The VLM-60 is a member of the VL 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 (<8 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 - Multi-turn

The VLM multi-turn absolute encoder is implemented with a revolution counter. The master reads the multiturn position from the encoder at power-up and during operation. In order to keep turn-count and absolute position in case of power disconnect or shut-down, the VLM includes an internal battery or with an option for an external battery connection.

General

Angular resolution	17 bit
Measurement range	Multi-turn 12-18 bit
Communication	SSi
Maximum tested static error	±0.015°
Extended accuracy static error	±0.010°
Maximum operational speed	4,000 rpm
Measurement range	Multi-turn
Rotation direction	Adjustable CW/CCW*

* Default same direction from bottom side of the encoder

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 Multi-turn with battery backup .

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.

Mechanical

Allowable mounting eccentricity	±0.1 mm
Allowable axial tolerance	±0.1 mm
Rotor inertia	1996 gr · mm²
Total weight	15 gr
Outer Ø /Inner Ø/ Height	60 / 25/ 8 mm
Material (stator, rotor)	FR4
Nominal air gap (stator, rotor)	0.6 mm

Electrical

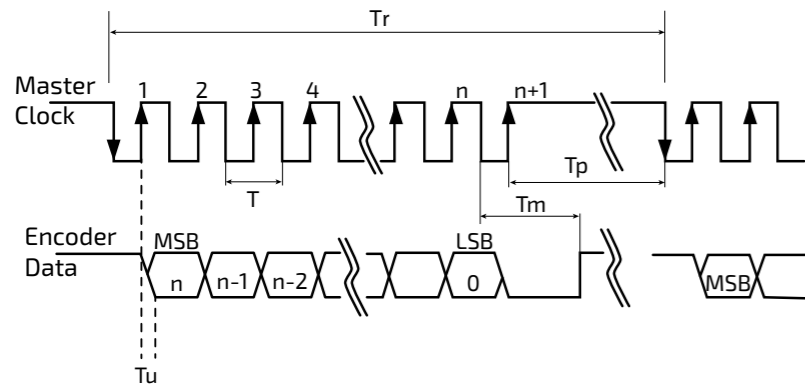|	
Supply voltage	5V ± 5%
Current consumption	<100mA
Interconnection	Connector
Battery type	CR1025SM
Backup battery life	36 months in typical conditions
External Battery supply voltage (Optional)	3.3V +/-10%

Environmental

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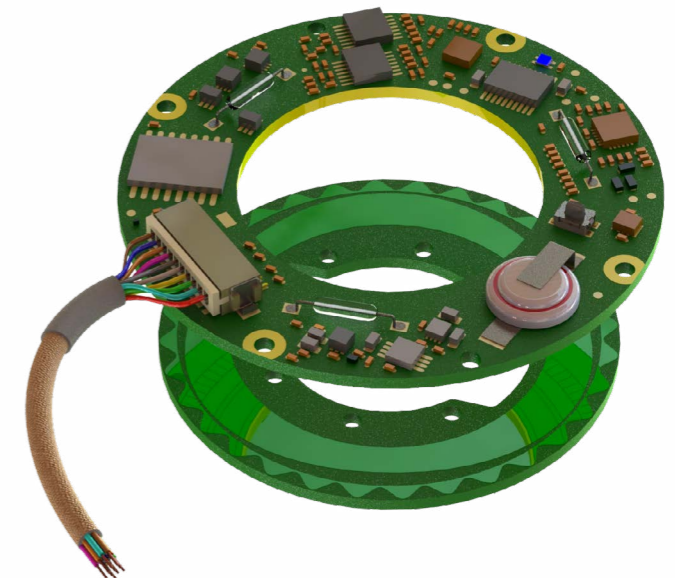
Digital SSi Interface

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.
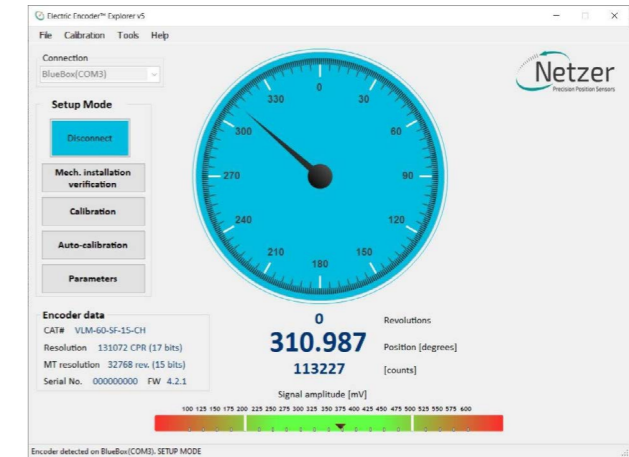

