

# DS-70-64-3SH

## Absolute position, rotary Electric Encoder™

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.

### Mechanical

Allowable mounting eccentricity	±0.1 mm
Allowable rotor axial motion	±0.1 mm
Rotor inertia	1.7 gr · mm <sup>2</sup>
Total weight	35 gr
Outer Ø / Inner Ø / Height	70 / 30 / 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

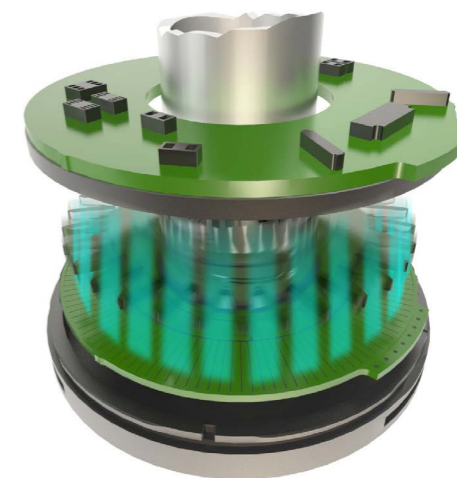
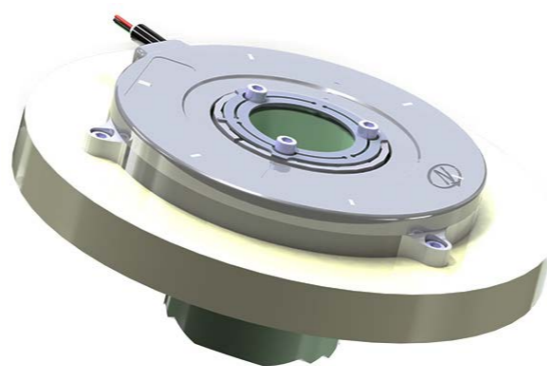
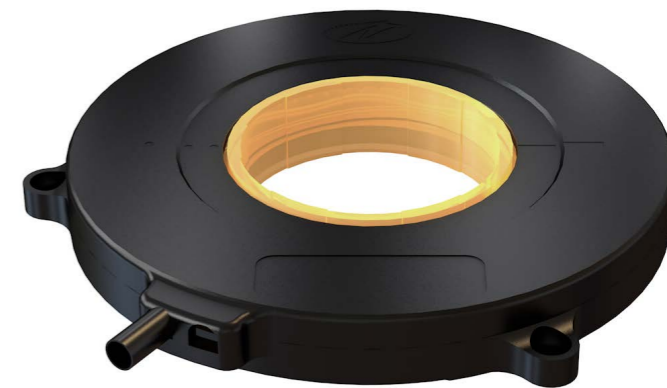
Angular resolution	19 bits ; 524,288 CPR
Static error	< 10 mDeg
Maximum operational speed	750 rpm
Measurement range	Unlimited rotation
Power On - Max. operational speed	3.3 RPM, ≤20°/sec
Build In Test BIT	Optional

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, 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.





