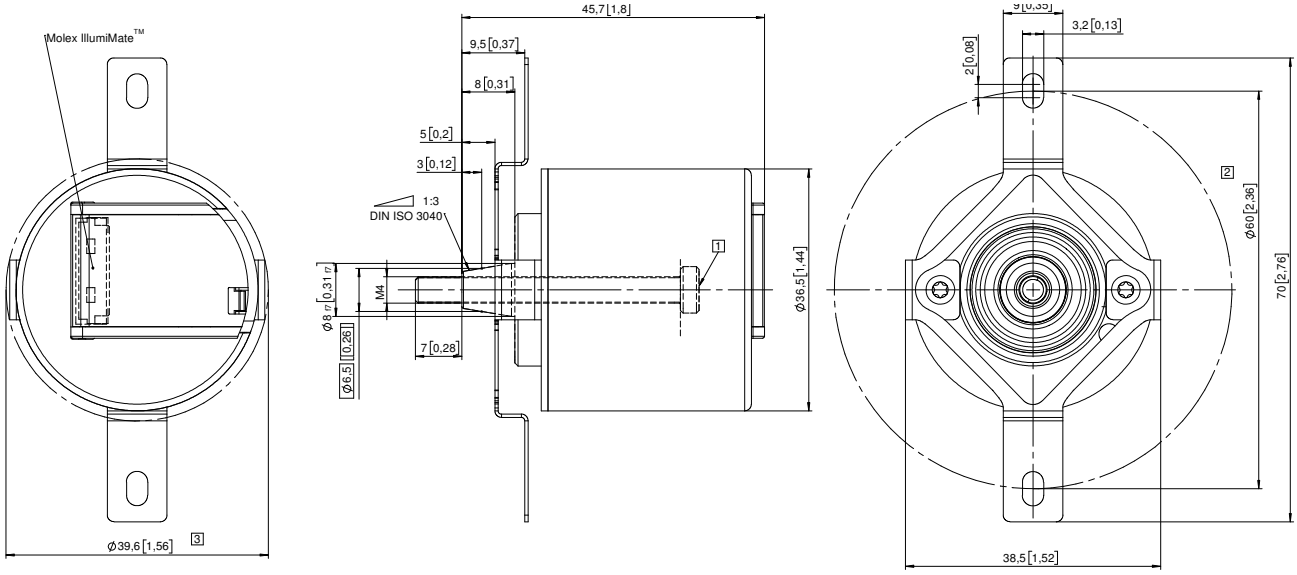
Dimensions

Dimensions in mm [inch]

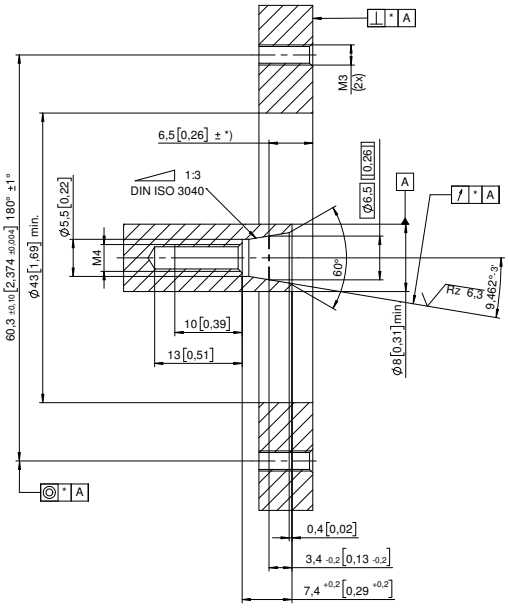
Flange with stator coupling, ø 60 [2.36]
Flange type 4
(with tapered shaft 2 and PCB connector)

1 Recommended torque (SW 2.5)
typ. 1 Nm
2 Pitch circle diameter
3 Envelope circle diameter



Mounting suggestion

* The tolerance size reduces the permissible shaft movement (see technical data).
General tolerances according to
DIN ISO 2768-mk.



Note:
We recommend hexagon socket head screws for fastening the stator coupling.
The hexagon keys to be used must comply with DIN ISO 2936 L (index L = long version) with ball head.
The ball head makes access easier, in particular for hardly accessible screws, and allows working up to an angle of 25°.