Description		Recommendations
n	Total number of data bits	18 + 10
T	Clock period	
f= 1/T	Clock frequency	0.1 - 5.0 MHz
Tu	Bit update time	90 nsec
Tp	Pause time	26 - ∞ μsec
Tm	Monoflop time	>25 μsec
Tr	Time between 2 adjacent requests	Tr > n*T+26 μsec
fr=1/Tr	Data request frequency	

SSi output signal parameters

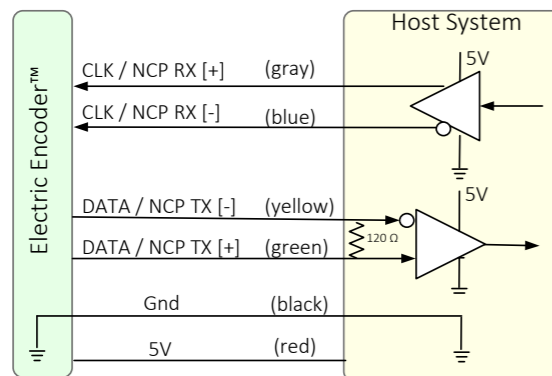| Output code	Binary
Serial output	Differential RS-422
Clock	Differential RS-422
Clock frequency	0.1 ÷ 5.0 MHz
Position update rate	35 kHz (Optional - up to 375 kHz)

SSi interface wires color code

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

Software tools: (SSi)

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.

Ordering Code

VLM - 60 - S F - ☐ - C H - n n n

VLM Product line

Outer Diameter

Output

S	SSi

Resolution - Single-turn

Code	Bit	CPR
F	17	131,072

Resolution - Multi-turn

12	4,096
13	8,192
14	16,384
15	32,768
16	65,536
17	131,072

EA	Extended Accuracy
nnn	Custom

Interconnection

CH	Connector - Horizontal

Note: The combination of single and multi should not exceeded more than 32 bit

Optional Cable

Interconection

On board connector - DF13A-10P-1.25H

Matting connector - DF13-10S-1.25C

#	SSi	Remarks
10	External Battery	
9	Battery Return	
8	5V	P.S.
7	GND	GND / RTN
6	Data+	Data / NCP TX
5	Data-	
4	Clock-	Clock / NCP RX
3	Clock+	

