

The DS-25 is a member of the DS series of Electric Encoders™ a product line based on Netzer Precision Motion Sensor proprietary technology. EE products are characterized by features that enable unparalleled performance:

- Low profile (7 mm)
- Hollow, floating shaft
- No bearings or other contact elements
- High resolution and unparalleled precision
- High tolerance to temperature extremes, shock, moisture, EMI, RFI and magnetic fields
- Very low weight
- Holistic signal generation
- Digital interfaces for absolute position

General

Angular resolution ¹	17 bits ; 131,072 CPR
Static error ²	< 0.020°
Maximum operational speed	4,000 rpm
Measurement	Single turn Absolute Position
Build In Test BIT	Optional

Mechanical

Allowable mounting eccentricity	±0.1 mm
Allowable rotor axial motion	±0.1 mm
Rotor inertia	11 gr · mm ²
Total weight	4 gr
Outer Ø / Inner Ø / Height	25 / 6 / 7 mm
Material (stator, rotor)	Ultem™ polymer

Notes - Optional (Call)

1	Angular resolution	18 - 19 bit
2	Static Error	< 0.010 Deg
3	Operating temperature	-55 °C to +125 °C

The Electric Encoder™ is unique in being holistic, i.e., its output reading is the averaged outcome of the whole area of the rotor, This feature makes the Electric Encoder™ forgiving to mounting tolerances, mechanical wander etc.

The absence of components such as ball bearings, flexible couplers, glass disc, light sources and detectors, along with very low power consumption makes the Electric Encoder™ virtually failure free.

The internally shielded, DC operated Electric Encoder™ includes an electric field generator, a field receiver, a sinusoidal shaped dielectric rotor, and processing electronics.

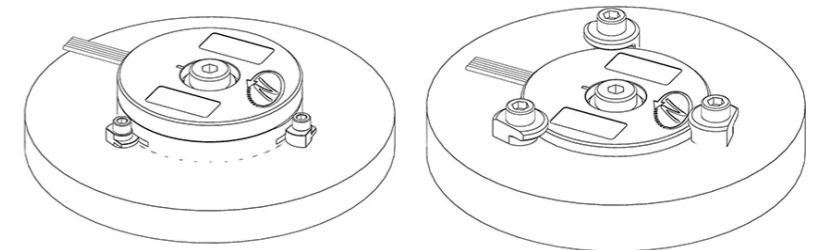
The output of Electric Encoder™ is a digital serial with absolute position single turn. The combination of precision, low profile, low weight and high reliability have made Netzer Precision encoders particularly suitable to a wide variety of industrial automation applications.

Electrical

Supply voltage	5V ± 10%
Current consumption	70 mA
Interconnection	#30 shielded cable
Cable Length	1,500 mm MAX

Environmental

EMC	IEC 6100-6-2, IEC 6100-6-4
Operating temperature ³	-55°C to +85°C
Storage temperature	-60°C to +140°C
Relative humidity	98% Non condensing
Shock endurance	100 g for 11 ms
Vibration endurance	20 g 10 – 2000 Hz
Protection	IP 40

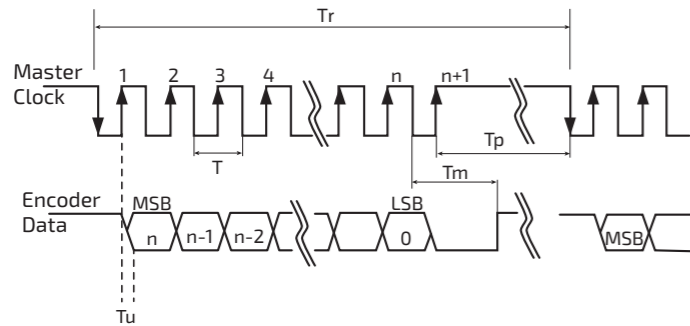


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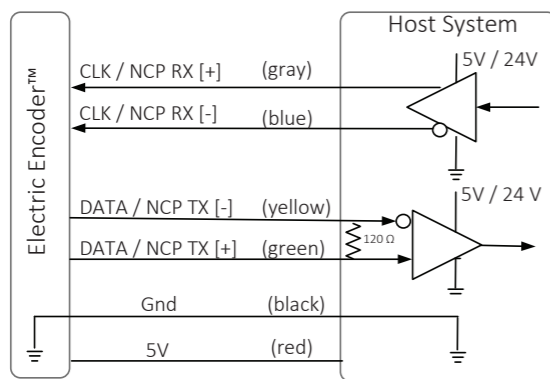


Digital SSI Interface

Synchronous Serial Interface (SSI) is a point to point serial interface standard between a master (e.g. controller) and a slave (e.g. sensor) for digital data transmission.



