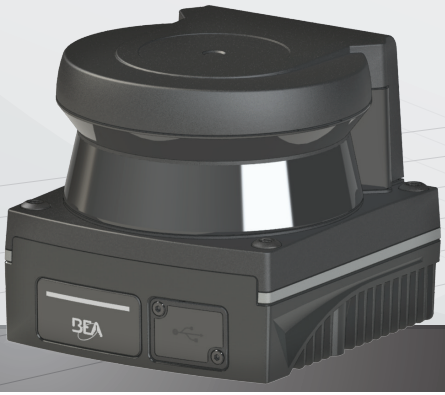
EN



LZR®-VISIOSCAN RD

LASER SCANNER FOR AGV/AMR NAVIGATION AND OBSTACLE AVOIDANCE

User's Guide for product model VISIOSCAN RD, product version V1.1.0 and higher.

(refer to the label on the product)

This user's guide is an informative document and can not be seen as a commitment of result.

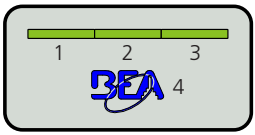
INTRODUCTION

The LZR®-VISIOSCAN RD 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, etc.

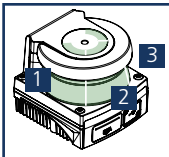
DESCRIPTION

1. Tri-colour LEDs
2. USB port, Type-C
3. USB port cover
4. Power/output, 5-pin, M12, male, A-coded
5. Ethernet, 4-pin, M12, female, D-coded

LED INDICATION

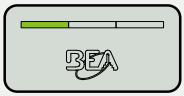


1. Power Status
2. Ethernet Connectivity
3. Error Status
4. Power Status



LED 1/2/3 indicates the left/ centre/right side of the window respectively to notify the contamination on the window.

1 45.8°~ 137.5° 3 -45.8°~ -137.5°
2 -45.8°~ 45.8°

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

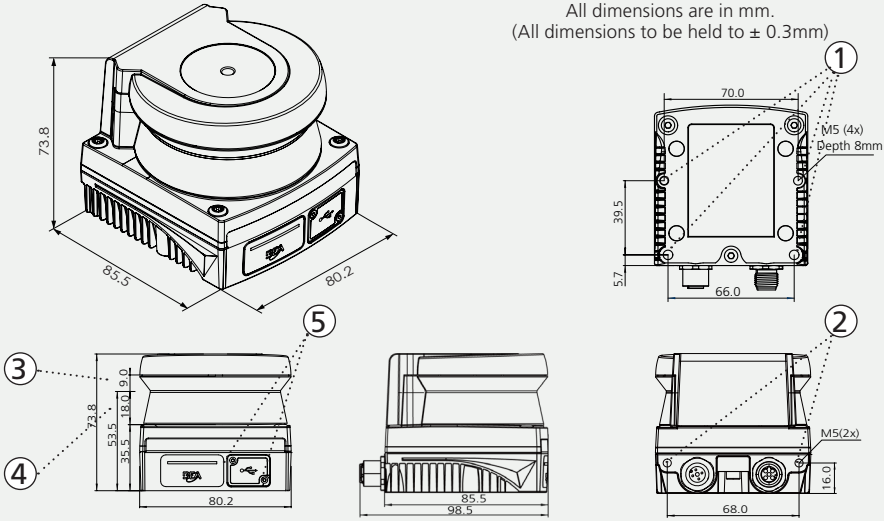
LED1/2/3 flashs 1 time/second, contamination warning on the left/ centre/right side of the optical window.**

LED1/2/3 flashs 3 times/second, contamination error on the left/ centre/right side of the optical window.**

* Indication can be turned off.
** For more details, please refer to trouble shooting (P7).

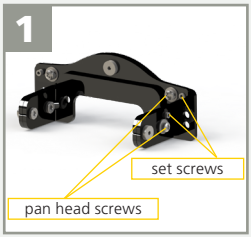
1 DIMENSIONS

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).

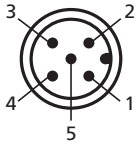
Mount the mounting bracket onto the back of the laser scanner using two M5 hexagon socket head cap screws.

