Netzer
Precision Motion Sensors Ltd.

DS-130 Absolute position, rotary Electric Encoder™

The DS-130 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 (10mm).

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

Absolute Position over digital interfaces.

Mechanical	
Allowable mounting eccentricity	±0.1 mm
Allowable rotor axial motion	±0.1 mm
Rotor inertia	12.378 gr · mm²
Total weight	65 gr
Outer Ø /Inner Ø/ Height	130 / 90 / 10 mm
Material (stator, rotor)	Ultem™ polymer

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

Characteristics	
Angular resolution	19 bits ; 524,288 CPR
Static error	< 10 mDeg
Maximum operational speed	750 rpm
Measurement range	Unlimited rotation
Power On- Max. operational speed	3.3 RPM , <=20°/sec
Build In Test BIT	Optional

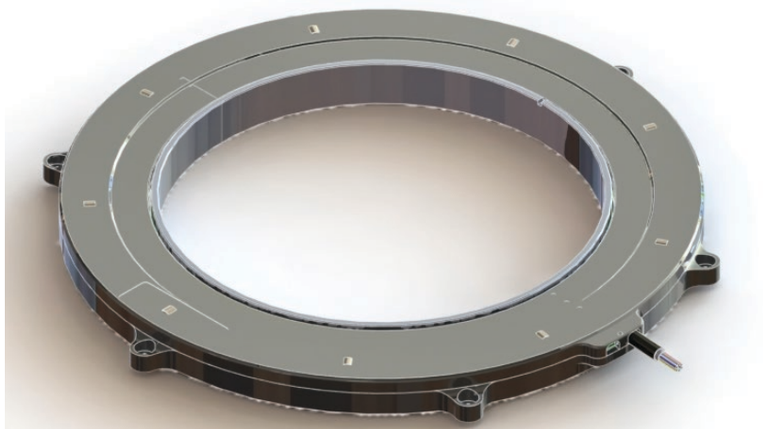
The Electric Encoder™ is unique in being holistic, i.e., its output reading is the averaged outcome of the whole area of the rotor , This feature makes the Electric Encoder™ forgiving to mounting tolerances, ball bearing wander etc.

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.



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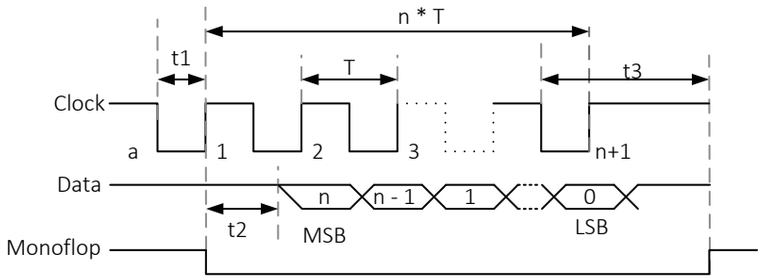
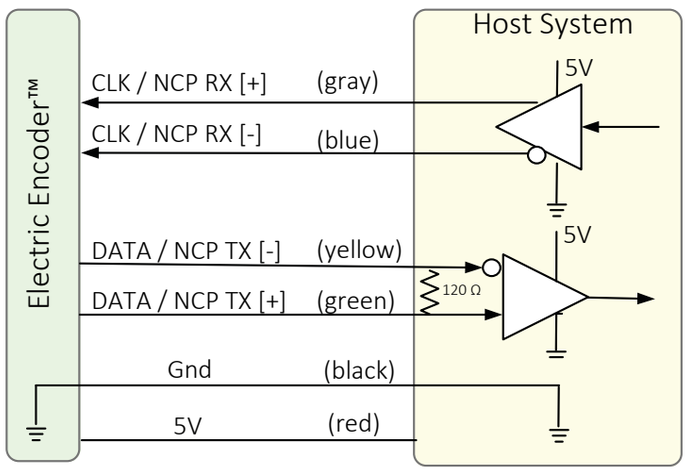
Digital SSi Interface

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.