	Description	Recommendations
n	Total number of data bits	12 - 19
T	Clock period	
f= 1/T	Clock frequency	0.1 ÷ 5.0 MHz
Tu	Bit update time	90 nsec
Tp	Pause time	26 - ∞ µsec
Tm	Monoflop time	>25 µsec
Tr	Time between 2 adjacent requests	Tr > n*T+26 µsec
fr=1/Tr	Data request frequency	



SSI / BiSS output signal parameters

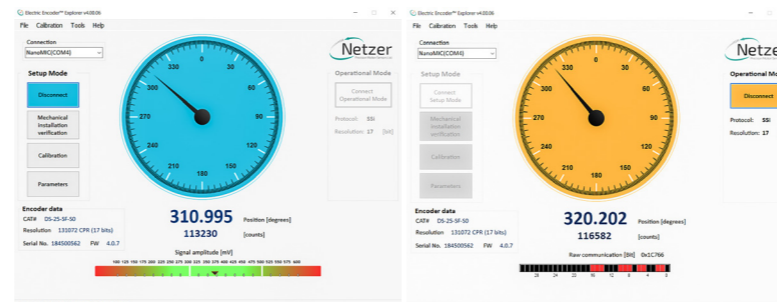
Signal latency	50 µSec
Output code	Binary
Serial output	Differential RS-422
Clock	Differential RS-422
Clock Frequency	0.1 ÷ 5.0 MHz
Position update rate	30 kHz

SSI / BiSS interface wires color code

Clock +	Grey	Clock
Clock -	Blue	
Data -	Yellow	Data
Data +	Green	
GND	Black	Ground
+5V	Red	Power supply

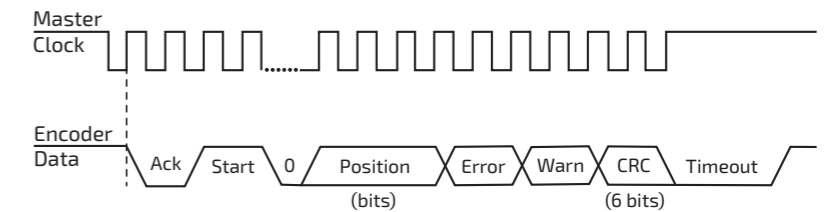
Software tools: (SSI / BiSS - C)

Advanced calibration and monitoring options are available by using the factory supplied Electric Encoder Explorer software. This facilitates proper mechanical mounting, offsets calibration and advanced signal monitoring.



Digital BiSS-C Interface

BiSS - C Interface is unidirectional serial synchronous protocol for digital data transmission where the Encoder acts as "slave" transmits data according to "Master" clock. The BiSS protocol is designed in B mode and C mode (continuous mode). The BiSS-C interface as the SSI is based on RS-422 standards.



Bit #	Description	Default	Length
27	Ack	0	1/clock
26	Start	1	1 bit
25	"0"	0	1 bit
8...24	AP		
7	Error	1	1 bit
6	Warn.	1	1 bit
0...5	CRC		6 bits
	Timeout		25 µs

Analog Interface

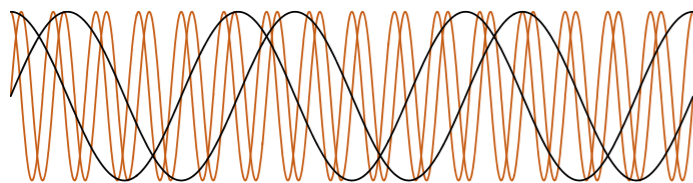
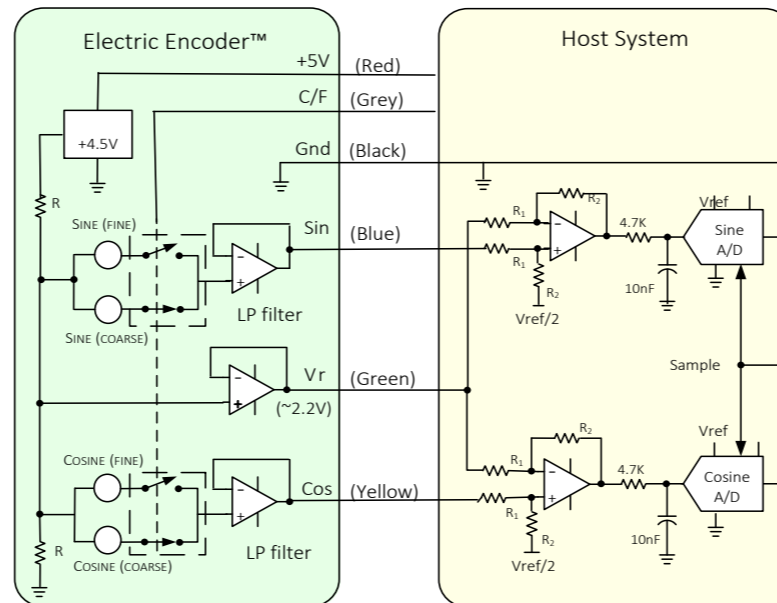
Coarse and fine channels

