The DS-70 is a member of the DS series of Electric Encoders™, based on Netzer Precision proprietary technology. The Electric Encoder™ offers many advantages - some unparalleled

- Low profile (10 mm)
- Hollow, floating shaft.
- No bearings or other contacting elements
- High resolution and precision
- High tolerance to temperature extremes, shock, moisture, EMI, RFI and Magnetic fields
- Very low weight
- Holistic signal generation
- Analog or Digital interfaces

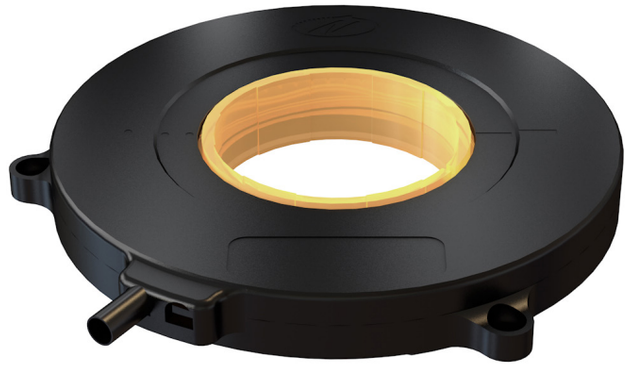
The Electric Encoder™ is unique in being holistic, i.e., its output reading is the averaged outcome of the whole area of the rotor , This feature makes the Electric Encoder™ forgiving to mounting tolerances, mechanical wander etc.

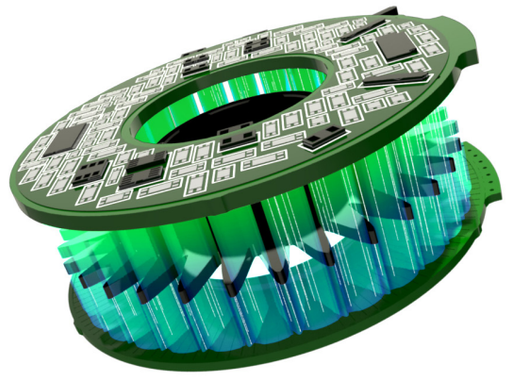
The absence of components such as ball bearings , flexible couplers, glass disc, light sources and detectors, along with very low power consumption makes the Electric Encoder™ virtually failure free.

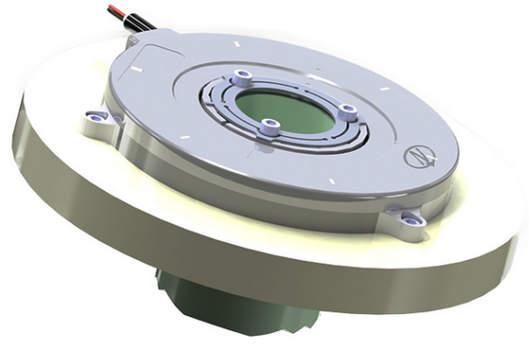
The internally shielded, DC operated Electric Encoder™ includes an electric field generator, a field receiver, a sinusoidal shaped dielectric rotor, and processing electronics.

The output signals of Electric Encoder™ are analog Sine / Cosine representing the rotation angle. The digital outputs are obtained by further processing - which may be either internal or external to the encoder.

The combination of precision, low profile, low weight and high reliability have made Netzer Precision encoders particularly suitable to a wide variety of critical applications including, but not limited to medical equipment and aerospace.