SSI data transmission timing diagram



	Description	Recommendations
n	Total number of data bits	
T	Clock period (sec)	User defined
1/T	Clock frequency 0.5 ÷ 2.0 MHz (user defined)	2.0 MHz
t1	Minimum time required for the encoder to freeze data and preset the shift registers before receiving the first rising edge to prompt the MSB	T/2
t2	Data transmission delay (increases with cable length)	“0” on standard cable length
t3	Required delay to refresh position data between subsequent posi-tion	>25 µSec

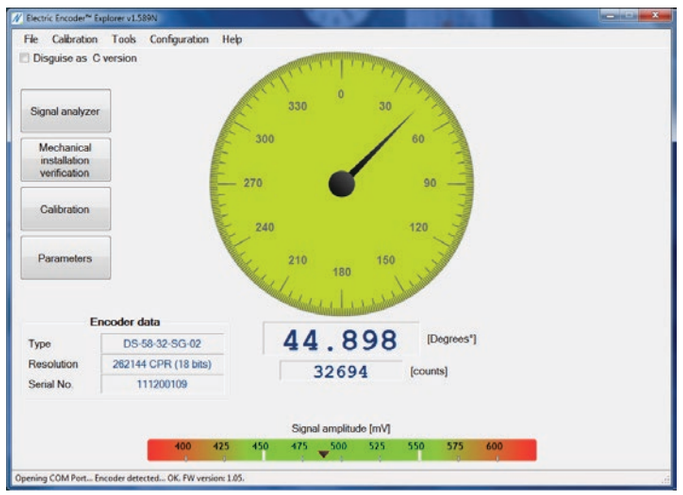


SSi / BiSS Output signal parameters	
Signal latency	~250 µSec
Output code	Binary
Serial output	Differential RS-422
Clock	Differential RS-422
Clock Frequency	0.5 ÷ 2.0 MHz
Position update rate (Max)	30 KHz
Current consumption	180 mA
SSi	
Monoflop time	25 µSec

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)

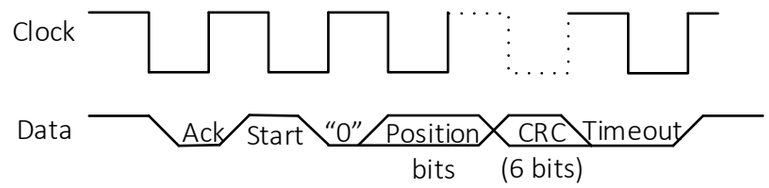
Advanced calibration and monitoring options are available by using the factory supplied **Electric Encoder Explorer** software, This facilitates proper mechanical mounting , offsets calibration and advanced signal monitoring.



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.

BiSS-C data transmission timing diagram



bit #		Description	De-fault	Length
27	Ack	Period during which the encoder calculates the absolute position , one clock cycle	0	1/clock
26	Start	Encoder signal for “start” data transmit	1	1 bit
25	“0”	“start” bit follower	0	1 bit
6...24	AP	Absolute Position encoder data		
0...5	CRC	The CRC polynomial for position, error and warn-ing 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.		
	Time-out	Elapse between the sequential “start”request cycle’s.		25 µs

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DS - 130 - 64 - 3S H - S 0 - n n n

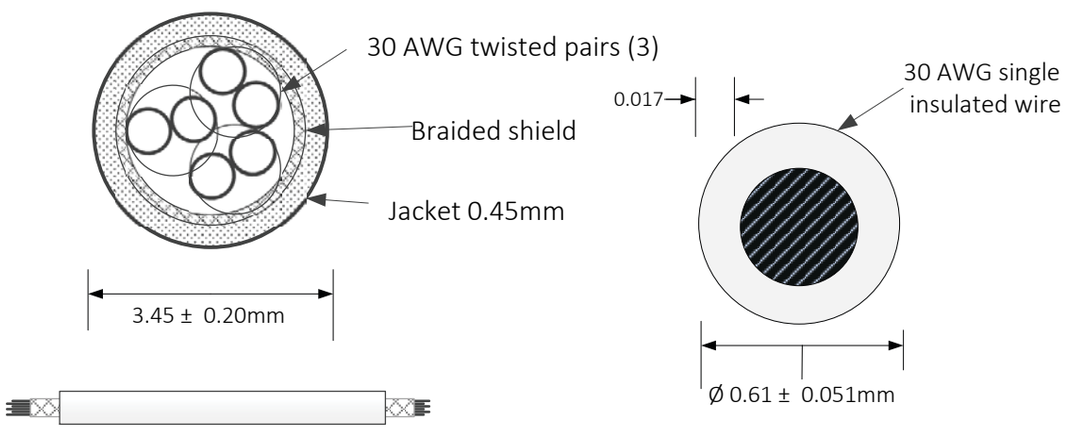
- DS Product line
- Outer Diameter: 130
- Fine ECR: 64
- Outputs: 3S
  - S- Digital : SSi
  - I- Digital : BiSS-C
- Resolution: H