The DS-25 has two operational modes: a Coarse-mode and a Fine-mode - equivalent to two separate encoders in a common housing. The modes are selectable by a logic C/F command; logic "0" (0V to +0.5V) selects the Coarse-mode, which has 3 Electrical Cycle/Revolution (EC/R) while logic "1" (+3V to +5V) selects the Fine-mode which has 16 EC/R.

The switching time is less than 1 ms.

The Coarse-mode outputs need to be read only upon system initiation after which the encoder is permanently switched to the Fine mode. Coarse and Fine sine / cosine pairs are used to calculate the initial absolute position, from that point tracking the Fine-channel outputs provides the absolute mechanical rotation angle with the specified accuracy and resolution.

All output signals are referenced to an internally generated voltage V_r (~2.25V).



Output signal parameters

Electric Cycles (Fine / Coarse channels)	16 / 3
Signal latency	250 μ Sec
Fine-mode output noise (DC to 1kHz)	100 μ V (p-p)
Fine-mode output amplitude	± 400 mV $\pm 20\%$
Coarse-mode output amplitude	± 300 mV $\pm 20\%$
Phase relationship (CW shaft rotation - seen from top)	Sine leads Cosine
Signal bandwidth	DC to 1 kHz
Current consumption	10mA

Analog interface wires color code

1	GND	Black	Ground
2	C/F	Grey	Coarse / Fine
3	Sine	Blue	Sine signal
4	Vr	Green	V referenceCosine signal
5	Cosine	Yellow	Cosine signal
6	+5V	Red	P.S.

Absolute position calculation

The analog Sine / Cosine outputs convey the Electrical angle of the Coarse or Fine signals. The Absolute mechanical angle is computed by digitizing the analog signals.

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Ordering Code

DS - 25 - S F - S O M

DS Product line

Outer Diameter

Output

S	SSi
I	BiSS
0	Analog

Resolution

Code	Bit	CPR
F	17	131,072

BIT (Build In Test): optional

[]	None
B	BIT

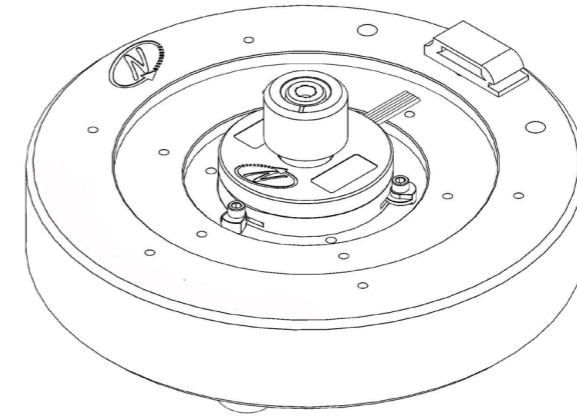
Rotor options - Ø ID

[]	Default, 6 mm
M	Rotor metal sleeve, 4.5 mm

Interconnection

0	Flying leads
S	Shielded cable 250 mm

Optional Accessories



Netzer Cat No.: CB 00014

Provider: Ray-Q USA. CAT No.: RQ 213210

Cable: 30 AWG twisted pair (3): 2 (30 AWG 25/44 tinned copper,

Insulation: PFE Ø 0.15 to Ø 0.6 ± 0.05 OD).

Temperature rating: -60 to +150 Deg C.

Braided shield: Thinned copper braided 95% min. coverage.

Jacket: 0.44 silicon rubber (NFA 11-A1) Ø3.45 ±0.2 OD

Pair #	Color
A1-A2	Red / Black
A3-A4	Gray / Blue
A5-A6	Green / Yellow



Related documents

DS-25 User Manual : Mechanical , Electrical and calibration setup.