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

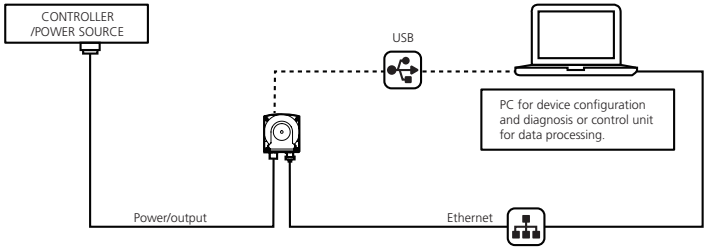


1	VIN+	Brown
2	OUT1	White
3	GND	Blue
4	OUT2	Black
5	Not Connected	

Ethernet: D-coded

1	TX+
2	RX+
3	TX–
4	RX–

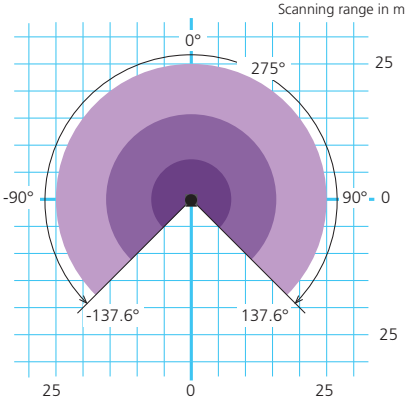
2 COMMISSIONING AND CONFIGURATION



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/>

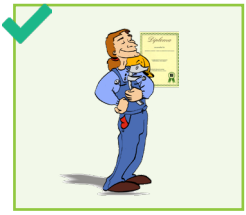
3 SCANNING RANGE DIAGRAM



- 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.

SAFETY

Do not open the housing.



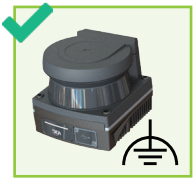
Only trained and qualified personnel may install and adjust the laser scanner.

INSTALLATION AND MAINTENANCE

Avoid extreme vibrations.

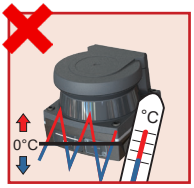
Do not cover the optical window.

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



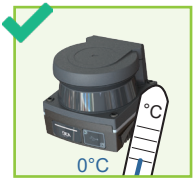
Ensure functional grounding via the shield of the connection cable.

Avoid condensation.



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 0°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.

Wipe the optical window regularly with a clean and damp cloth.

Do not use aggressive products to clean the optical window.

Avoid rubbing the dirt on the surface.

TECHNICAL SPECIFICATIONS

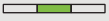
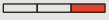
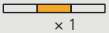
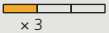
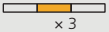
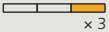
Technology	Laser scanner, time-of-flight measurement
Optical characteristics	IR LASER: wavelength 905 nm; Output power < 0.1 mW; Class 1 (IEC/EN 60825-1)
Scanning angle	275°
Scanning frequency	80 Hz / 40 Hz (adjustable)
Angular resolution	0.2° @ 80 Hz, 0.1° @ 40 Hz
Scanning range	0.08 – 25 m; 7 m @ 1.8% 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	< 5.5 W
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, 100 mA)
Indicators	3 x Status LEDs (Tri-color), 1 x Logo LED (Blue)
Mechanical specifications	
Degree of protection	IP67 (only with the USB port cover in place, IEC 60529)
Dimensions	73.8 mm (H) x 80.2 mm (W) x 85.5 mm (D) (not including connectors) (All dimensions to be held to ± 0.3 mm)
Weight	Approx. 560 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
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	Commercial environments (IEC 61000-6-3)

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 ensure double insulation from primary voltages.

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.
 × 1	LED 1 is flashes 1 x every 2 seconds.	The left side of the optical window contamination has reached the warning threshold.	Clean the optical window by wiping it with a clean damp cloth.
 × 1	LED 2 is flashes 1 x every 2 seconds.	The center of the optical window contamination has reached the warning threshold.	Clean the optical window by wiping it with a clean damp cloth.
 × 1	LED 3 is flashes 1 x every 2 seconds.	The right side of the optical window contamination has reached the warning threshold.	Clean the optical window by wiping it with a clean damp cloth.
 × 3	LED 1 is flashes 3 x every second.	The left side of the optical window contamination has reached the error threshold.	Clean the optical window by wiping it with a clean damp cloth.
 × 3	LED 2 is flashes 3 x every second.	The center of the optical window contamination has reached the error threshold.	Clean the optical window by wiping it with a clean damp cloth.
 × 3	LED 2 is flashes 3 x every second.	The right side of the optical window contamination has reached the error 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 RD:
asia.beasensors.com/en/product/lzr-visioscan-rd/

- 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

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