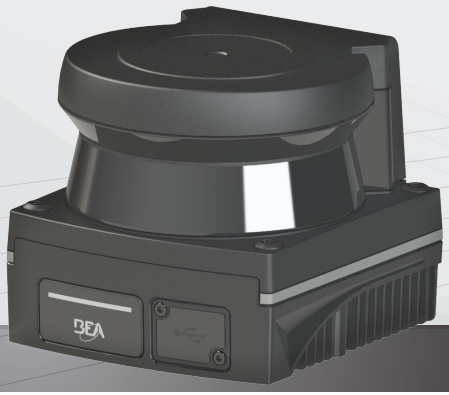
EN



# LZR®-VISIOSCAN RD

## RAW-DATA LASER SCANNER FOR FACTORY AUTOMATION AND AGV / AMR APPLICATIONS

User's Guide for product model LZR®-VISIOSCAN RD, product version V2.2.0 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.

## SAFETY TIPS

Do not open the housing.

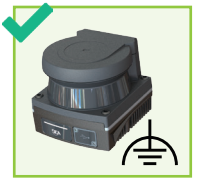
Only trained and qualified personnel may install and adjust the laser scanner.

## INSTALLATION AND MAINTENANCE

Avoid extreme vibrations.

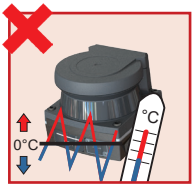
Do not cover the optical window.

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.

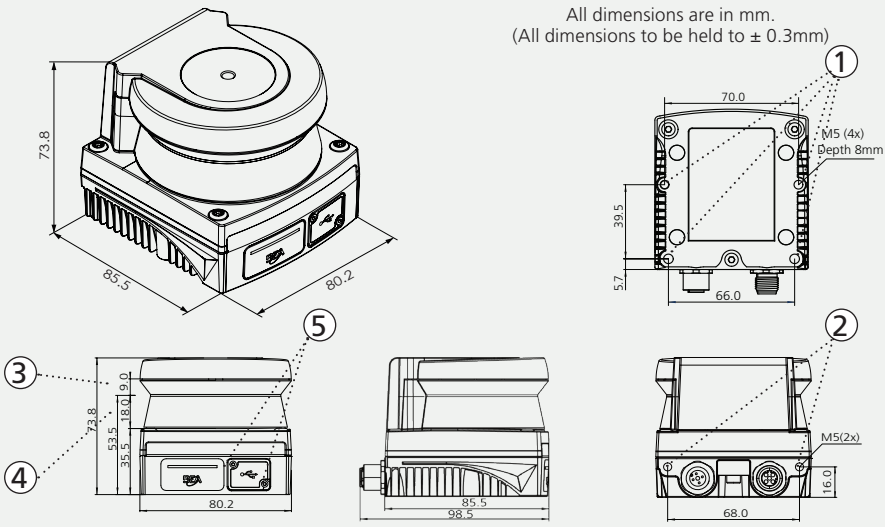
Avoid rubbing the dirt on the surface.

## INTRODUCTION

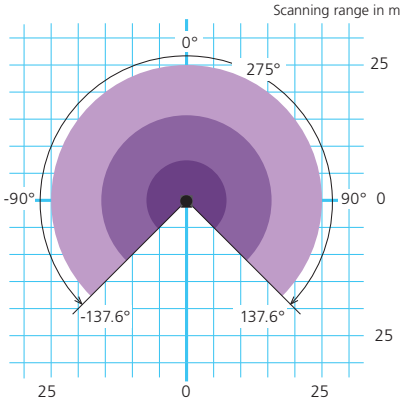
The LZR®-VISIOSCAN RD is a laser scanner that scans a single curtain over an angle of 275°. The laser scanner outputs accurate measurement data at a high scanning frequency through Ethernet communication, enabling further processing to achieve a variety of applications such as navigation and obstacle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

## DESCRIPTION

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.




- 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.

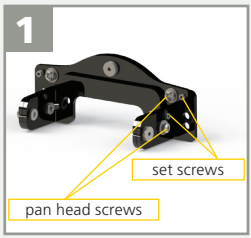
## ACCESSORIES

Ethernet cable

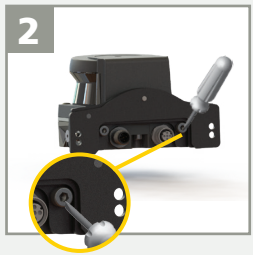
Power cable / 3 lenghts (2m, 3m, 5m)

## DEVICE INSTALLATION

### 1 MOUNTING




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



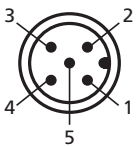

Mount the mounting bracket onto the back of the laser scanner using two M5 hexagon socket head cap screws.

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.