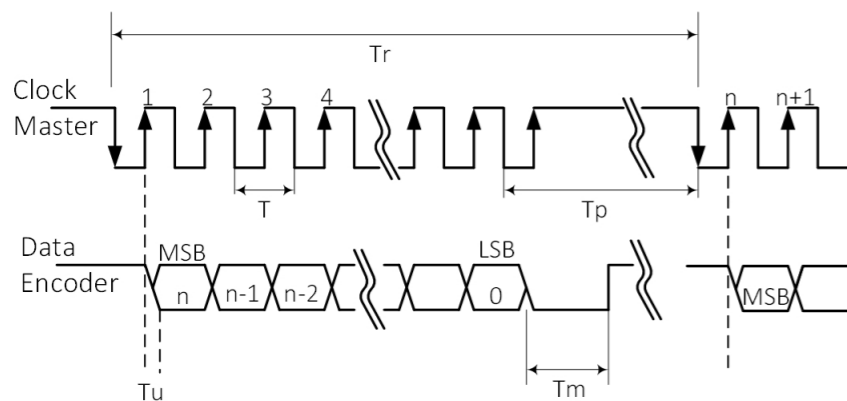
# DS-70-64-35H

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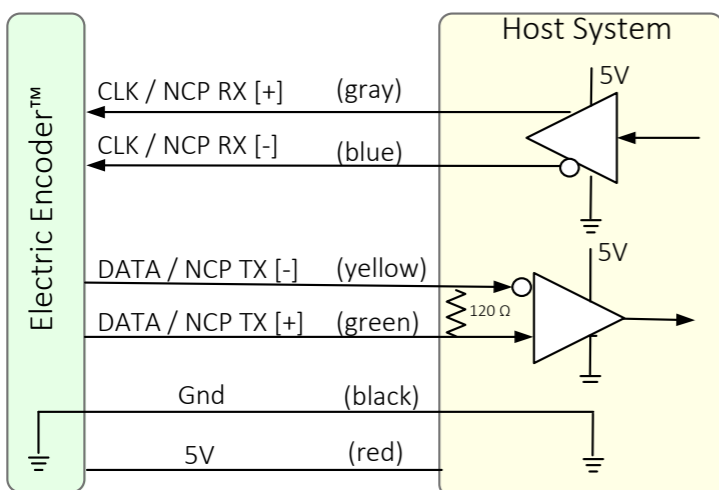


## Digital SSI Interface

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- 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

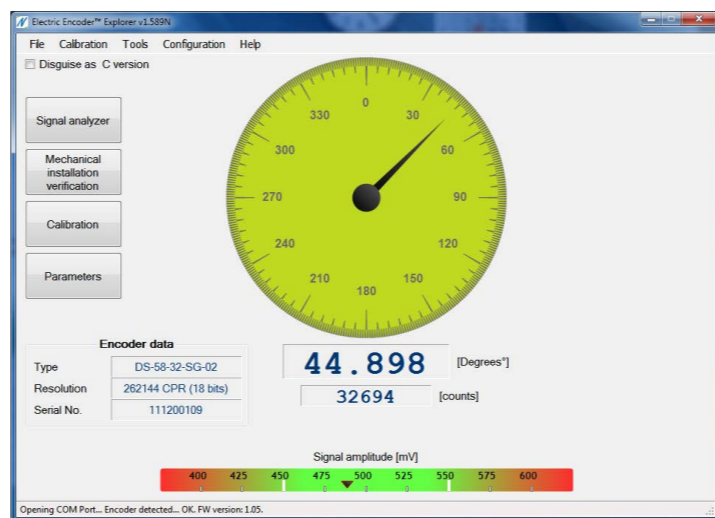
SSI	
Monoflop time	25 μSec

### SSI / BiSS interface wires color code

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

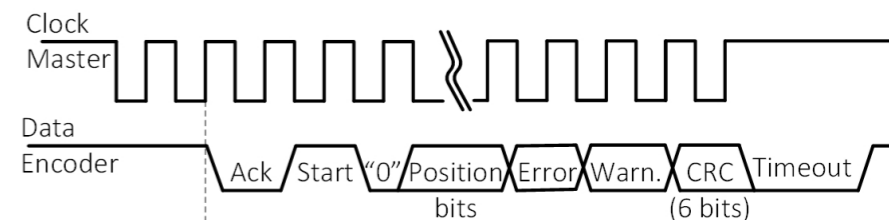
### Software tools: (SSI / BiSS - C)

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.