Resolution		
Code	Bit	CPR
H	19	524,288

- Interconnection: S
  - S- shielded cable (default)
  - R- Strain relief & shielded cable
- C- Connector (optional): 0
- nnn- Custom: n n n

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-130 User Manual : Mechanical , Electrical and calibration setup.

Demonstration Kit:

DS-130DKIT-01: Includes ,mounted encoder on rotary jig , and RS-422 to USB converter.

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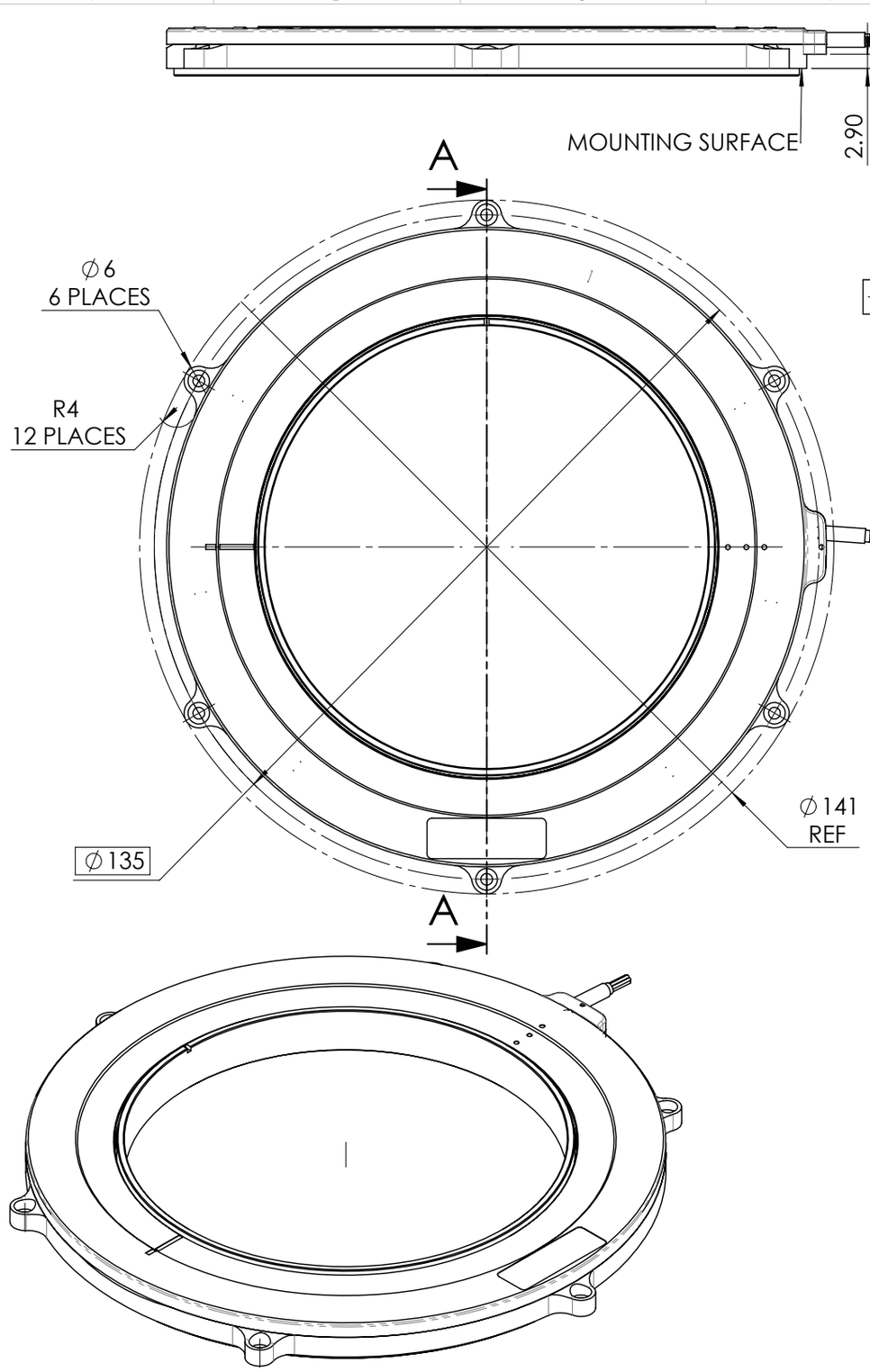
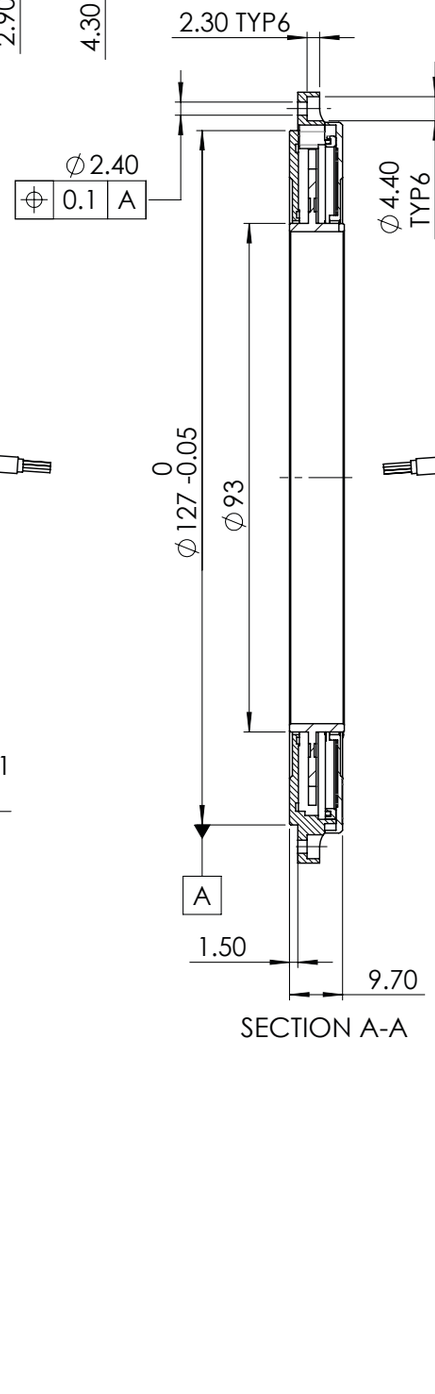
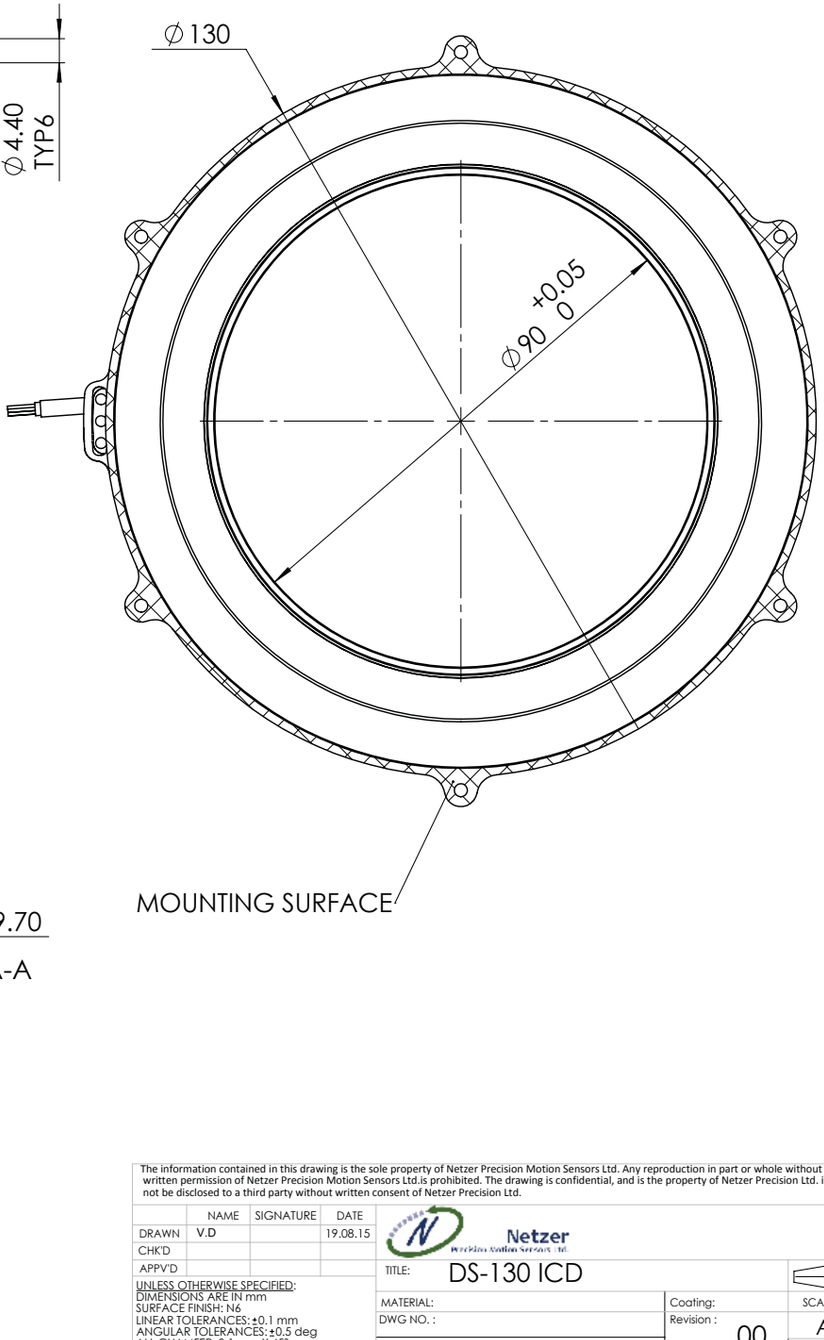
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED





SECTION A-A



	NAME	SIGNATURE	DATE
DRAWN	V.D		19.08.15
CHK'D			
APPV'D			

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN mm
SURFACE FINISH: N6
LINEAR TOLERANCES: ±0.1 mm
ANGULAR TOLERANCES: ±0.5 deg
ALL CHAMFER: 0.1 mm X 45°

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TITLE: DS-130 ICD

MATERIAL:
Coating:
SCALE: 1:1
DWG NO. :
Revision : 00
A3
CAT NO. : ICD-DS-130-00
SHEET 1 OF 1

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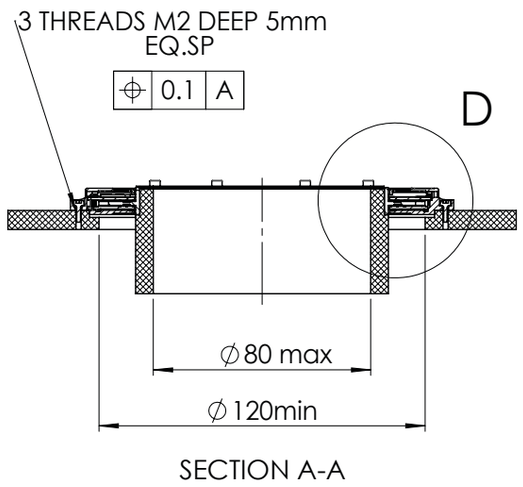

