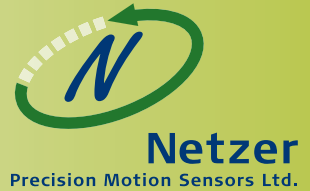


DS-70

Absolute position, rotary Electric Encoder™



The DS-70 is a member of the DS series of Electric Encoders, based on Netzer Precision proprietary technology. These encoders offer many advantages, some unparalleled:

- Low profile (10 mm).
- Hollow, floating shaft.
- No bearings or other contacting elements.
- High precision.
- High tolerance to temperature, shock, moisture, EMI & RFI.
- Insensitive to magnetic fields.
- Very low weight.

The DS-70 is suited to demanding application such as: aerospace, medical, instrumentation, automation, etc.



The holistic structure of the Electric Encoder™ provides generous mounting tolerance, thus obviating the need for internal ball bearings.

The lack of bearings and components such as flexible couplers, glass disc, light sources and detectors, along with very low power consumption makes the DS-70 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 outputs signals of DS-70 Electric Encoder™ are analog Sine / Cosine representing the rotation angle, incremental or absolute position.



Mechanical

Allowable mounting eccentricity (operational)	±0.1 mm
Allowable rotor axial motion (operational)	±0.1 mm
Rotor inertia	1.7 gr mm ²
Total weight	35gr
Outer diameter / Inner diameter / Profile	70 / 30 / 10 mm
Material (stator, rotor)	Ultem™ polymer
Material mounting clamps , M2	S.S.

Electrical

Supply voltage	5V ± 5%
Interconnection	Ø 3 mm Shielded cable

Environment

EMC	IEC 6100-6-2, IEC 6100-6-4
Operating temperature range	-40°C to +85°C
Relative humidity	<98 % - non condensing
Shock endurance	IEC 60068-2-27 100 g for 11 ms
Vibration endurance	IEC 60068-2-6 20 g 10 – 2000 Hz
Protection	IP 40

Performance

Electrical Cycles – Fine/Coarse channels	64 / 3
Angular resolution (using 12 bit A/D conversion)	19 bits
Static error (with offset compensation)	< 10 mDeg (0.17mrad)
Maximum operational speed	750 rpm
Measurement range	Unlimited rotation
Output	SSi absolute position
BIT (build in tests , optional)	Included (SSi version)

Digital - SSI Interface (absolute position)

DS-70

Output signal parameters

Signal latency	~250 μ Sec
Output code	Binary
Serial output SSI	Differential RS-422
Clock SSI	Differential RS-422
Monoflop time	25 μ Sec
Clock Frequency	0.5 \div 2.5 MHz
Position update (Max)	29 KHz

Electrical parameters

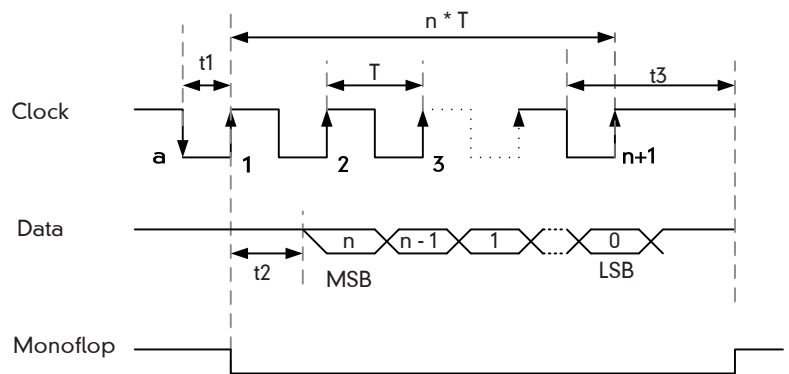
Current consumption	~ 180 mA
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SSI - Wires color code

#	Name	Color	Function
1	Clock +	Grey	SSi Clock
2	Clock -	Blue	
3	Data -	Yellow	SSi Data
4	Data +	Green	
5	GND	Black	Ground
6	+5V	Red	Power supply

Synchronous Serial Interface (SSi) allows for serial transmission of absolute position data from the Electric Encoder™ responding to controller clock pulses. The Encoder and controller are linked by clock and data differential signal lines.

