

The DL-27 is a member of the DL series of Electric Encoders™, based on Netzer Precision proprietary technology. The Electric Encoder™ offers many advantages - some unparalleled

- High resolution and precision
- High tolerance to temperature extremes , shock, moisture, EMI, RFI and Magnetic fields.
- Digital interfaces
- IP65



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             | 17-21 bit                     |
| Maximum tested static error    | ±0.015°                       |
| Extended accuracy static error | ±0.015°                       |
| Maximum operational speed      | 1,500 rpm                     |
| Measurement                    | Single turn absolute position |
| Rotation direction             | Adjustable CW/CCW*            |
| Build In Test BIT              | Optional                      |

\* Default same direction from bottom side of the encoder

### Mechanical

|                                  |                           |
|----------------------------------|---------------------------|
| Starting torque                  | 30 x 10 <sup>-4</sup> N.m |
| Shaft radial force (max)         | 100 N                     |
| Total weight                     | 30 gr                     |
| Outer diameter / Profile / Shaft | 27 / 26.4 / 3 mm          |
| Material (case, shaft)           | Stainless steel           |

### Electrical

|                     |                |
|---------------------|----------------|
| Supply voltage      | 5V ± 5%        |
| Current consumption | 110 mA         |
| Interconnection     | Shielded cable |
| Cable Length        | 250mm standard |

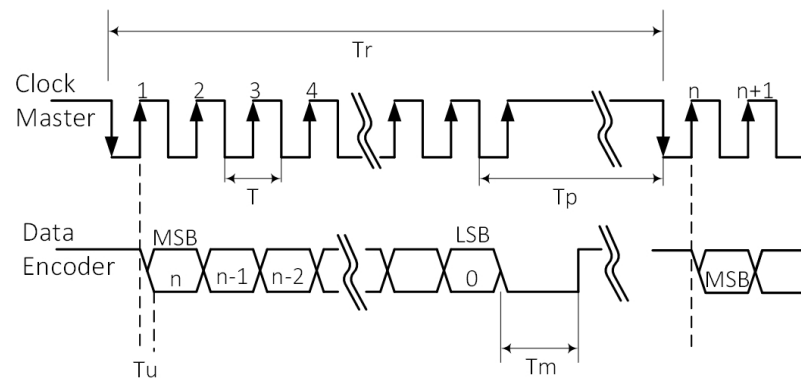
### Environmental

|                             |                            |
|-----------------------------|----------------------------|
| EMC                         | IEC 6100-6-2, IEC 6100-6-4 |
| Operating temperature range | -40°C to +85°C             |
| Storage temperature         | -50°C to +100°C            |
| Shock endurance             | 100 g for 11 ms            |
| Vibration endurance         | 20 g 10 – 2000 Hz          |
| Protection                  | IP 65                      |



## 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 / BiSS Output signal parameters

|                            |                     |
|----------------------------|---------------------|
| Output code                | Binary              |
| Serial output              | Differential RS-422 |
| Clock                      | Differential RS-422 |
| Clock Frequency            | 0.5 ÷ 5.0 MHz       |
| Position update rate (Max) | 30 KHz              |

### SSI / BiSS interface wires color code

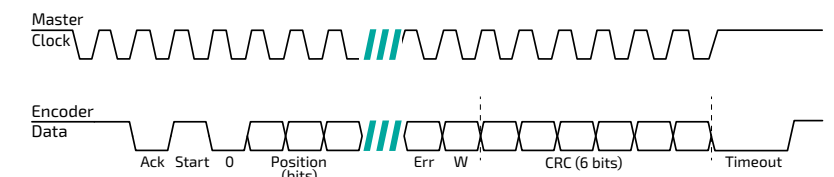
|         |        |              |
|---------|--------|--------------|
| Clock + | Grey   | Clock        |
| Clock - | Blue   |              |
| Data -  | Yellow | Data         |
| Data +  | Green  |              |
| GND     | Black  | Ground       |
| +5V     | Red    | Power supply |

|         | 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           |                  |

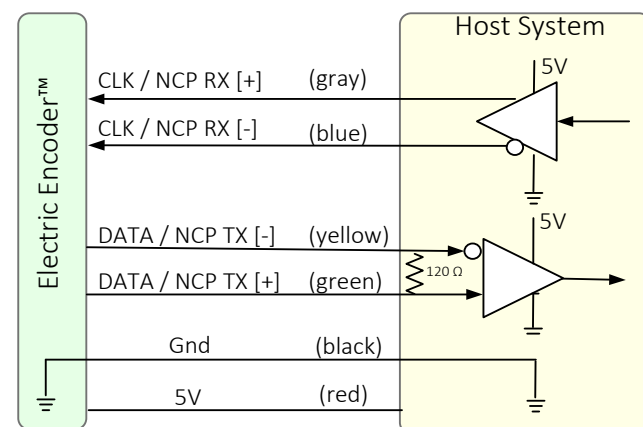


## Digital BiSS-C Interface

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  |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|
| 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   |
| 8...24 | AP      | Absolute Position encoder data                                                                                                                                                            |         |         |
| 7      | Warn.   | Warning                                                                                                                                                                                   | 1       | 1 bit   |
| 6      | Error   | Error                                                                                                                                                                                     | 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   |



## Ordering Code

DL - XXX - S G - S 0 - n n n

DL Product Line

Outer Diameter

25, 27, 66

Output

S SSi  
I BiSS

Resolution

| Code | bit | CPR       |
|------|-----|-----------|
| F    | 17  | 131,072   |
| G    | 18  | 262,144   |
| H    | 19  | 524,288   |
| I    | 20  | 1048,578  |
| J    | 21* | 2,097,152 |
| K    | 22* | 4,194,304 |

DL-25, 27 17-21 bit

DL-66 18-22 bit

\* SSi only

BIT (Built In Test): Optional

[ ] None  
B BIT

EA Extended Accuracy  
nnn Custom

Cable Length

0 250 mm Flying leads - 30AWG  
1 500 mm Flying leads - 30AWG  
2 750 mm Flying leads - 30AWG  
3 1000 mm Flying leads - 30AWG  
4 250 mm Flying leads - 28AWG  
5 500 mm Flying leads - 28AWG  
6 750 mm Flying leads - 28AWG  
7 1000 mm Flying leads - 28AWG

To add a connector contact us

Cable Options

S Jacket and shielded cable  
C Connector (D38999)

## Optional Accessories

### Cable options

|                |                                                                               |                                                                                  |
|----------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Netzer Cat No. | CB-00014-A                                                                    | CB-00034                                                                         |
| Cable type     | 30 AWG twisted pair x 3                                                       | 28 AWG twisted pair x 3                                                          |
| Wire type      | 2 x 30 AWG tinned copper<br>Insulation: PFE Ø 0.15 FEP<br>OD: Ø 0.6 ± 0.05 mm | 2 x 30 AWG 40/44 tinned copper<br>Insulation: PFE Ø 0.12<br>OD: Ø 0.64 ± 0.05 mm |
| Temp. Rating   | -55°C to +125°C                                                               | -55°C to +150°C                                                                  |
| Braided shield | Thinned copper braided 95% min. coverage                                      |                                                                                  |
| Jacket         | 0.45 TPE                                                                      | 0.44 silicon rubber (NFA 11-A1)                                                  |
| Diameter       | Ø 3.4 ± 0.16 mm                                                               | Ø 3.53 ± 0.16 mm                                                                 |