General

Angular resolution	19 bits ; 524,288 CPR
Maximum tested static error	≤ 0.010°
Maximum operational speed	750 rpm
Measurement range	Unlimited rotation
Power On - Max. operational speed	3.3 RPM, <=20°/sec
Build In Test BIT	Optional

Electrical

Supply voltage	5V ± 5%
Interconnection	Shielded cable or
Cable Length	1,500 mm MAX

Mechanical

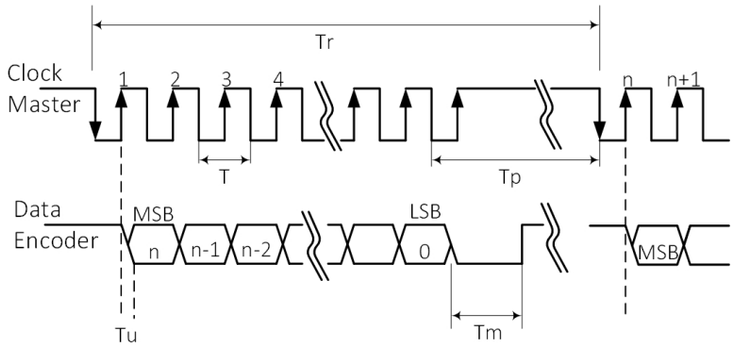
Allowable mounting eccentricity	±0.1 mm
Allowable rotor axial motion	±0.1 mm
Rotor inertia	1,940 gr · mm^2
Total weight	35 gr
Outer Ø /Inner Ø/ Height	70 / 30 / 10 mm
Material (stator, rotor)	Ultem™ polymer

Environmental

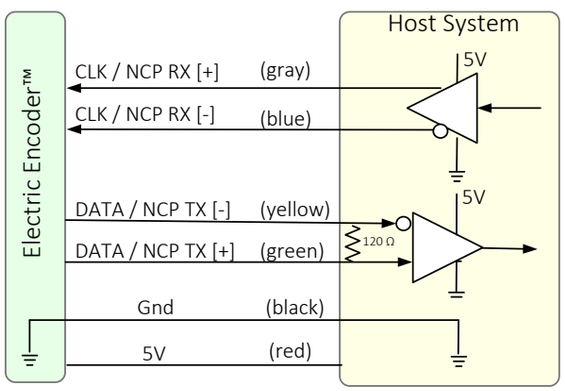
EMC	IEC 6100-6-2, IEC 6100-6-4
Operating temperature range	Digital: -40°C to +85°C
Relative humidity	98% Non condensing
Shock endurance	100 g for 11 ms
Vibration endurance	20 g 10 – 2000 Hz
Protection	IP 40

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 - 22
T	Clock period	
f= 1/T	Clock frequency	0.5 - 2.0 MHz
Tu	Bit update time	200 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

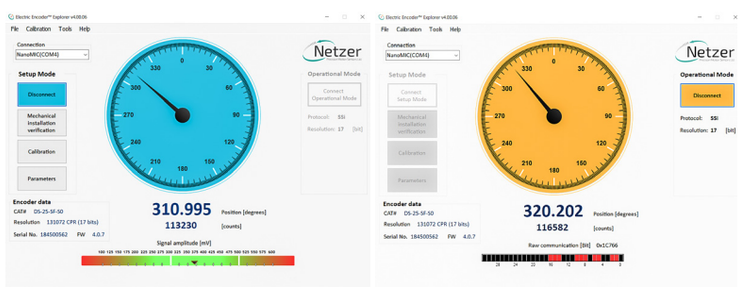
Signal latency	~250 µSec
Output code	Binary
Serial output	Differential RS-422
Clock	Differential RS-422
Clock Frequency	0.5 ÷ 2.0 MHz
Position update rate (Max)	30 KHz
Current consumption	180 mA
SSi	
Monoflop time	25 µSec

SSi / BiSS interface wires color code

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

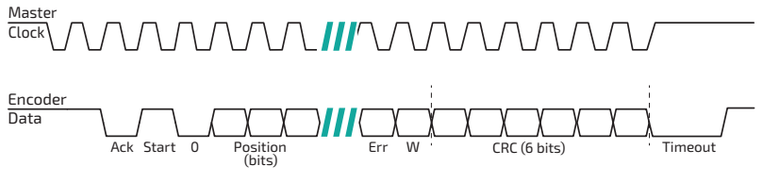
Software tools: (SSi / BiSS - C)

