LZR® -H100
LASER SCANNER FOR BARRIERS & GATES
with max. detection range of 32’ × 32’

User’s Guide
READ BEFORE BEGINNING INSTALLATION/PROGRAMMING/SET-UP

SAFETY

The device emits invisible (IR) and visible laser radiation.
- IR laser: wavelength 905nm; output power 0.10mW (Class 1 according to IEC 60825-1)
- Visible laser: wavelength 635nm; output power 0.95mW (Class 2 according to IEC 60825-1)

The visible laser beams are inactive during normal operation. The installer can activate the visible lasers if needed.

Do not stare into visible laser beams.

CAUTION!
Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This sensor is designed to be used as a movement and presence sensor to control the opening and the closing process of a gate or a barrier. The installer of the system is responsible for installing the sensor and the system in compliance with applicable national and international standards on safety. The manufacturer of the sensor cannot be held responsible for incorrect installations or inappropriate adjustments of the sensor.

This device is not intended for use in with any automatically activated doors. US Pat. No. 7,084,388, which is not owned by BEA, covers automatic doors comprising, among other things, a scanning detector. The LZR-H100 is not sold with consent, implied or otherwise, for use with automatically activated doors, as set forth in the aforementioned patent.

INSTALLATION AND MAINTENANCE

Avoid extreme vibrations.
Avoid covering the laser windows.
Avoid moving objects and light sources in front of the laser window.
Avoid the presence of smoke and fog in the detection field.
Avoid condensation on the laser windows.
Avoid exposure to sudden and extreme temperature changes.
Avoid direct exposure to high pressure cleaning.
Do not use aggressive products to clean the laser windows.
Clean the laser window with compressed air. If needed, wipe only with a soft, clean and damp microfibre cloth.
Keep the sensor permanently powered in environments where the temperature can drop below 35 °F.
DESCRIPTION

1. laser window – emission
2. laser window – reception
3. LED signals (4)
4. screws for position lock (2)
5. connector
6. protection cover
7. visible laser beams (3)
8. notches for tilt angle adjustment (2)
9. adjustable bracket
10. cable conduits (4)

LED SIGNAL

1. Detection LED: R1 – opening field
2. Detection LED: R2 – safety field
3. Error LED
4. Power LED

**DETENTION LEDs**
- red: detection
- green: no detection

**ERROR LED**
- orange: error
- off: no error

**POWER LED**
- blue: power
- off: no power

All 4 LEDs can be switched off and on again by remote control. This can be useful in cases where the sensor should not draw any attention.

SYMBOLS

- Caution! Laser radiation
- Remote control sequence
- Possible remote control adjustments
- Factory values
- Alarm
- Tip
- Quick installation
HOW TO USE THE REMOTE CONTROL

After unlocking, the red LED flashes and the sensor can be adjusted by remote control.

If the red LED flashes quickly after unlocking, you need to enter an access code from 1 to 4 digits.

To end an adjustment session, always lock the sensor.

ADJUSTING ONE OR MORE PARAMETERS

CHECKING A VALUE

RESTORING TO FACTORY VALUES

SAVING AN ACCESS CODE

The access code is recommended for sensors installed close to each other.

DELETING AN ACCESS CODE

Enter the existing code

30 minutes after last use, the sensor locks access to the remote control session. To regain access, cycle the power. The remote control session will then be accessible for another 30 minutes.
It is important to understand the basic setup features before installing the sensor.

**VISIBLE RED LASER BEAMS**

The sensor and detection field position are very important for the safe operation of the barrier.

In order to position the sensor correctly, use the 3 visible red laser beams.

The visible laser beams are also used to determine the location of the reference of the sensor.

**REFERENCE**

The sensor must learn a reference when the safety field is the only protection against contact between the vehicle and the boom.

The reference can be adjusted on any type of object already present on site (wall, tree, barrier boom support) or on a post.

