

The VLX-60 is a member of the VLX series of Electric Encoders™ a product line based on Netzer Precision Position Sensor proprietary technology. EE products are characterized by features that enable unparalleled performance:

- Low profile (<10 mm)
- Hollow shaft (Stator / Rotor)
- No bearings or other contact elements
- High resolution and unparalleled precision
- High tolerance to temperature extremes, shock, moisture, EMI, RFI and magnetic fields
- Very low weight
- Holistic signal generation
- Digital interfaces for absolute position

### General

Angular resolution	18-20 bit
Maximum tested static error	±0.015°
Extended accuracy static error	±0.010°
Maximum operational speed	4,000 rpm
Measurement range	Single turn, unlimited
Rotation direction	Adjustable CW/CCW*

\* Default same direction from bottom side of the encoder

### Mechanical

Allowable mounting eccentricity	±0.1 mm
Allowable axial mounting tolerance	±0.1 mm
Rotor inertia	1,930 gr · mm <sup>2</sup>
Total weight	14
Outer Ø /Inner Ø/ Profile	60 / 25/ 8 mm
Material (stator, rotor)	FR4
Nominal air gap (stator, rotor)	0.6 mm

### Electrical

Supply voltage	5V ± 5%
Current consumption	90 mA
Interconnection	Connector

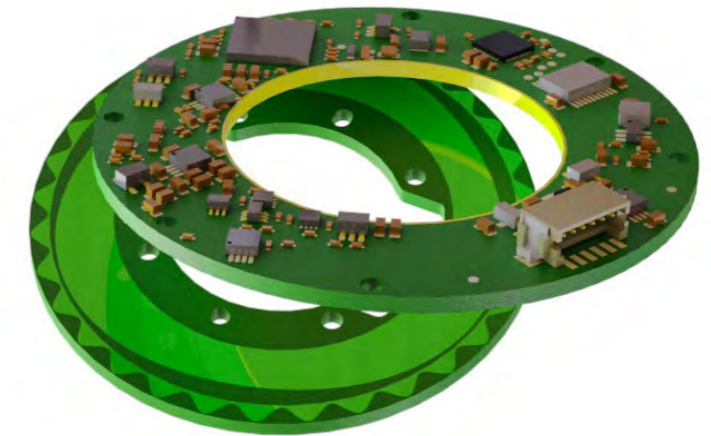
The holistic structure of the Electric Encoder™ makes it unique: Its output reading is the averaged outcome of the entire area of the rotor. This feature allows the EE a tolerant mechanical mounting and to deliver outstanding precision.

Due to the absence of components such as ball bearings, flexible couplers, glass discs, light sources and detectors along with very low power consumption enables the EE to deliver virtually failure-free performance in nearly all types of conditions.

The internally shielded, DC operated EE includes an electric field generator, a field receiver, sinusoidal-shaped dielectric rotor, and processing electronics.

The EE output is a digital serial synchronous with absolute position single turn.

This combination of high precision, low profile and, low weight has made Netzer Precision encoders highly reliable and particularly well suited to a wide variety of industrial automation applications.

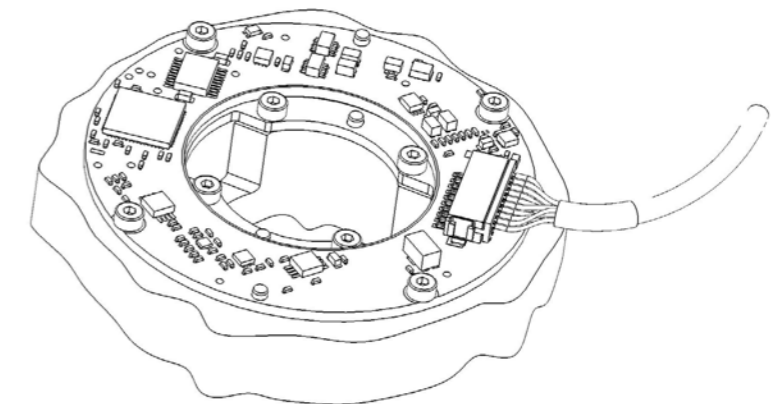


### Environmental

EMC	IEC 6100-6-2, IEC 6100-6-4
Operating temperature	-25°C to +65°C
Storage temperature	-40°C to +100°C
Relative humidity	98% Non condensing
Shock endurance	100 g for 11 ms
Vibration endurance	20 g 10 – 2000 Hz
Protection	IP 40