SSi data transmission timing diagram



n = total number of data bits.

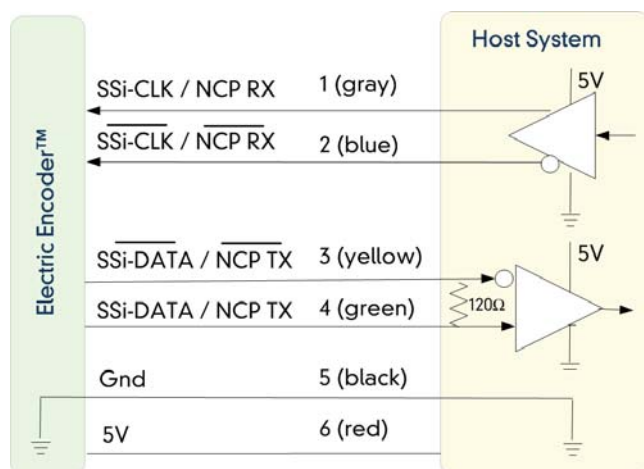
T = clock period (sec) - user defined.

$1/T$ = clock frequency 0.5 \div 2.5 MHz (user defined).

t_1 = 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 = data transmission delay (increases with cable length)

t_3 = required delay to refresh position data between subsequent position reads.



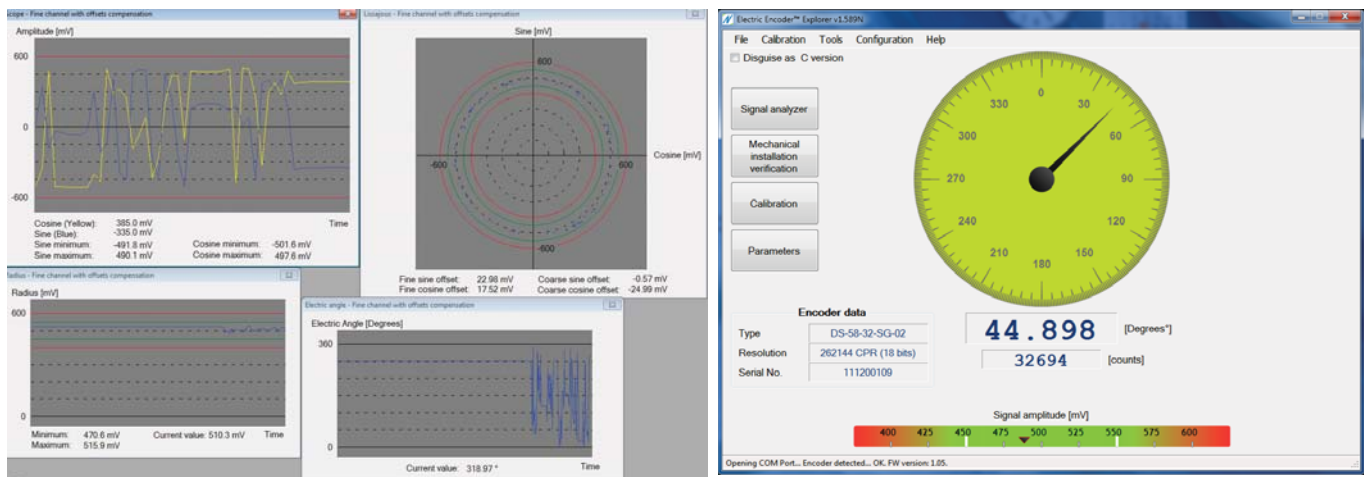
Digital - SSi Interface (absolute position)

DS-70

Software tools:

Advanced calibration and monitoring options available by using the Electric Encoder Explorer software (factory supplied) using the NCP (Netzer Communication Protocol) , the Encoder Explorer enables:

