EN

LZR®-VISIOSCAN NAV

DISTANCE MEASURING LASER SCANNER FOR AUTOMATIC FORKLIFT & AMR NAVIGATION

User's Guide for product model VISIOSCAN NAV, product version V2.1.0 and higher.

(refer to the label on the product)

SAFETY

- The sensor cannot be used for purposes other than its intended use.
- The manufacturer of the system incorporating the sensor is responsible for compliance of the system to applicable national and international regulations and safety standards.
- The installer must read, understand and follow the instructions given in this manual. Improper installation can result in improper sensor operation.
- The manufacturer of the sensor cannot be held responsible for injury or damage resulting from incorrect use, installation or inappropriate adjustment of the sensor.
- Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

INSTALLATION AND MAINTENANCE

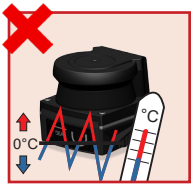
Avoid extreme vibrations.

Do not cover the optical window. Avoid condensation.

Avoid the presence of smoke, fog, or light sources in the measurement field.

Ensure functional grounding via the shield of the connection cable.

Do not open the housing.



Avoid exposure to sudden and extreme temperature changes.

Avoid direct exposure to high pressure cleaning.

Keep the laser scanner permanently powered in environments where the temperature can descend below -10°C.

CLEANING THE OPTICAL WINDOW

Please take precautions when cleaning the optical window, as the polycarbonate window can be scratched and will compromise the detection performance of the laser scanner.

For cleaning the optical window, please use only Isopropanol cleaners (>99%) with a soft cloth.

Do not use aggressive products to clean the optical window.

The Isopropanol cleaner can only be used on the optical window.

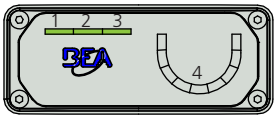
INTENDED USE

The LZR®-VISIOSCAN NAV is a laser scanner that scans a single curtain over an angle of 275°. The laser scanner outputs accurate measurement data at a high scanning frequency through Ethernet communication, enabling further processing to achieve a variety of applications such as navigation and obstacle avoidance for AGV/AMRs, material profiling, etc.

DESCRIPTION

1. USB port front cover
2. Status LEDs
3. Window Contamination LEDs
4. USB port, Type-C
5. Power/output, 5-pin, M12, male, A-coded
6. Ethernet, 4-pin, M12, female, D-coded

LED INDICATION

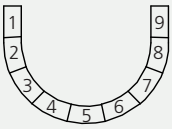


1. Power Status
2. Ethernet Connectivity
3. Error Status
4. Window Contamination Status

LED 1		LED 2		LED 3	
	Power off. No supply voltage.		No ethernet connection.		Power off. No supply voltage.
*	Power on.	*	Ethernet connection established, no measurement data transfer.	*	Normal operation, no error.
	External power supply error.	* × 3	Ethernet measurement data transmission (default off).		Internal error.
					Fatal error.

* Indication can be turned off.

The U-shaped LEDs indicate the contamination status of the optical window divided into 9 segments.



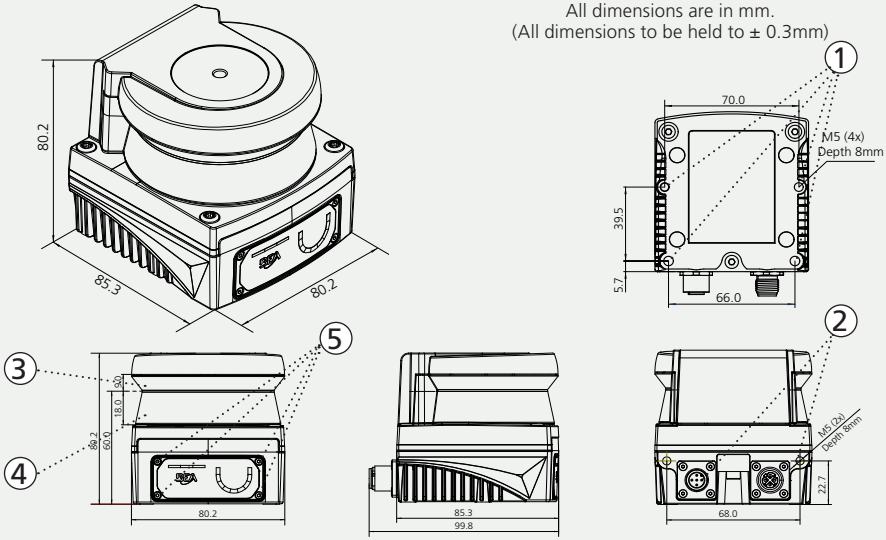
1	105° ~ 137.5°	4	15° ~ 45°	7	-75° ~ -45°
2	75° ~ 105°	5	-15° ~ 15°	8	-105° ~ -75°
3	45° ~ 75°	6	-45° ~ -15°	9	-137.5° ~ -105°