### Calibration / Compensation

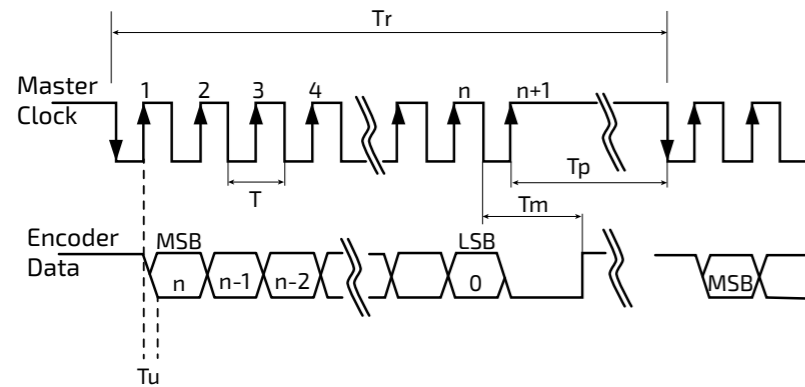
Offsets	Automatic / Manual
Signals level	Automatic / Manual
Signals integrity	Error / Warning report
Thermal	Error / Warning report
Zero position	Manual



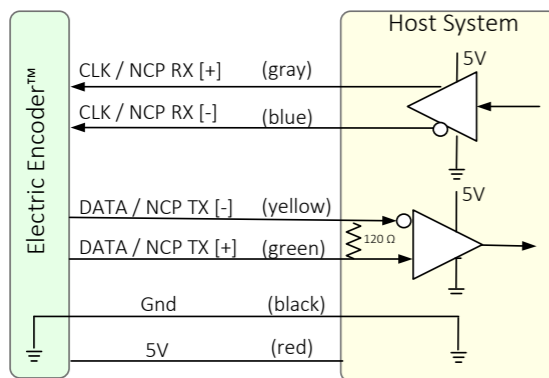


## Digital SSI Interface

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	0.1 - 5.0 MHz
Tu	Bit update time	90 nsec
Tp	Pause time	26 - ∞ μsec
Tm	Monoflop time	>25 μsec
Tr	Time between 2 adjacent requests	$Tr > n \cdot T + 26 \mu\text{sec}$
$fr = 1/Tr$	Data request frequency	



## SSI / BiSS output signal parameters

Output code	Binary
Serial output	Differential RS-422
Clock	Differential RS-422
Clock frequency	0.1 ÷ 5.0 MHz
Position update rate	35 kHz (Optional - up to 375 kHz)

## SSI/BiSS interface pin/cable color code

DF-13 on-board connector pin#	DB9 F (cable end) pin#	Cable Color	Function
7	1	Blue	CLK - / NCP RX -
8	2	Gray	CLK + / NCP RX +
5	3	Green	DATA + / NCP TX +
6	4	Yellow	DATA - / NCP TX -
4	5	Black	GND
3	8	Red	5v

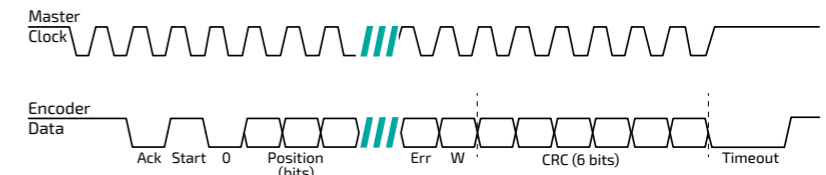
## Software tools: (SSI / BiSS - C)

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.



Bit #	Description	Default	Length
28	Ack	0	1/clock
27	Start	1	1 bit
26	"0"	0	1 bit
8...25	AP		
7	Error	1	1 bit
6	Warn.	1	1 bit
0...5	CRC		6 bits
	Timeout		25 μs

### Ordering Code

VLX - 60 - S H - C H - n n n

VLX Product line

Outer Diameter

Output

S	SSi
I	BiSS

Resolution

Code	Bit	CPR
G	18	262,144
H	19	524,288
I	20	1,048,576

EA Extended Accuracy

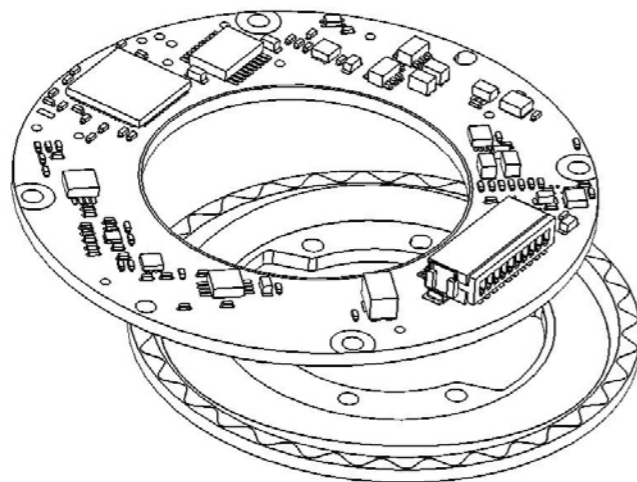
nnn Custom

Interconnection

H Horizontal (Connector)