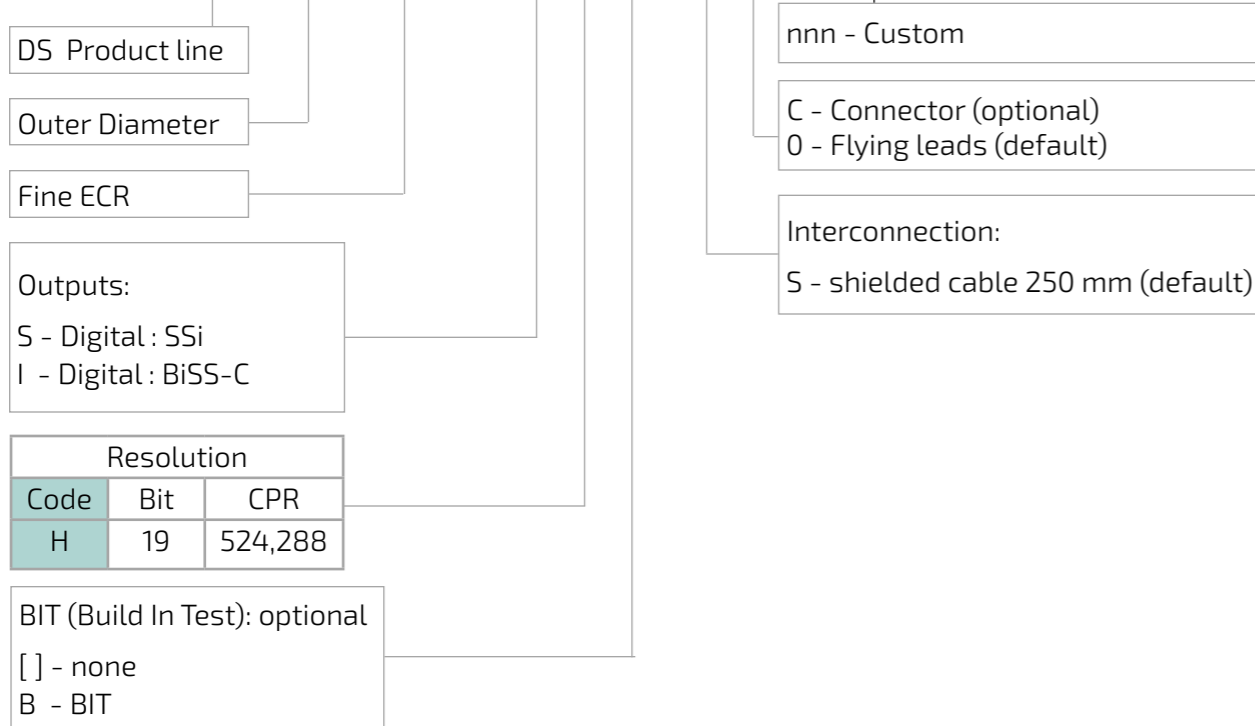
bit #		Description	Default	Length
29	Ack	Period during which the encoder calculates the absolute position, one clock cycle	0	1/clock
28	Start	Encoder signal for "start" data transmit	1	1 bit
27	"0"	"start" bit follower	0	1 bit
8...26	AP	Absolute Position encoder data		
7	Error	Error (amplitude levels)	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
	Timeout	Elapse between the sequential "start" request cycle's.		25 μs



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



Netzer Cat No.: CB-00014

Provider: Ray-Q USA. wire CAT No: RQ213210

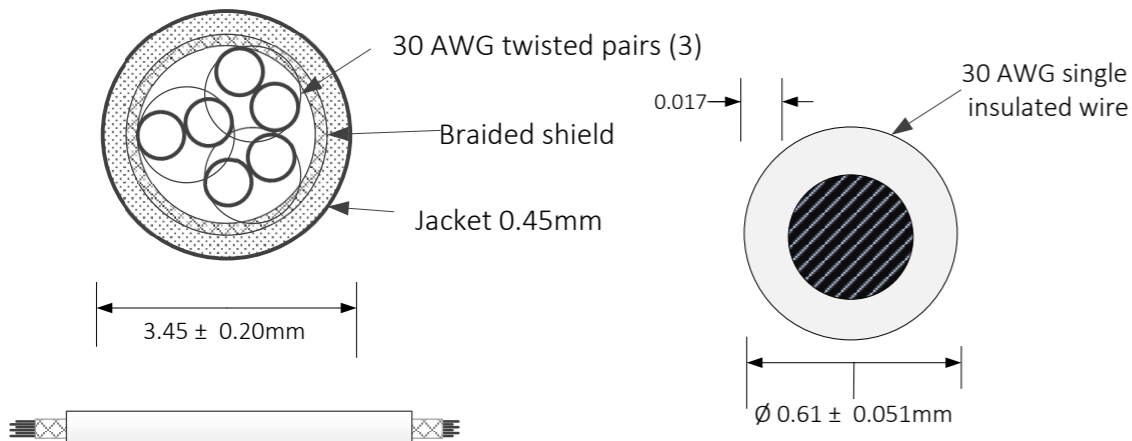
Cable: 30 AWG twisted pair (3) :2 (30 AWG 25/44 finned copper , 0.15 PFE to  $\varnothing 0.6 \pm 0.05$  OD).