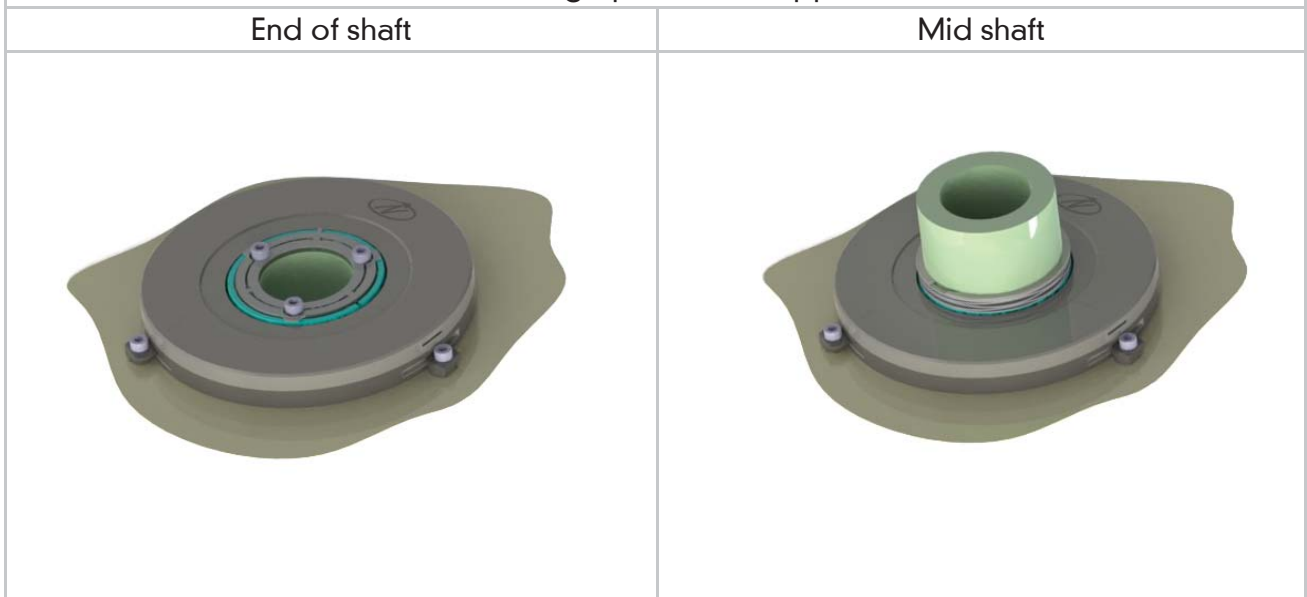
- A. Calibration, built-in tests (BIT) and advanced setup.
- B. Proper mechanical mounting - setup and validation
- c. Calibration , offsets , CAA and user defined "zero".



Electric Encoder Explorer (windows XP / 7)

Resolution In bits	Steps /360°	mDeg /step	Arc-sec /step	mRad /step
18	262,144	1.3733	4.9438	0.024
19 (DS-70)	524,288	0.6866	2.4719	0.012
20	1,048,576	0.3433	1.236	0.006

Rotor mounting options for stepped shaft



Installation kit's CAT

End of stepped shaft : MA-DS70-004

Middle of stepped shaft : MA-DS70-002

DS-70 rotor 0.05mm S.S. Shims : DS-70-R-01

DS-70 Ordering

DS - 70 - 64 - S H - S C - n n n

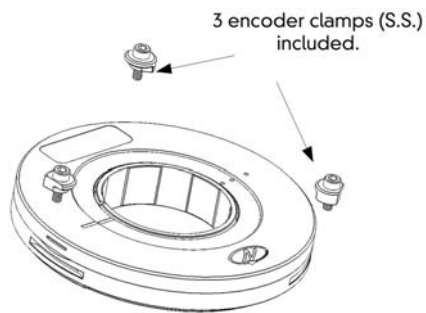
DS
Product line
OD mm
Fine EC/R
Outputs:
S - Digital : SSi