Always make sure the object on which the reference is adjusted:
- is positioned in the continuity of the 0° laser beam
- is positioned min. at the end of the barrier or farther away than the end of the barrier
- has a surface of at least 6 inches
- is firmly fixed to the floor and not subject to vibrations

FOR BEST RESULTS:
- use the reflective sticker
- place the sticker horizontally on the structure (as shown)
- center the laser’s red spot on the reflector

Use reflective sticker (supplied) when the distance between sensor and reference is higher than 16.5 feet.

**SAFETY FIELD**

If the safety field is the only protection against contact with the barrier, the safety field of the sensor must be situated directly below the barrier.

This is only possible when the sensor is positioned correctly and the reference has been learned.

If the reference is situated at the end of the barrier, the detection field width is the same as the reference distance.

If the reference is farther away, adjust the detection field width to the width of the barrier.

In order to maximize safety for mixed traffic (vehicles and trucks), an additional vertical detection zone is recommended (LZR-I30).
These requirements ensure optimal safety of the barrier in order to protect against contact with the barrier.

**DOUBLE ACCESS LANE**

- 2 LZR-H100
- 2 references, 1 for each sensor

**SINGLE ACCESS LANE**

- 2 LZR-H100
- 1 reference
RECOMMENDED MOUNTING

Install the sensor at a mounting height between 14 – 17 inches. If the barrier is only used by trucks, the mounting height may be increased.

Ensure that the detection field is parallel to the barrier.

When using the safety field, place the sensor just behind the barrier to ensure that the safety field protects the area around the barrier.

Ensure there are no obstructions in front of the sensor!

If the 0° reference beam is too low or too high, vehicle contact with the barrier may occur.

Do not position the detection field as shown.

When using the safety, do not place the sensor before the barrier (A) or more than 15 inches after the barrier (B). The area around the barrier is not safe.

Do not cover the front face of the sensor with glass or plastic.

<table>
<thead>
<tr>
<th>d (in)</th>
<th>Lmin (in)</th>
<th>hmin (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9.5</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>2.3</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>2.5</td>
</tr>
</tbody>
</table>
1 MOUNTING

Carefully read the application requirements and tips before mounting the sensor. Mounting position of the sensor is crucial for safe operation of the barrier.

a. Use a mounting post or a mounting accessory (e.g. LBA accessory) to secure the sensor to the pole.

b. Position the bracket and secure using the 4 screws to avoid vibrations.

c. Open the protection cover, plug the connector and position the cable in the raceway.

d. Firmly close the protection cover. Do not pinch the cable.

e. Position the housing on the bracket.

f. Turn the sensor until the two triangles are aligned.

2 WIRING

Use the visual aid below to ensure correct wiring to the door control.

- **WIRE COLORS**
  - Red (+)
  - Black (-)
  - White
  - Green
  - White/Black
  - Green/White
  - Blue (+)
  - Blue/White (-)
  - Orange
  - Orange/Black

- **FUNCTION**
  - Power supply (10 – 35 VDC)
  - Relay 1: Opening Field
  - Relay 2: Safety Field
  - Test
  - Learn

- **LED signal at power-on:**
  - Correct positioning is needed

- **Power on without test signal:**
  - Connect blue/white and blue wires to test or power supply.

- **No test function:**
  - Connect BLUE (DC+) and BLUE/WHITE (DC-) to power supply. (no polarity)

- **No detection**
- **Safety and opening detection**
**FIELD POSITIONING**

*The detection field and reference position are very important for safe operation of the barrier.*

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**a**

Activate the visible laser beams by remote control to position the sensor fields correctly.

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**b**

Use a sheet of white paper to verify that the laser beam is positioned at 0°. The reference point can be adjusted on any object at the end of the barrier or farther away. Its surface should be at least 6 inches wide and it must be secured. Use the reflective sticker when the distance between sensor and reference is more than 16 feet (see page 4).

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**c**

- The reference must be parallel to the barrier.
- The beginning of the opening field should be approximately 15 inches above the ground.