Demonstration Kit

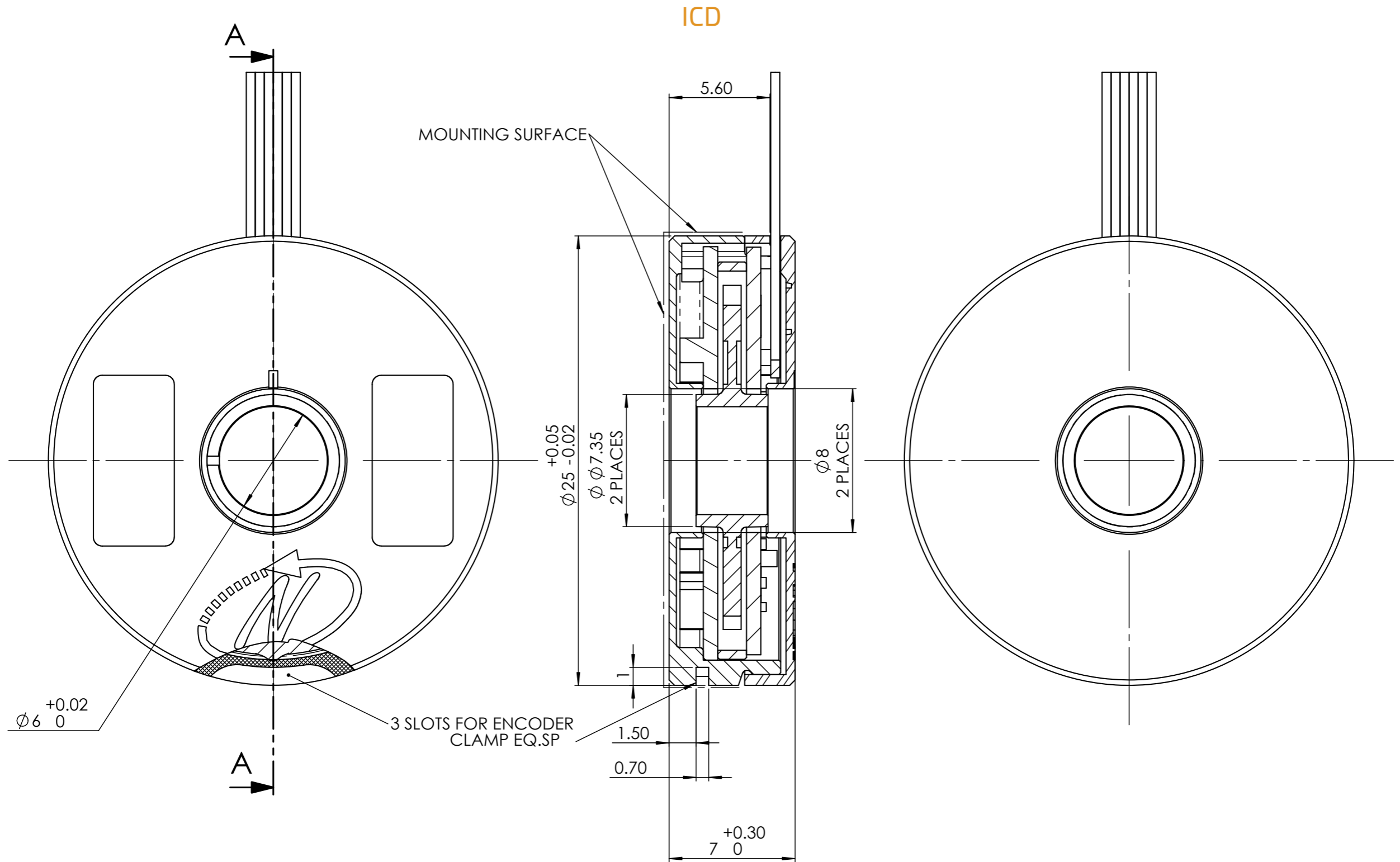
DKIT-DS-25-SF with SSi interface

DKIT-DS-25-IF with BiSS interface

Includes, mounted encoder on rotary jig, and RS-422 to USB converter.