Optional Accessories

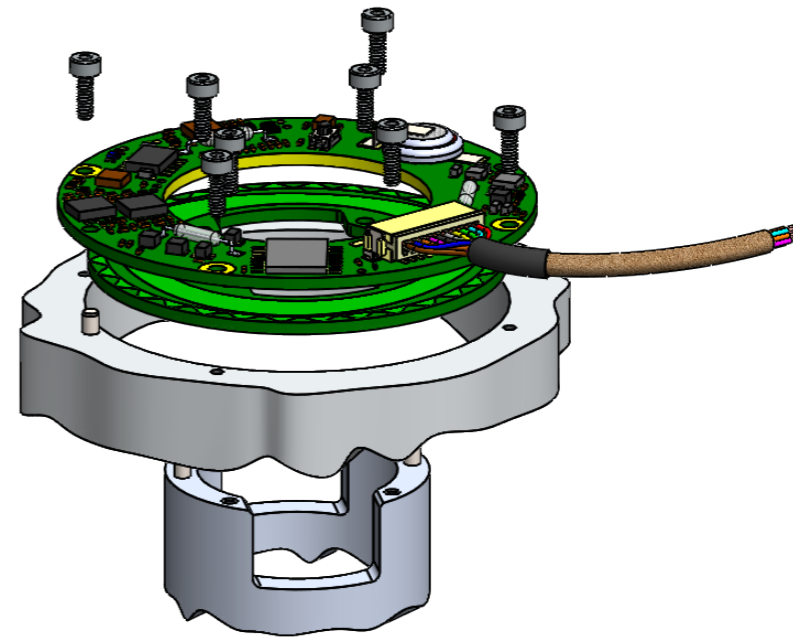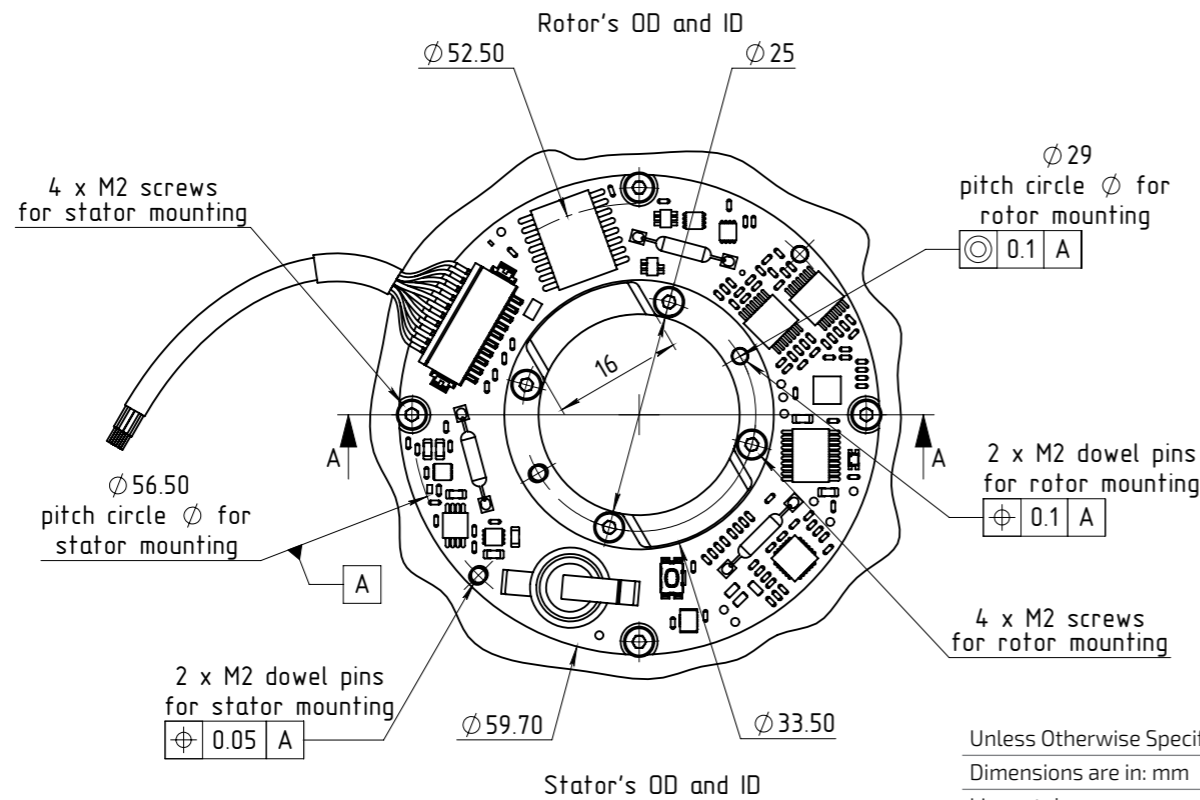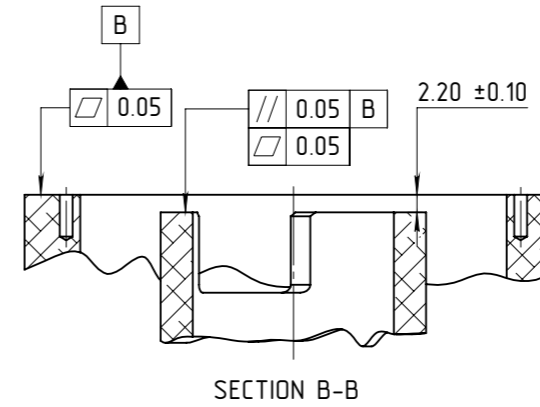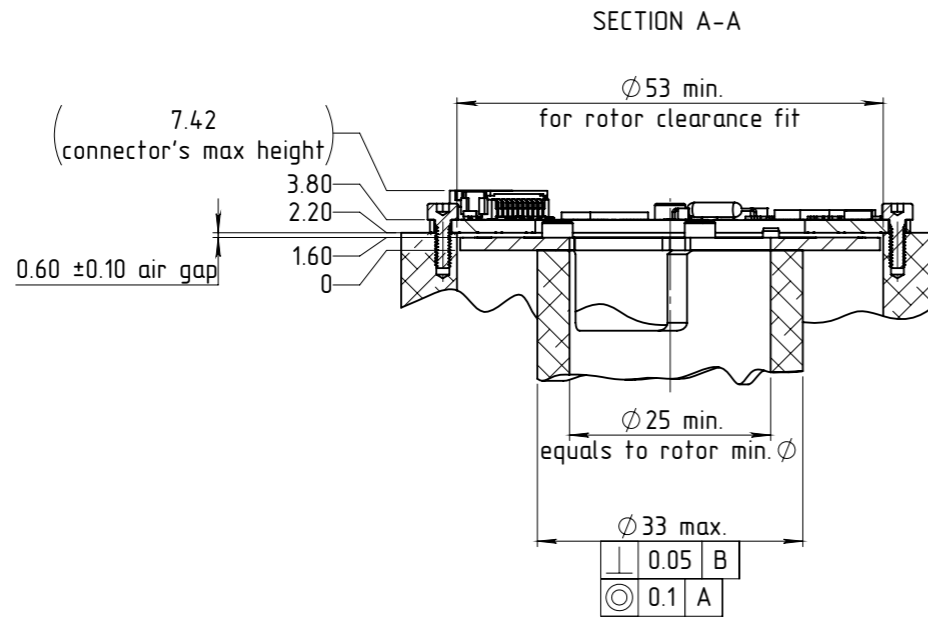| SSi	Remarks
CB-00120-250	AWG30, 250 mm
CB-00120-500	AWG30, 500 mm