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**d**

To finish, lock the sensor position using a screwdriver.

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**REFERENCE**

- Turn the sensor slightly on its axis to adjust the lateral angle of the sensor to place the 0° laser spot on the reference.

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To turn off the beams, use the same sequence. After 15 minutes, the beams turn off automatically.
Select the correct mounting side with or without reference.

For best detection performance, use the sensor with the reference point.

WITH REFERENCE
(RECOMMENDED)

WITHOUT REFERENCE

By default, the sensor automatically adjusts the width of the safety field based on the reference.
5 SAFETY FIELD

FIELD DIMENSIONS

Before launching a learn, the field dimensions can be adjusted by remote control. *Dimensions must be entered using the metric system - convert if necessary.*

Value C must be adapted to the width of the barrier:
- when the reference point is farther away than the desired detection field width
- when a mounting side without reference has been selected

<table>
<thead>
<tr>
<th>WIDTH</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

auto-set to reference:

<table>
<thead>
<tr>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>9.6</td>
</tr>
</tbody>
</table>

* without reference, the width will be automatically set to 9.9 m

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>9.6</td>
</tr>
<tr>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>

EX: C D 1 5 for a field depth of 1.5 m

You can also increase or decrease the field in increments of 10 cm:

<table>
<thead>
<tr>
<th>WIDTH</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

LEARN

Launch a learn by remote control. You have 3 seconds to step out of the detection field. Then wait for the sensor to learn its environment (30 seconds).

During the learn, the detection field must be free of snow buildups, heavy rain, snowfall, fog or other moving objects.

If you walk along the detection area while the learn function is active, the sensor memorizes the outline of the walk path and stores this as a new detection field. The shortest distance measured by each laser beam is stored by the sensor and determines the field limit.

Once the sensor has finished the learn, make sure that the safety field is correctly configured and that the area around the barrier or gate is safe.

Always launch a new learn after adjusting the field dimensions.

If the safety field is the only protection against contact with the boom, the safety field of the sensor must be situated right under the barrier. This is only possible when the sensor is positioned correctly and the reference has been learned.

The safety field is necessary for the correct functioning of the installation. If the safety field is badly adjusted, the manufacturer of the sensor cannot be held responsible for inappropriate functioning of the installation. Always verify the correct functioning of the safety field before leaving the premisses.
6 OPENING FIELD

FIELD DIMENSIONS

Before launching a learn, the field dimensions can be adjusted by remote control. Dimensions must be entered using the metric system - convert if necessary.

WIDTH

<table>
<thead>
<tr>
<th>A</th>
<th>00</th>
<th>0.5</th>
<th>9.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>same width as safety field</td>
<td>0.5 m</td>
<td>9.6 m</td>
<td></td>
</tr>
</tbody>
</table>

DEPTH

<table>
<thead>
<tr>
<th>B</th>
<th>00</th>
<th>0.5</th>
<th>9.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>if no opening field is needed*</td>
<td>0.5 m</td>
<td>9.6 m</td>
<td></td>
</tr>
</tbody>
</table>

* Setting the Opening Field to 00 will eliminate its output and LED function.

EX: 3-B-5-0 for a field depth of 5 m

You can also increase or decrease the field in increments of 10 cm:

A + -  B + -

LEARN

Launch a learn by remote control. You have 3 seconds to step out of the detection field. Then wait for the sensor to learn its environment (45 seconds).

During the learn, the detection field must be free of snow buildups, heavy rain, snowfall, fog or other moving objects.

If you walk along the detection area while the learn function is active, the sensor memorizes the outline of the walk path and stores this as a new detection field. The shortest distance measured by each laser beam is stored by the sensor and determines the field limit.

If the 1st red LED stays ON and no moving objects are in the detection field, reduce the opening field size or launch a new learn.