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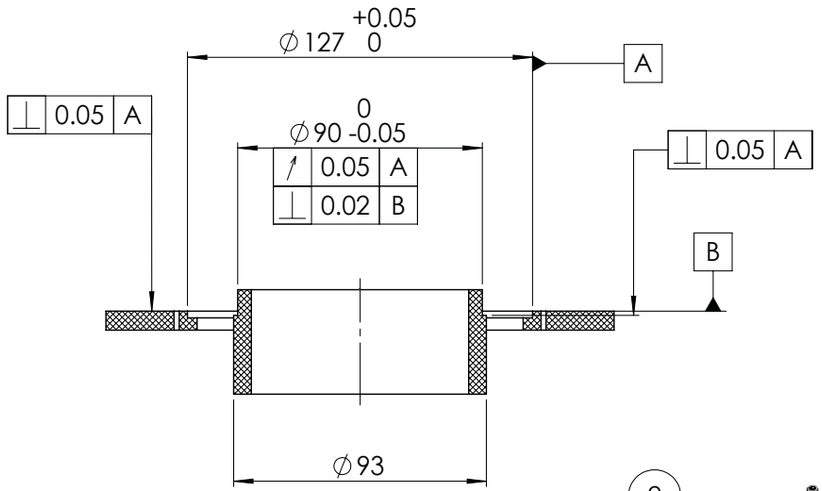
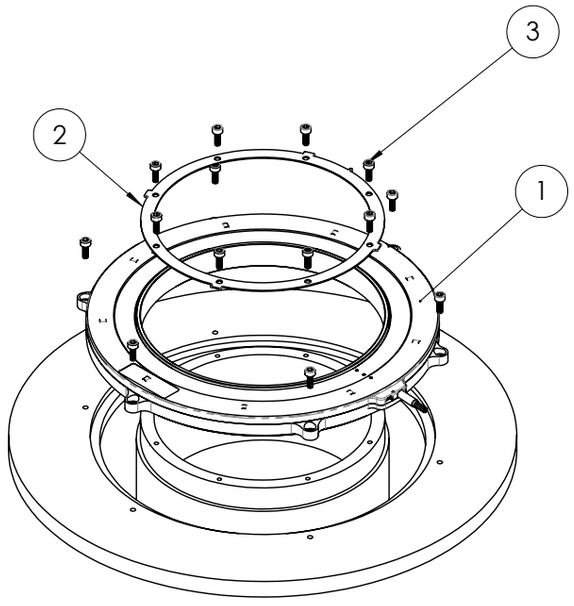
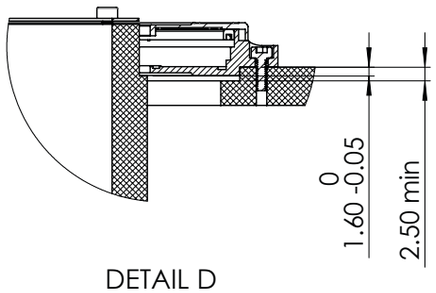
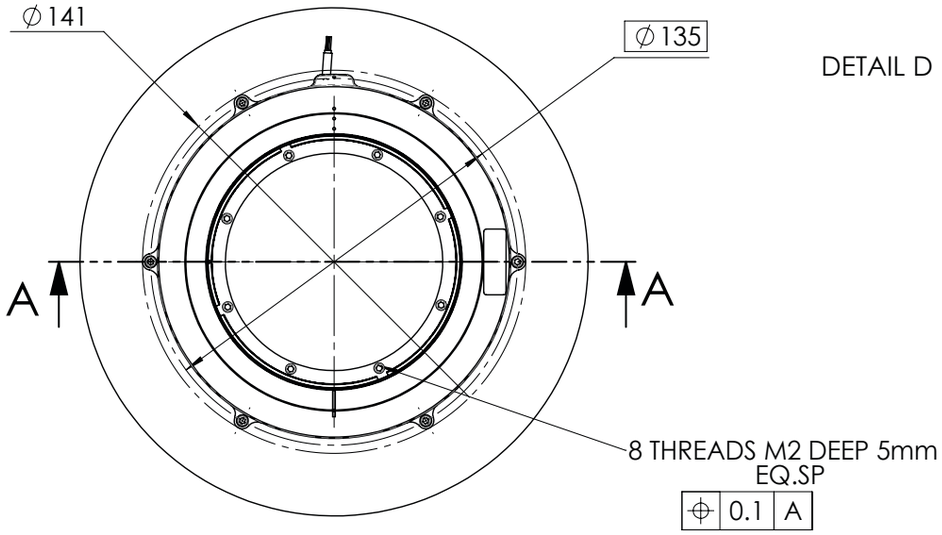


SECTION B-B





DETAIL D



Shaft - End installation

No	Part			Description	QTY.
1	DS-130-64-3SH	Included		DS-130 encoder	1
3	MP-00329	Included		Socket head cup screw,Alen M2X4mm , St.St. ,DIN912	6
2	MA-DS130-004	Optional	Shaft End installation kit	MP-00016-02	1
3				MP-00329	6

Critical dimensions marked with "*"