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
29	Ack	Period during which the encoder calculates the absolute position , one clock cycle	0	1/clock
28	Start	Encoder signal for "start" data transmit	1	1 bit
27	"0"	"start" bit follower	0	1 bit
8...26	AP	Absolute Position encoder data		
7	Error	Error (amplitude levels)	1	1 bit
6	Warn.	Warning (non active)	1	1 bit
0...5	CRC	The CRC polynomial for position, error and warning data is: $x^6 + x^1 + x^0$. It is transmitted MSB first and inverted. The start bit and "0" bit are omitted from the CRC calculation.		6 bits
	Time-out	Elapse between the sequential "start"request cycle's.		25 µs

Ordering Code

DS - 70 - 64 - 3 S H [ ] - S 0 - n n n

DS Product line

Outer Diameter

Fine ECR

Outputs
S - Digital : SSi
I - Digital : BiSS-C

Resolution

Code	Bit	CPR
H	19	524,288

BIT (Build In Test): optional
[ ] - none
B - BIT

nnn - Custom

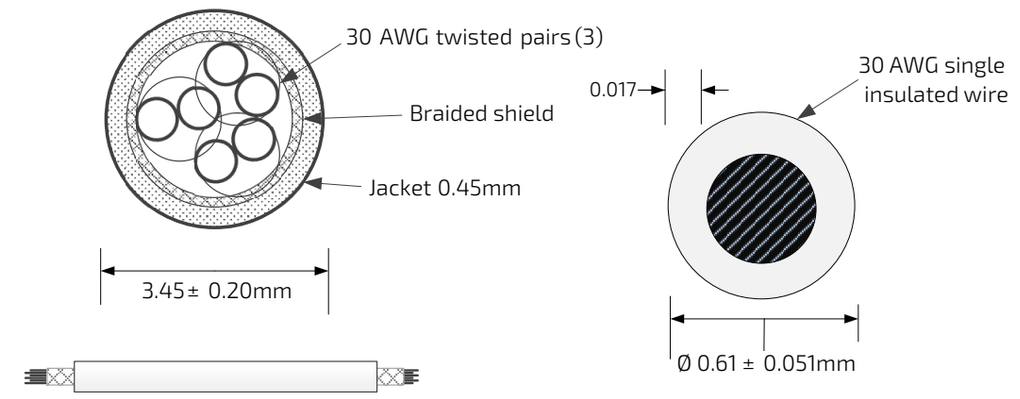
C - Connector (optional)
0 - Flying leads (default)

Interconnection
S - shielded cable 250 mm (default)

Cable Information

Netzer Cat No.: CB-00014
Provider: Ray-Q USA. wire CAT No: RQ213210
Cable: 30 AWG twisted pair (3):2 (30 AWG 25/44 finned copper, 0.15 PFE to Ø0.6 ± 0.05 OD).
Temperature rating: -60 to +150 Deg C.
Braided shield: Thinned copper braided 95% min. coverage.
Jacket: 0.45 silicon rubber jacket Ø3.45 ±0.2 OD