Corporate Headquarters

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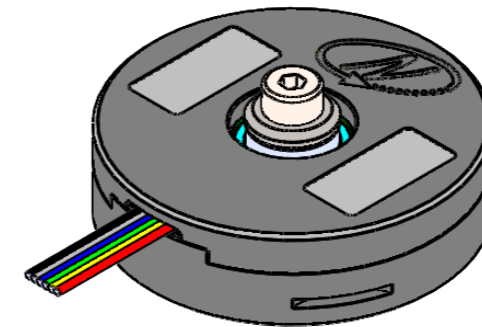
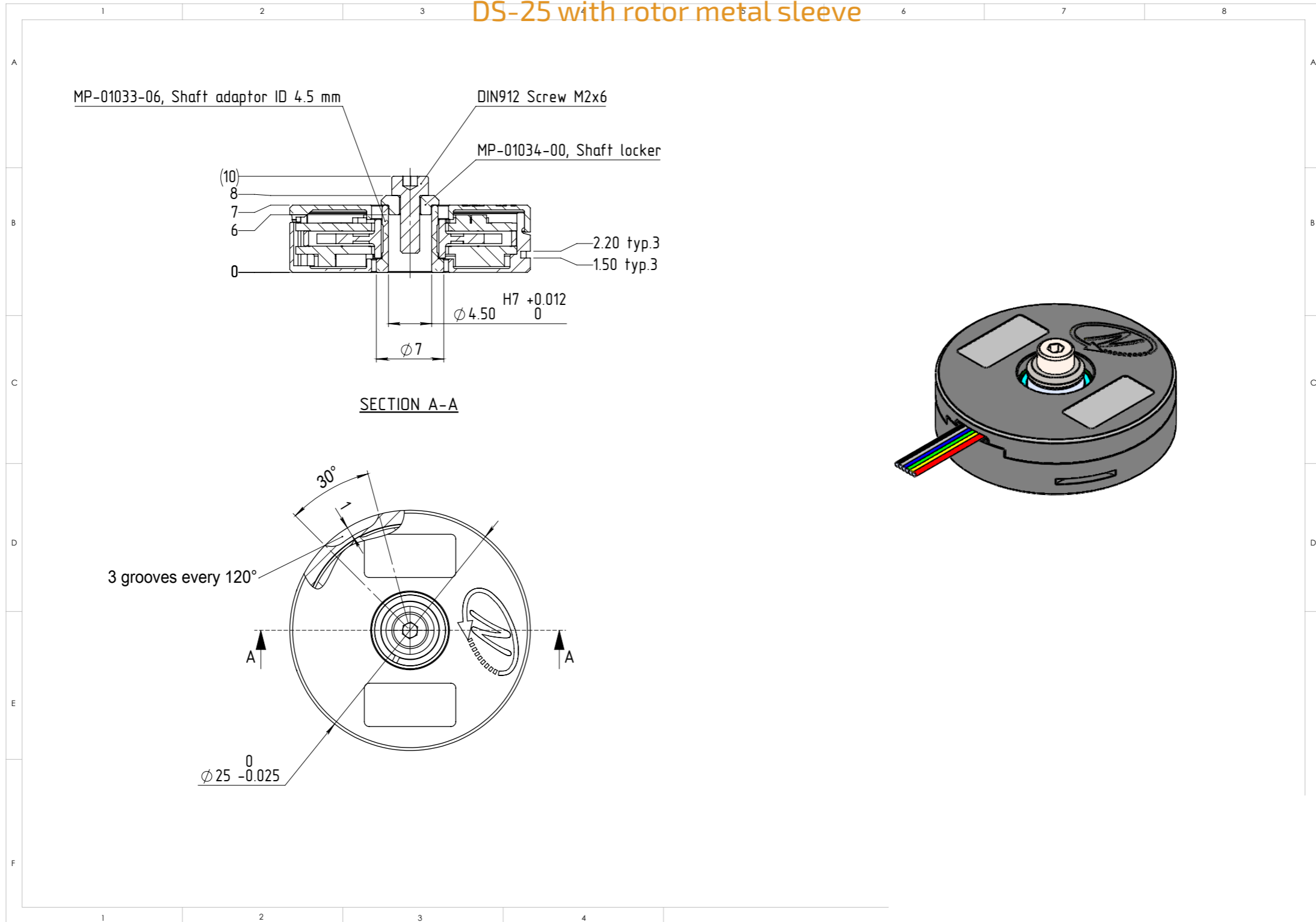