LED flashing orange at 0.5Hz: Contamination warning reaching threshold 1

LED light up permanently red: Contamination warning reaching threshold 2

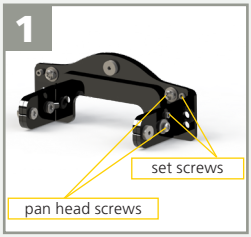
1 DIMENSIONS

All dimensions are in mm.
(All dimensions to be held to ± 0.3mm)

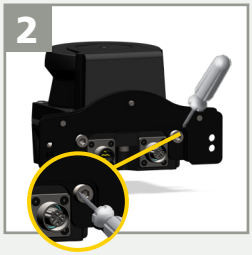


1. M5 threaded mounting hole, 8 mm deep.
   - Use all four M5 threaded mounting holes for direct mounting, so the values given in the technical parameters for vibration and shock resistance are achieved.
   - Maximum depth of thread engagement: 8 mm.
   - Tightening torque: 4.5 Nm to 5 Nm.
2. M5 threaded mounting hole, 8 mm deep.
3. Laser transmission window: 9 mm.
4. Laser receiver window: 18 mm.
5. M2 USB port cover fixing screw, hexalobular socket, tightening torque 1.2 Nm.

2 MOUNTING

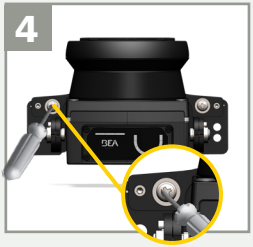


Prepare the mounting bracket.
(A Mounting kit including the mounting bracket and screws can be ordered separately).



Mount the mounting bracket onto the back of the laser scanner using two M5 hexagon socket head cap screws.

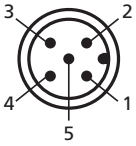
Adjust the tilt angle of the laser scanner by using the two pan head screws on the side of the bracket, then lock the bracket using the two set screws.



Align the laser curtain by using the two pan heads crews on the back of the bracket, then lock the bracket using the two set screws.

1 PIN ASSIGNMENT

Power/output: A-coded

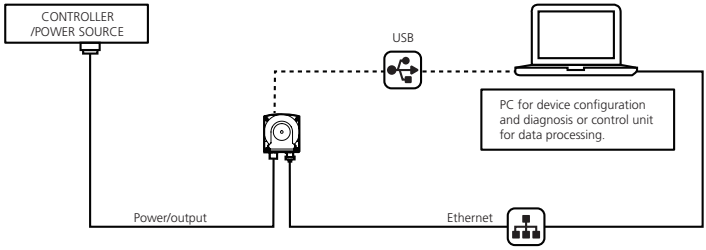


		BEA Cable
1	VIN+	Brown
2	OUT1 (Warning)	White
3	GND	Blue
4	OUT2 (Error)	Black
5	Not Connected	

Ethernet: D-coded

1	TX+
2	RX+
3	TX–
4	RX–

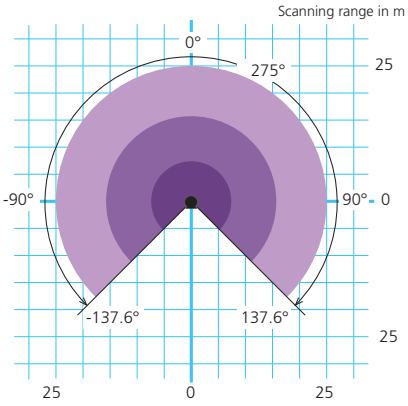
2 COMMISSIONING AND CONFIGURATION



1. Power up the laser scanner by connecting the power/output connector to a power source.
2. Connect the laser scanner to a PC using either the Ethernet or USB interface.
3. Start the <Visioscan Set> software* on the PC and establish communication between the laser scanner and the software by using the default IP address and port number (192.168.1.2 : 3050).

* Visioscan Set is the configuration software for BEA LZR®-VISIOSCAN, and can be downloaded on BEA's website. <https://asia.beasensors.com/en/bea-digital-tools/>

3 SCANNING RANGE DIAGRAM



- Scanning range for objects up to 1.8% reflectivity, typ. 7 m.
- Scanning range for objects up to 10% reflectivity, typ. 15 m.
- Max. scanning range 25 m.