0 - flying leads
C - connector

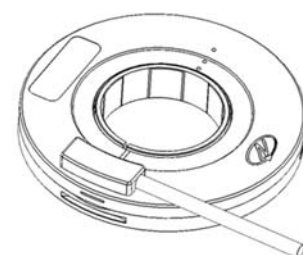
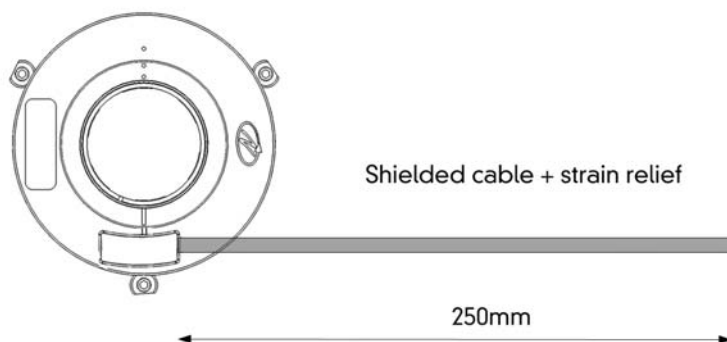
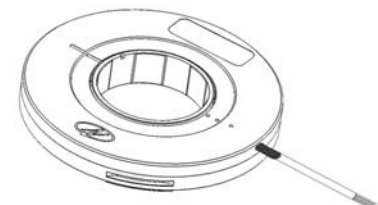
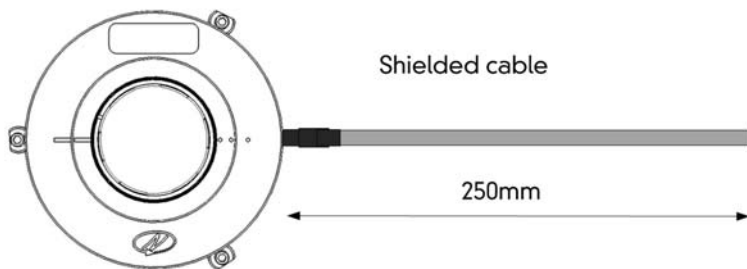
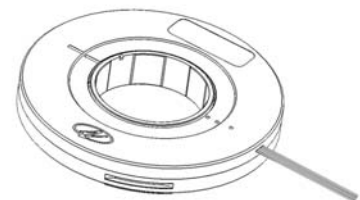
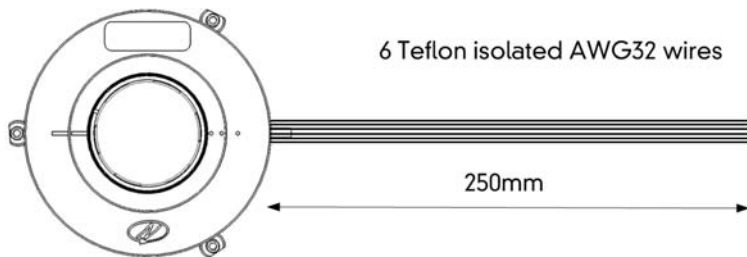
0 - Loose wires 250 mm
S - shielded cable
R - Strain relief & shielded cable