V Vertical (Connector)

C Connector



### Cable Information

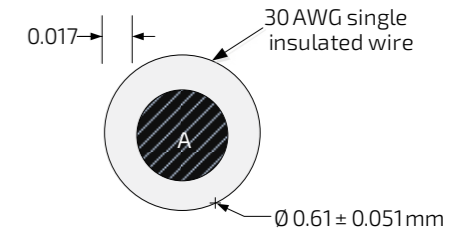
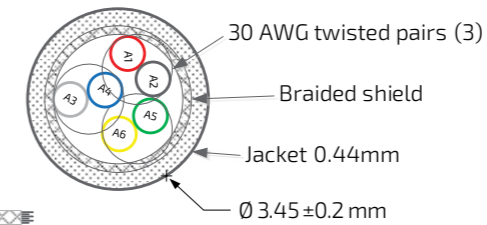
#### Accessories - cables (optional)

SSi / BiSS	Remarks
CB-00088-250	AWG30, 250 mm
CB-00088-500	AWG30, 500 mm



Netzer Cat No.: CB 00014  
 Provider: Ray-Q USA. CAT No.: RQ 213210  
 Cable: 30 AWG twisted pair (3): 2 (30 AWG 25/44 tinned copper,  
 Insulation: PFE Ø 0.15 to Ø 0.6 ± 0.05 OD).  
 Temperature rating: -60 to +150 Deg C.  
 Braided shield: Thinned copper braided 95% min. coverage.  
 Jacket: 0.44 silicon rubber (NFA 11-A1) Ø3.45 ±0.2 OD

Pair#	Color
A1-A2	Red / Black
A3-A4	Gray / Blue
A5-A6	Green / Yellow



#### Related documents

VLX-60 User Manual: mechanical, electrical and calibration setup.

