The DS-90 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.
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.

Clock
- Master

Data Encoder
- MSB
- LSB

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 -: Blue
- Data -: Yellow
- Data +: Green
- +V: Red
- GND: Black
- Power supply: 5V

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.

Master Clock

Encoder Data

bit # | Description | Default | Length
--- | --- | --- | ---
29 | Ack | 0 | 1/clock
28 | Start | 1 | 1 bit
27 | ‘0’ | 0 | 1 bit
8...26 | AP | Absolute Position encoder data
7 | Error | 1 | 1 bit
6 | Warn. | 1 | 1 bit
0...5 | CRC | The CRC polynomial for position, error and warning data is: x6 + x1 + x0. 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

www.netzerprecision.com
**Ordering Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Bit</th>
<th>CPR</th>
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<td>H</td>
<td>19</td>
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BIT (Build In Test): optional
- [] - none
- B - BIT

**Cable Information**

- **Netzer Cat No.: CB-00014**
- **Provider: Ray Q USA, wire CAT No: RQ213210**
- **Cable: 30 AWG twisted pair (3) Z (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**

**Related documents**
- **DS-90 User Manual:** Mechanical, Electrical and calibration setup.

**Optional Accessories**

**Demonstration Kit**

- **DKIT-DS-90-64-3SH-S0:** (SSI interface)
- **DKIT-DS-90-64-3IH-S0:** (BiSS interface)

Includes, mounted encoder on rotary jig, and RS-422 to USB converter.
ICD
DS-90-64-3SH-S0 / DS-90-64-3IH-S0

SECTION A-A

SECTION C-C
3 PLACES
ICD
DS-90-64-3SH-R0 / DS-90-64-3IH-R0

SECTION A-A

SECTION C-C
3 PLACES
Shaft - End installation (step)

<table>
<thead>
<tr>
<th>No</th>
<th>Part</th>
<th>Description</th>
<th>QTY. per kit</th>
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<tr>
<td>1</td>
<td>DS-90-64-3SH</td>
<td>Included DS-90 encoder</td>
<td>1</td>
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<tr>
<td>2</td>
<td>EAPK005</td>
<td>Included Kit Encoder clamps</td>
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<td>3</td>
<td>MA-DS90-004</td>
<td>Optional Shaft End installation kit Bolt DIN 912 M2×4 SIMP</td>
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<tr>
<td>4</td>
<td></td>
<td>DS-90 wave spring</td>
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Critical dimensions marked with ***
1) For any incompatibility with the model or missing dimension, please refer to Netzer for clarification.
2) Packing must prevent physical damage during process storage and shipment.

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>DS-90 encoder</td>
<td>Included</td>
<td>DS-90 encoder 1 per kit</td>
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<tr>
<td>2</td>
<td>EAPKO05</td>
<td>Included Kit</td>
<td>Kit, 3 x M2 Encoder clamps ST. ST. 3</td>
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<td>3</td>
<td>MA-DS90-001</td>
<td>Optional Shaft End installation kit</td>
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<td>4</td>
<td>DS-90 wave spring</td>
<td>Optional</td>
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<tr>
<td>5</td>
<td>DS-90 retaining ring</td>
<td>Optional</td>
<td>DS-90 retaining ring 1</td>
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Critical dimensions marked with ‘*’