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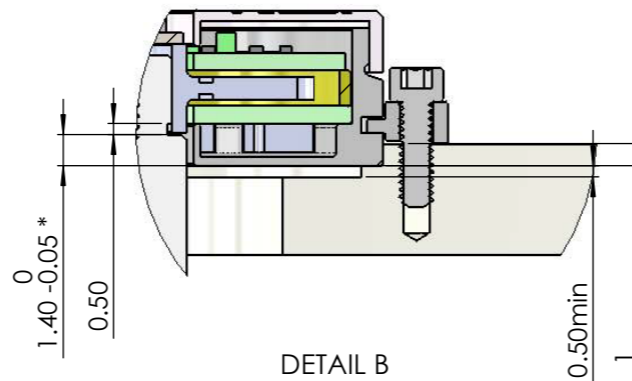
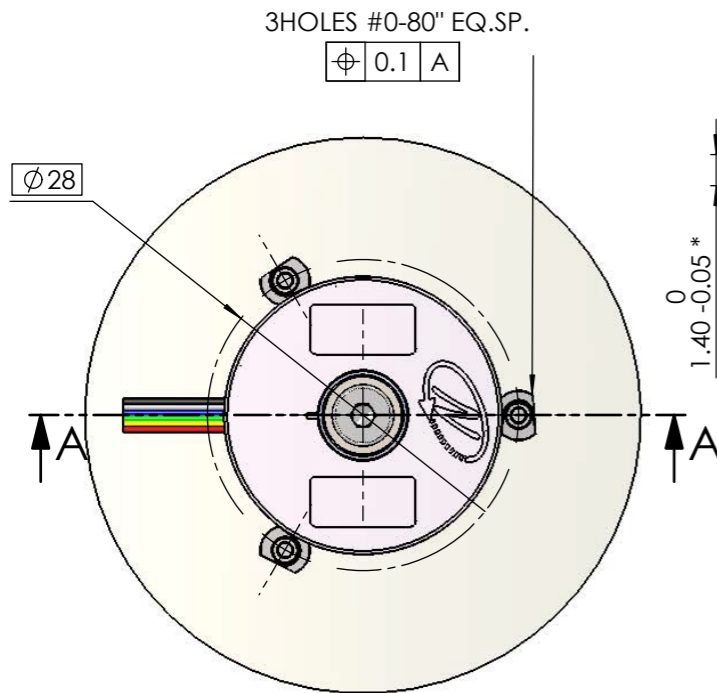
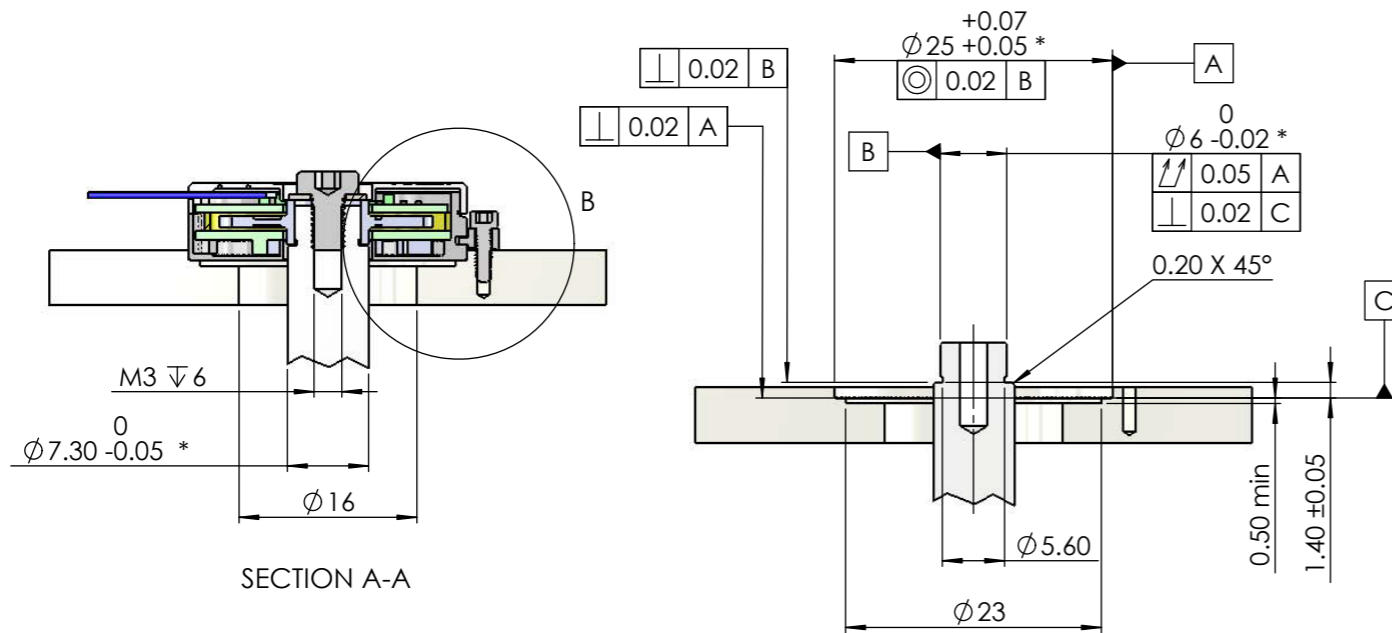
DS-25 with rotor metal sleeve