#### Optional Accessories

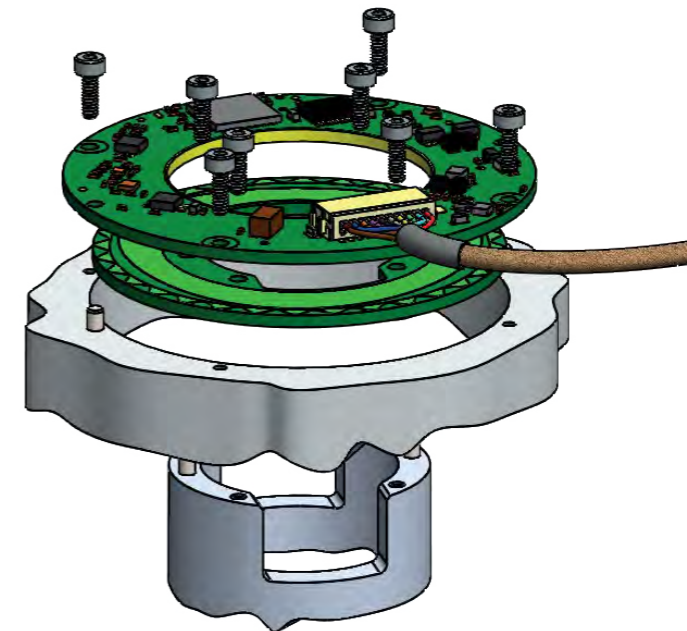
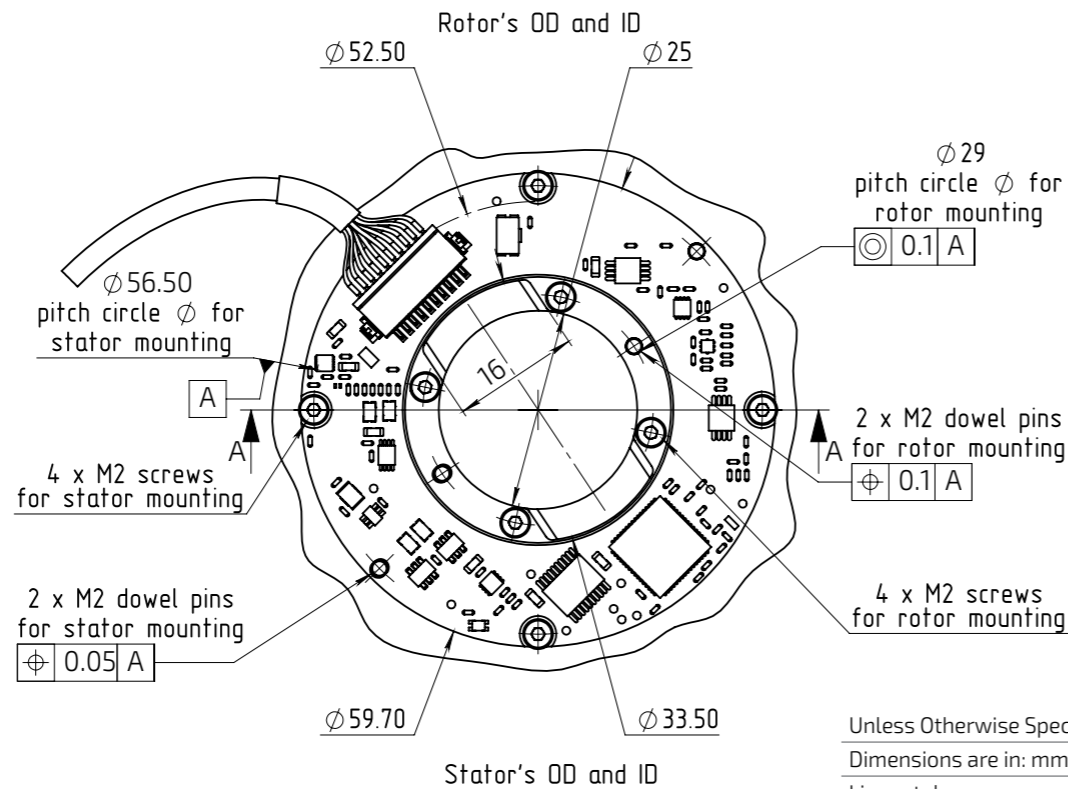
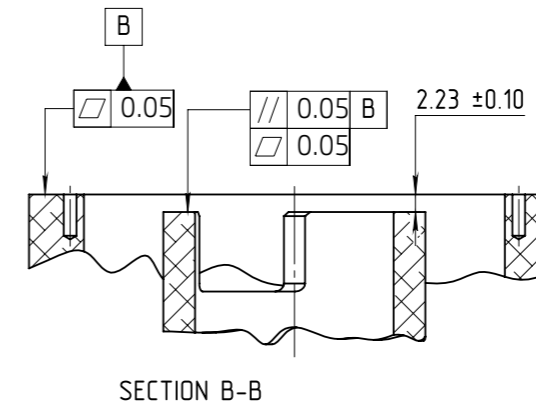
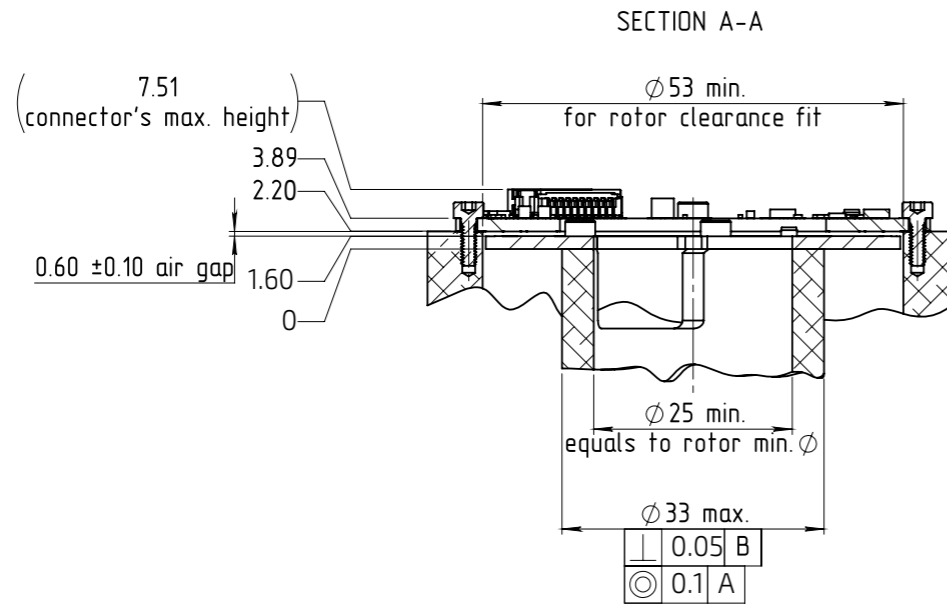
##### Demonstration Kit

DKIT-VLX-60-SG-CH - SSi interface

DKIT-VLX-60-IG-CH - BiSS interface

The Demo-kit Includes: mounted encoder on rotary jig, and RS-422 to USB converter.

ICD



Unless Otherwise Specified

Dimensions are in: mm	Surface finish: N6
Linear tolerances	
0.5-4.9: ±0.05 mm	5-30: ±0.1 mm
31-120: ±0.15 mm	121-400: ±0.2 mm