1 -
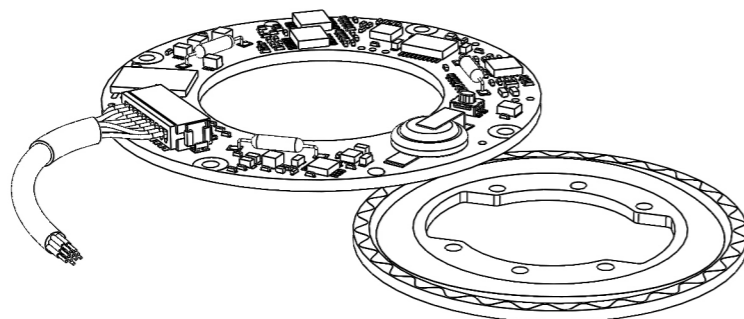
Related Documents

VLM-60 User Manual: Mechanical, Electrical and calibration setup.

Demonstration Kit

DKIT-VLM-60-SF-15-CH - SSi interface
The demo-kit includes: mounted encoder on rotary jig, and RS-422 to USB converter.

SECTION A-A

⌀53 min.
for rotor clearance fit

7.42
(connector's max height)

3.80
2.20
1.60
0

0.60 ±0.10 air gap

⌀25 min.
equals to rotor min. ⌀

⌀33 max.

| ⊥ | 0.05 | B |
| ◎ | 0.1 | A |

B

| ▱ | 0.05 |

| // | 0.05 | B |
| ▱ | 0.05 |

2.20 ±0.10

SECTION B-B

Rotor's OD and ID

⌀52.50

⌀25

⌀29
pitch circle ⌀ for
rotor mounting

| ◎ | 0.1 | A |

4 x M2 screws
for stator mounting

16

2 x M2 dowel pins
for rotor mounting

| ⊕ | 0.1 | A |

⌀56.50
pitch circle ⌀ for
stator mounting

A

A

A

4 x M2 screws
for rotor mounting

2 x M2 dowel pins
for stator mounting

| ⊕ | 0.05 | A |

⌀59.70

⌀33.50

Stator's OD and ID

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

WARNING

⚠ Do not use Loctite or other glues containing Cyanoacrylate.
We recommend to use 3M glue - Scotch-Weld™ Epoxy
Adhesive EC-2216 B/A.

VLM-60-V01