Pair #	Color
1	Red / Black
2	Gray / Blue
3	Green / Yellow



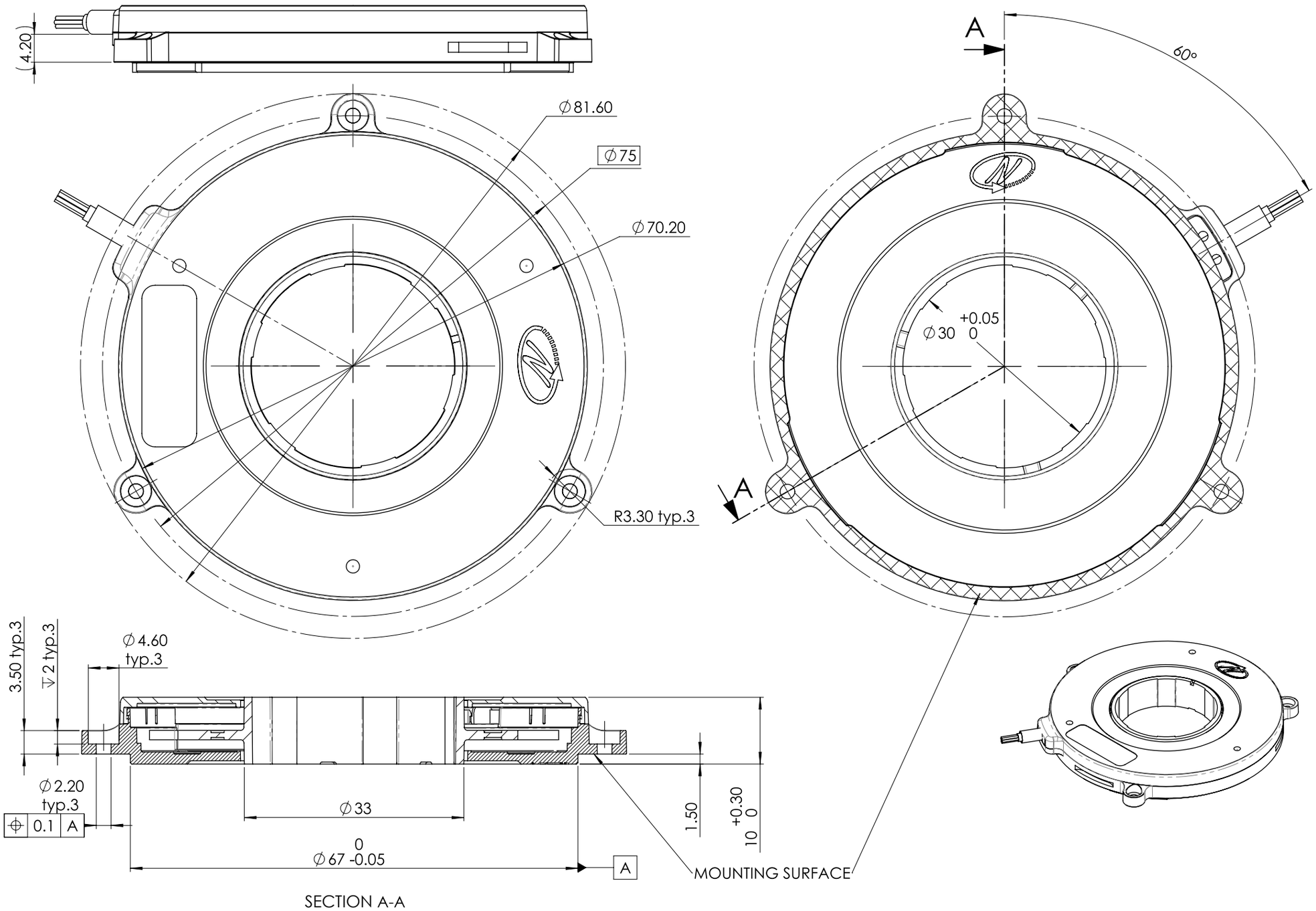
Related documents

DS-70 User Manual: Mechanical , Electrical and calibration setup.