Resolution Binary		
Code	Bit	CPR
F	17	131,072
G	18	262,144
H	19	524,288

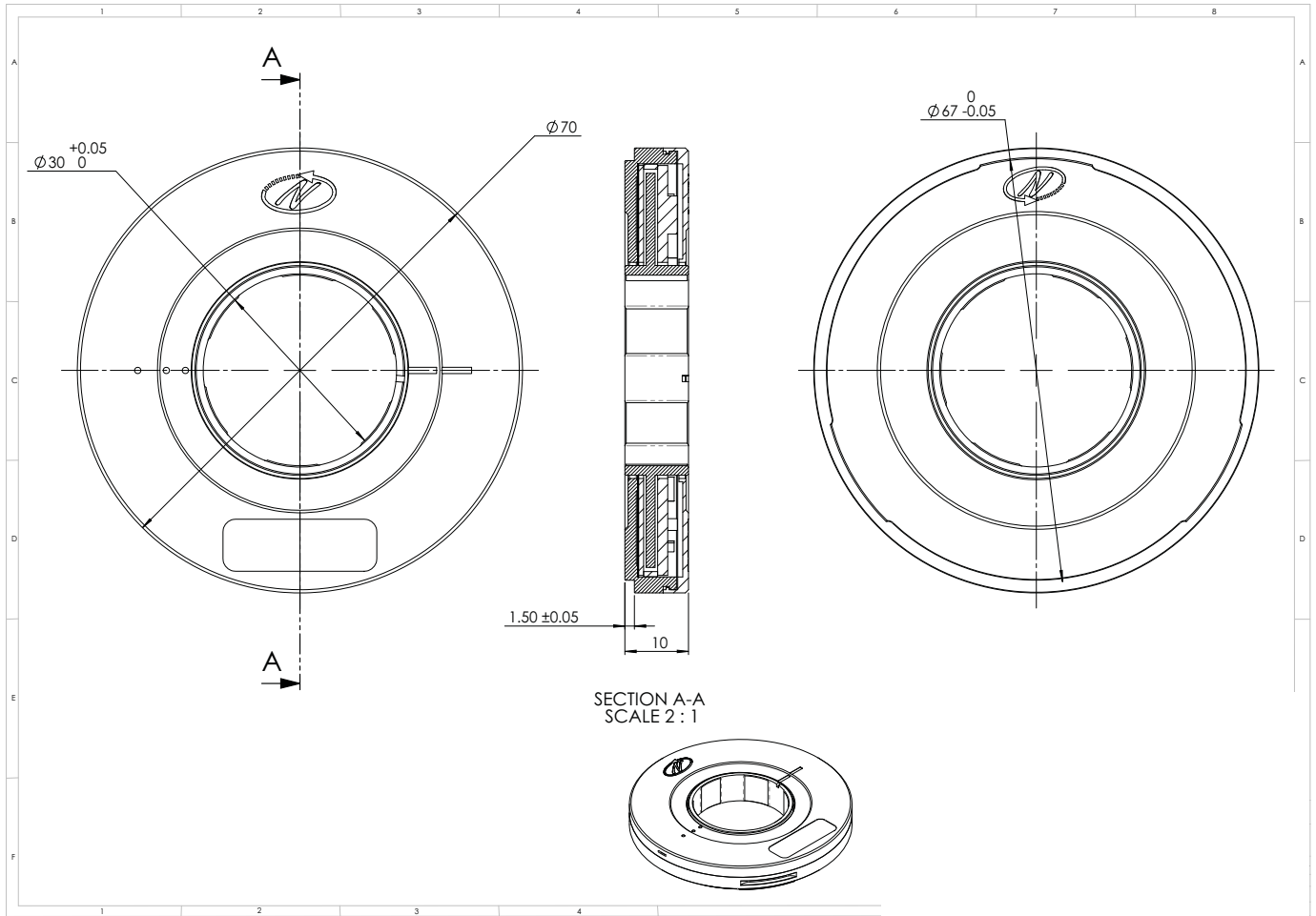
Resolution Decimal		
Code	Bit	CPR
O	17	128,000
P	18	256,000
Q	19	512,000



Interconnection options



DS-70 Mounting options



Netzer Cat No.: CB00014

30 AWG twisted pair (3) :

2 (30 AWG 25/44 tinned copper , 0.15 PFE to $\varnothing 0.6 \pm 0.05$).

Provider: Ray-Q USA.

Cable:

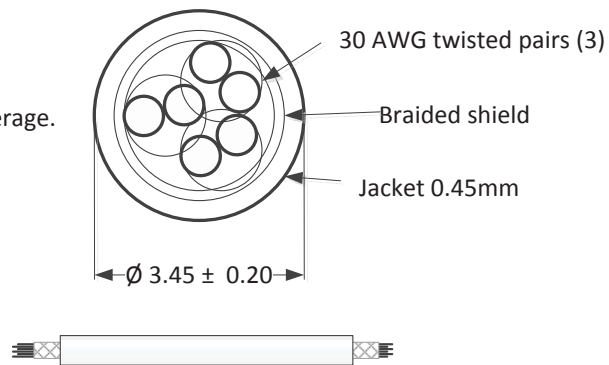
Three 30 AWG twisted pairs.

Shield:

Tinned copper braided 95% min. coverage.

Jacket:

0.45 silicon rubber to $\varnothing 3.45 \pm 0.2$



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

DS-70