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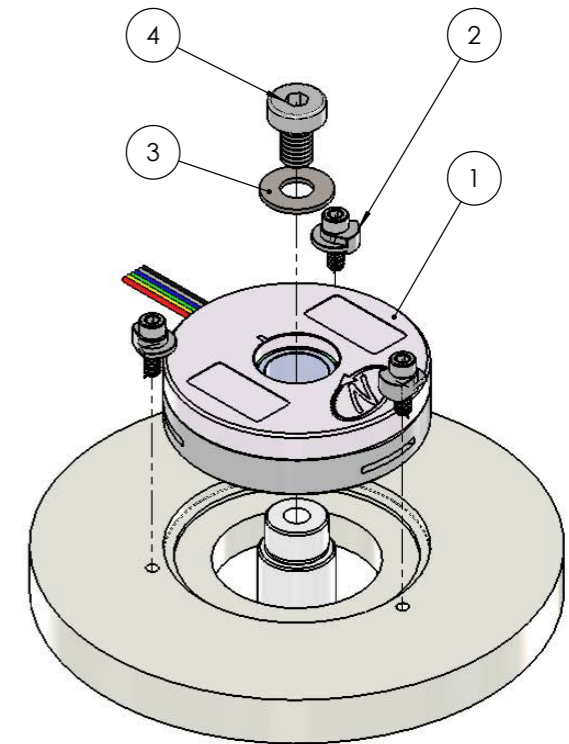
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Shaft - End installation (step)



UNLESS OTHERWISE SPECIFIED

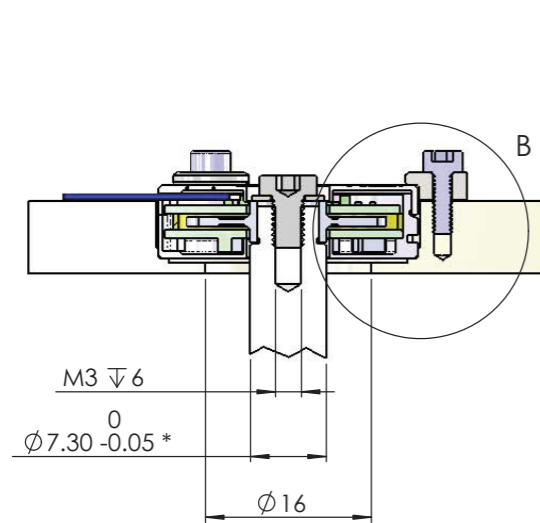
Dimensions are in: mm
 Surface Finish: N6
 Linear Tolerances: ± 0.5 deg
 All Chamfer: $0.1 \text{ mm} \times 45^\circ$



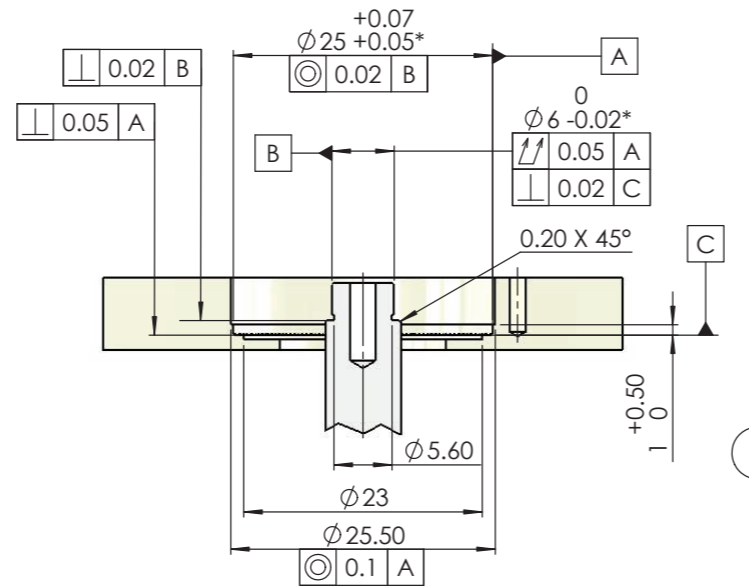
No	Part	Included	Description	QTY.	
1	DS-25	Included	DS-25 encoder	1	
2	EAPK004	Included	Kit 0-80" Kit, 3 x Encoder clamps Nylon	1	
3	MA-DS25-004	Optional	Shaft End installation kit	Washer DIN125-A3.2	1
4				Screw DIN 7984 M3x5	1

Critical dimensions marked with "*"