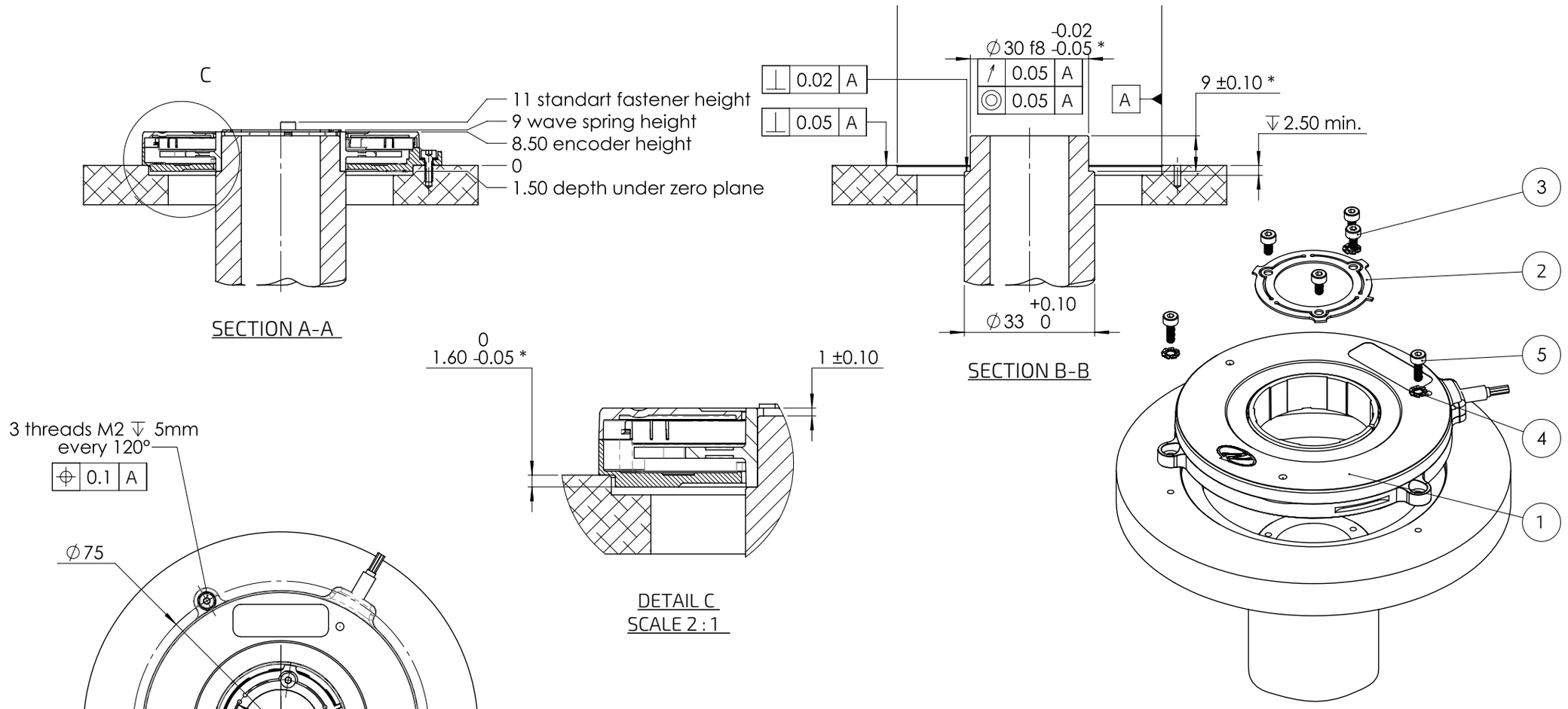
Optional Accessories

Demonstration Kit

DS-70DKIT-01: Includes ,mounted encoder on rotary jig, and RS-422 to USB converter.


4.20
⌀81.60
⌀75
⌀70.20
R3.30 typ.3
A
60°
⌀30 +0.05 0
A
3.50 typ.3
⌀2 typ.3
⌀4.60 typ.3
⌀2.20 typ.3
0.1 A
⌀33
0 ⌀67 -0.05
A
1.50
10 +0.30 0
MOUNTING SURFACE

SECTION A-A



Notes:
1. For any incompatibility with the model or missing dimension, please refer to Netzer for clarification.
2. All installation dimensions and tolerances are according to DS-70 ICD drawing.
3. All dimensions marked with * are critical for encoder installation.

WARNING

Do not use Loctite or other glues containing Cyanoacrylate. We recommend to use 3M glue - Scotch-Weld™ Epoxy Adhesive EC-2216 B/A.

Shaft - End installation (step)

No	Part			Description	QTY.
1	DS-70-64-3SH	Included		DS-70 encoder	1
2	MA-DS70-004	Optional	Shaft End installation kit	MP-03085-00 spring	1
3				MP-00329 DIN 912 M2 X 4 Alen	1
4		Optional		Star washer DIN 6798A M2	3
5	EAPK008	Optional	Mounting Kit	DIN 912 M2 X 6mm Alen	3

Critical dimensions marked with "*"