Temperature rating: -60 to +150 Deg C.

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

Jacket: 0.45 silicon rubber jacket  $\varnothing 3.45 \pm 0.2$  OD

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



**Related documents:**

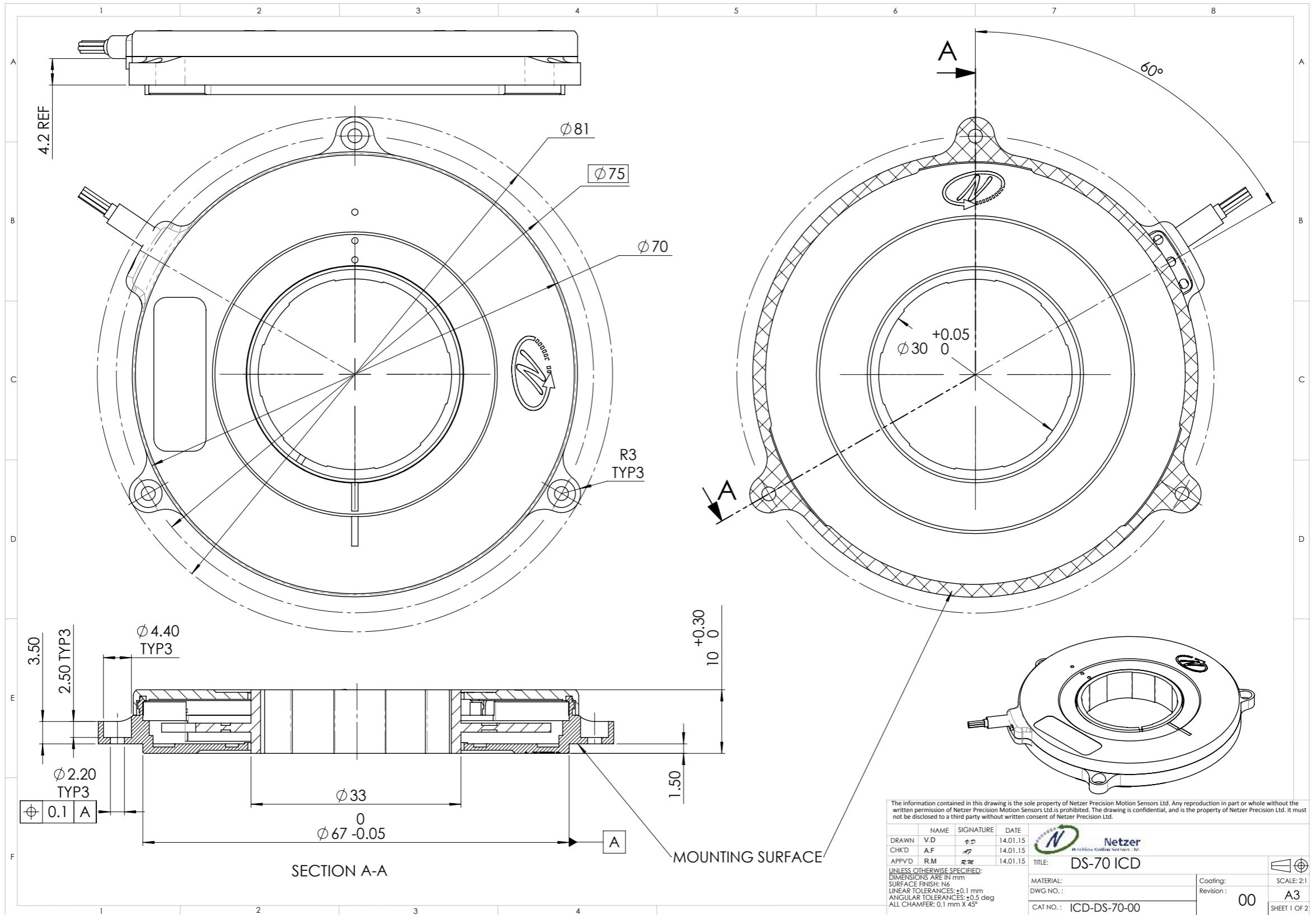
DS-70 User Manual : Mechanical , Electrical and calibration setup.