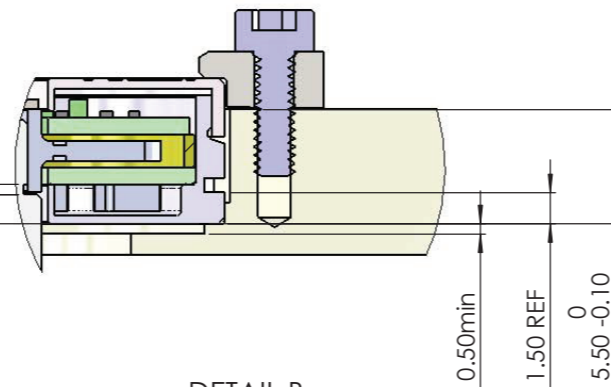
Deep, Shaft - End installation (step)



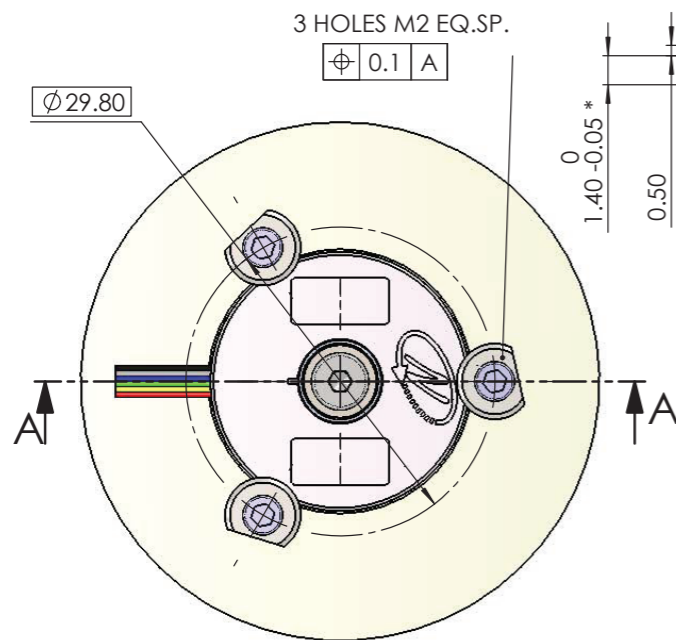
SECTION A-A



SECTION C-C

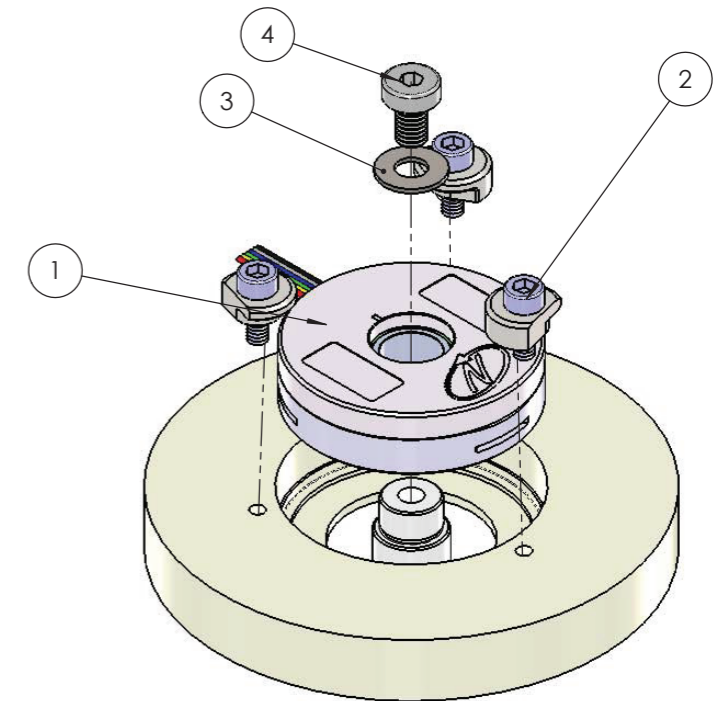


DETAIL B



UNLESS OTHERWISE SPECIFIED

Dimensions are in: mm
Surface Finish: N6
Linear Tolerances: ± 0.5 deg
All Chamfer: 0.1 mm x 45°



No	Part	Included	Description	QTY.	
1	DS-25	Included	DS-25 encoder	1	
2	EAPK005	Included	Kit M2 Kit, 3 x Encoder clamps St. St.	1	
3	MA-DS25-004	Optional	Shaft End installation kit	Washer DIN125-A3.2	1
4				Screw DIN 7984 M3x5	1

Critical dimensions marked with "*"

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