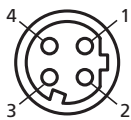
### 2 WIRING & PIN ASSIGNMENT

Power/output: A-coded



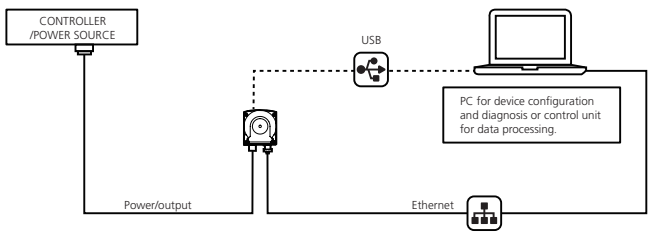

| | | |
|---|---|---|
| 1 | VIN+ | Brown |
| 2 | OUT1 | White |
| 3 | GND | Blue |
| 4 | OUT2 | Black |
| 5 | Not Connected | |

Ethernet: D-coded




| | |
|---|---|
| 1 | TX+ |
| 2 | RX+ |
| 3 | TX– |
| 4 | RX– |

### 3 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://eu.beasensors.com/en/bea-tools/>

## LED INDICATION

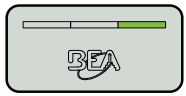
### LED 1 : Power status

- Power off. No supply voltage.
- * Power on.
- External power supply error.

### LED 2 : Ethernet Connectivity

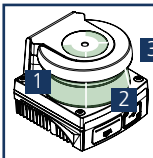
- No ethernet connection.
- * Ethernet connection established, no measure-ment data transfer.
- * x3 Ethernet measurement data transmission (default off).

### LED 3 : Sensor status



- Power off. No supply voltage.
- * Normal operation, no error.
- Internal error.
- Fatal error.

* NOTE : BEA Logo and green indications can be turned OFF




LED 1, 2 & 3 also flash orange to notify the level of contamination of the left/central/ right part of the optical window. For further details, please refer to troubleshooting.

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

## TROUBLESHOOTING

| | | | |
|---|---|---|---|
| | All LED are OFF | Power off | Check cables and connections. |
| | | All LED are turned OFF | Check LED settings. |
| | LED 1 is permanently red. | Power supply is out of limit. | Check the power supply. |
| | LED 2 is off. | Ethernet connection is not established. | Check ethernet cable and connections. |
| | LED 3 is permanently orange. | Internal error. | Reboot sensor. |
| | LED 3 is permanently red. | Fatal error. | Send sensor back for a technical check-up. |
| × 1 | LED 1 is flashes 1 x every 2 seconds. | Contamination in the left side of the optical window 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. | Contamination in the center of the optical window 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. | Contamination in the right side of the optical window 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. | Contamination in the left side of the optical window 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. | Contamination in the center of the optical window 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. | Contamination in the right side of the optical window has reached the error threshold. | Clean the optical window by wiping it with a clean damp cloth. |

## 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) | ≤ 3 mm (0.08 – 7 m); ≤ 6 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/EN 60529) |
| Dimensions | 73.8 mm (H) x 80.2 mm (W) x 85.5 mm (D) (not including connectors)<br>(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/EN 61496-3) |
| **EMC** | |
| Class of immunity | Industrial environments (IEC/EN 61000-6-2) |
| Class of emission | Commercial environments (IEC/EN 61000-6-3) |

| | |
|---|---|
| **Vibration resistance** | |
| Class | 5M2 (IEC/EN 60721-3-5) |
| Sinusoidal vibrations | 3.5 mm, 5 – 9 Hz (IEC/EN 60721-3-5) |
| | 1.0 g, 9 – 200 Hz (IEC/EN 60721-3-5) |
| | 1.5 g, 200 – 500 Hz (IEC/EN 60721-3-5) |
| | 0.35 mm, 10 – 55 Hz (IEC/EN 60068-2-6) |
| **Shock resistance** | |
| Class | 5M2 (IEC/EN 60721-3-5) |
| Single shock | 15 g, 11 ms, 3 shocks per axis (IEC/EN 60721-3-5) |
| Continuous shock | 10 g, 16 ms, 1000 shocks per axis (IEC/EN 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.

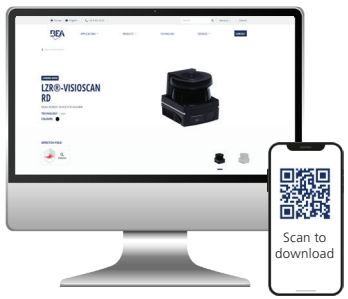
*Specifications are subject to changes without prior notice.*
*All values measured in specific conditions.*

## 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:
**https://eu.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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A **Halma** company

BEA hereby declares that this product is in conformity with European legislation 2014/30/EU (EMC) and 2011/65/EU (RoHS).
The complete declaration of conformity is available on our website.

This product should be disposed of separately from unsorted municipal waste.