**Demonstration Kit:**

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

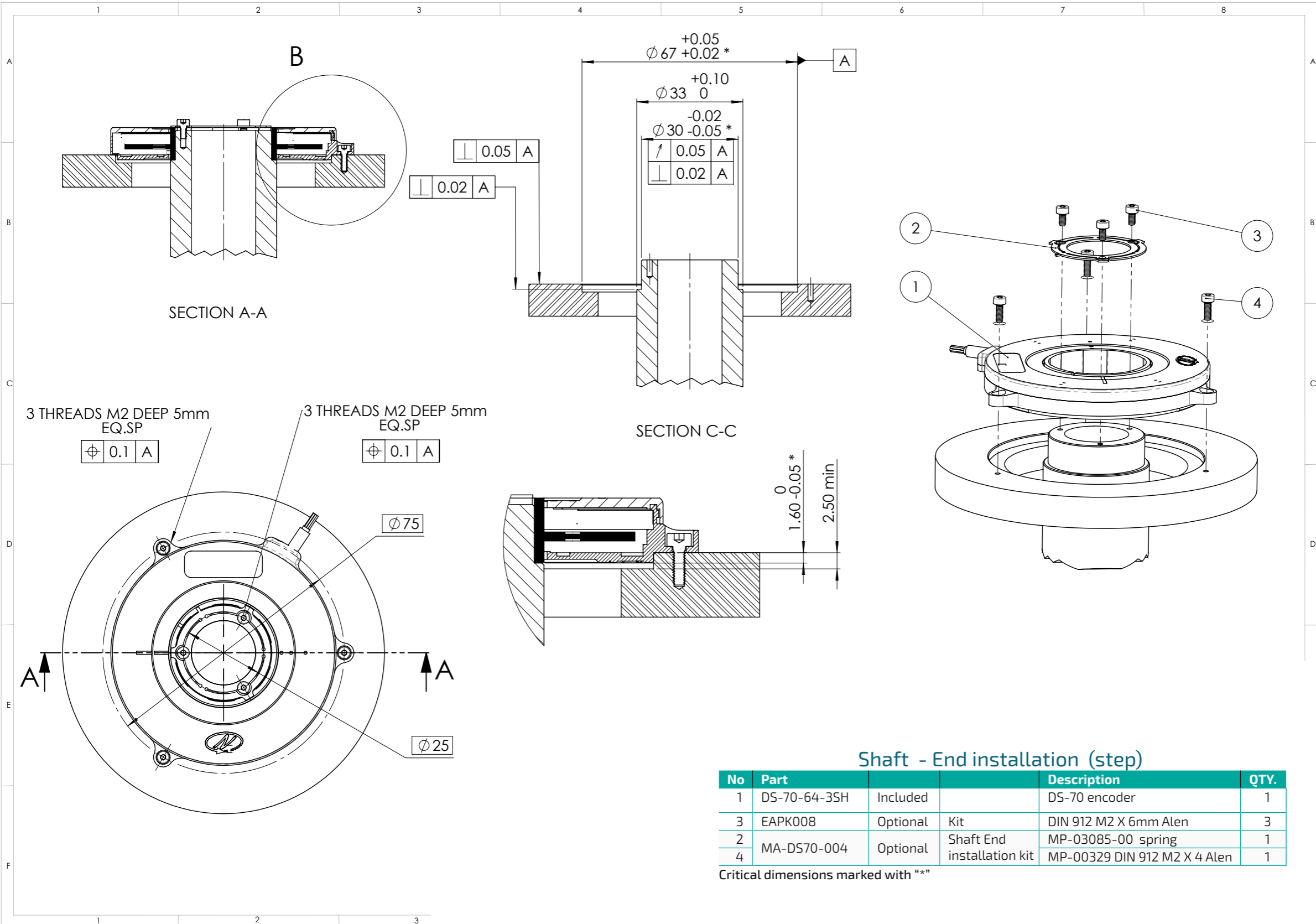
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### Shaft - End installation (step)

No	Part	Included	Description	QTY.
1	DS-70-64-3SH	Included	DS-70 encoder	1
3	EAPK008	Optional	Kit DIN 912 M2 X 6mm Alen	3
2	MA-DS70-004	Optional	MP-03085-00 spring	1
4			MP-00329 DIN 912 M2 X 4 Alen	1

Critical dimensions marked with "\*\*"