TECHNICAL SPECIFICATIONS

Technology	Laser scanner, time-of-flight measurement
Optical characteristics	IR LASER: wavelength 905 nm; Output power < 0.1 mW; Class 1 (IEC/EN 60825-1)
Scanning angle	275°
Scanning frequency	80 Hz / 40 Hz / 20 Hz / 10 Hz
Angular resolution	0.2° @ 80Hz, 0.1° @ 40Hz, 0.05° @ 20Hz, 0.025° @ 10Hz
Scanning range	0.08 – 25 m; 7 m @ 1.8% reflectivity; 15 m @ 10% reflectivity
Light spot size	
Diameter of the light spot	11 mm x 7 mm @ 1 m (at 90% spot energy)
Beam divergence	8 mm/m (longitudinal) x 2 mm/m (transversal)
Flatness of scanning plane	± 0.2°
Measurement accuracy	
Measurement speed	110 080 measurements per second
Systematic error	± 10 mm*
Statistical error (1σ)	≤ 6 mm (0.08 – 7 m); ≤ 10 mm (7 – 15 m); * ≤ 6 mm (0.08 – 25 m) for reflectors
Electrical specifications **	
Supply voltage	12 – 24 V DC, - 10% / + 30%
Power consumption	6 W (without output load), 11 W (with 2 loaded outputs)
Interfaces **	
Ethernet	TCP/IP, UDP/IP
Default IP address	192.168.1.2
Port	3050
USB	USB 2.0, Type-C
Digital Outputs	2 x PNP (Max. 30 V DC, 80 mA)
Indicators	3 x Status LEDs; 9 x Window contamination LEDs
Mechanical specifications	
Degree of protection	IP67 (only with the USB port cover in place, IEC/EN 60529)
Dimensions	80.2 mm (H) x 80.2 mm (W) x 85.3 mm (D) (not including connectors) (All dimensions to be held to ± 0.3 mm)
Weight	Approx. 640 g
Housing material	Zinc / Plastic
Optical window material	Plastic / PC
Connection type	1 x Power/output, 5-pin, M12 male connector, A-coded 1 x Ethernet, 4-pin, M12 female connector, D-coded 1 x USB, Type-C, socket
Ambient conditions	
Operating temperature	- 30 °C to + 60 °C
Storage temperature	- 40 °C to + 70 °C
Relative humidity	< 95%, non-condensing
Height above sea level during operation	< 2000 m
Ambient light immunity	100 000 lux (ambient light); 3 000 lux (IEC 61496-3)

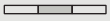
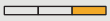
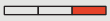
EMC	
Class of immunity	Industrial environments (IEC 61000-6-2)
Class of emission	Industrial environments (IEC 61000-6-4) (The device shall not be used in residential environments.)
Vibration resistance	
Class	5M2 (IEC 60721-3-5)
Sinusoidal vibrations	3.5 mm, 5 – 9 Hz (IEC 60721-3-5) 1.0 g, 9 – 200 Hz (IEC 60721-3-5) 1.5 g, 200 – 500 Hz (IEC 60721-3-5) 0.35 mm, 10 – 55 Hz (IEC 60068-2-6)
Shock resistance	
Class	5M2 (IEC 60721-3-5)
Single shock	15 g, 11 ms, 3 shocks per axis (IEC 60721-3-5)
Continuous shock	10 g, 16 ms, 1000 shocks per axis (IEC 60068-2-27)

* Typical value at 10% reflectivity up to 7m scanning range or as specified; real values depends on ambient conditions and the target object.

** External electrical sources must be within specified voltages and ensure double insulation from primary voltages. For UL compliance, the device shall be supplied exclusively by class 2 power supplies.

Specifications are subject to changes without prior notice.
All values measured in specific conditions.

TROUBLESHOOTING

	LED 1 is off. LED 3 is off.	There is no power.	Check cables and connections.
	LED 1 is permanently red.	Power supply is out of limit.	Check the power supply (voltage, capacity).
	LED 2 is off.	Ethernet connection is not established.	Check ethernet cable and connections.
	LED 2 is permanently green.	Ethernet connection is established, but no measurement data being transferred.	Send the command to start measurement data transfer.
	LED 3 is permanently orange.	There is an internal error.	Reboot the laser scanner.
	LED 3 is permanently red.	There is a fatal error.	Send the laser scanner back for a technical check-up.
	U-shaped LEDs are flashing orange at 0.5Hz.	The respective section of the optical window's contamination has reached the warning 1 threshold.	Clean the optical window by wiping it with a clean damp cloth.
	U-shaped LEDs are permanently red.	The respective section of the optical window's contamination has reached the warning 2 threshold.	Clean the optical window by wiping it with a clean damp cloth.

ADDITIONAL INFORMATION

Additional information about the product can be found on the BEA website and the BEA Sensors Github page.

Explore the LZR®-VISIOSCAN NAV:
asia.beasensors.com/en/product/lzr-visioscan-nav/

- Product Information
- Technical Specifications
- Product Documentations
- Declaration of Conformity
- Visioscan Set Configuration Software
- Protocol Documentation
- API Documentation

Access to BEA ROS Drives:
github.com/BEASensors

BEA / A-B Area, 3rd Floor, No.1 Building / No.5 Xinghai Road, BDA, Beijing / CHINA
T +86 10 57761630 | **F** +86 10 62628775 | **E** info-as@beasensors.com | **W** asia.beasensors.com

BEA SA | LIEGE Science Park | ALLÉE DES NOISETIERS 5 - 4031 ANGLEUR [BELGIUM] | T +32 4 361 65 65 | F +32 4 361 28 58 | INFO@BEA.BE | WWW.BEASENSORS.COM