Always launch a new learn after adjusting the field dimensions.
REMOTE CONTROL ADJUSTMENTS (OPTIONAL)

PEDESTRIAN FILTER
opening field

Select value 3 or higher to reject pedestrians. All objects wider than the selected size will be detected.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>off</td>
<td>50 cm</td>
<td>65 cm</td>
<td>72 cm</td>
<td>100 cm</td>
<td>120 cm</td>
</tr>
</tbody>
</table>

MAX. PRESENCE TIME
opening field

STANDSTILL IN OPENING FIELD:
Select the amount of time R1 should stay active after an object becomes still in the opening field.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>off</td>
<td>5 sec</td>
<td>10 sec</td>
<td>30 sec</td>
<td>1 min</td>
<td>2 min</td>
<td>5 min</td>
<td>10 min</td>
<td>2 hour</td>
<td>∞</td>
</tr>
</tbody>
</table>

DETECTION DELAY
opening field

ENVIRONMENT FILTER:
Increase value in case of heavy rain, snow, or moving objects in the environment.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>off</td>
<td>100 ms</td>
<td>200 ms</td>
<td>300 ms</td>
<td>400 ms</td>
<td>500 ms</td>
<td>600 ms</td>
<td>700 ms</td>
<td>800 ms</td>
<td>900 ms</td>
</tr>
</tbody>
</table>

OUTPUT FUNCTION

RELAY 1
motion

RELAY 2
presence

motion or presence

motion + presence

OUTPUT CONFIGURATION

RELAY 1
A – NO

RELAY 2
P – NC

FACTORY VALUE
## REMOTE CONTROL ADJUSTMENTS (OPTIONAL)

### DETECTION TRAJECTORY

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIDIRECTIONAL</strong></td>
<td>bidirectional detection approaching + departing</td>
<td><img src="image1" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI 400%</strong></td>
<td>unidirectional detection only approaching in any direction</td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI 200%</strong></td>
<td>unidirectional detection only approaching towards the barrier/gate</td>
<td><img src="image3" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI 100%</strong></td>
<td>unidirectional detection only approaching within width of barrier/gate</td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI 50%</strong></td>
<td>unidirectional detection only approaching towards central zone of barrier/gate</td>
<td><img src="image5" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI CENTER</strong></td>
<td>unidirectional detection only approaching towards center of barrier/gate</td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI RIGHT</strong></td>
<td>unidirectional detection only approaching towards right side of barrier/gate</td>
<td><img src="image7" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>UNI LEFT</strong></td>
<td>unidirectional detection only approaching towards left side of barrier/gate</td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
</tbody>
</table>

### IMMUNITY

- **standard**
- **high**

*NOTE: Select "high" if fog is causing unwanted detections.*

### MAGIC WAND

- **learn safety field**
- **learn opening field**
- **factory values**
- **visible laser beams**
# TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No blue LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only blue LED is on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection LED remains green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection LED remains red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange LED flashing and detection LEDs are red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange LED is on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor does not respond to the remote control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor does not unlock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### No power
- Polarity of power supply is inverted
  - Check the polarity of the power supply.
- All LEDs have been deactivated by remote control
  - Activate LEDs using remote control.

### No power
- Check cable and connection.

### Only blue LED is on
- Test input is not connected
  - Check wiring. The blue and blue/white cable must be connected to the test input or the power supply.

### All LEDs have been deactivated by remote control
- Activate LEDs using remote control.

### Detection field too small or deactivated
- Check size of fields.
- Launch a Learn.

### Object size is too small
- Decrease minimum object size.

### Someone/Something is in the detection field
- Step out of the field and/or remove the any object(s) from the field.
- Activate the 3 red beams and check if the position of the sensor is correct. If not, adjust the hex screws.
- Verify the field size.
- Launch a Learn.

### No background (reference point) is found
- Check position of sensor.
- Check the mounting side setting. If no reference point is found, set the mounting side to value 3 to 5.
- Launch a new Learn.

### Sensor is masked
- Verify and clean the front screens with a damp cloth.

### Power supply voltage exceeds acceptable limits
- Check power supply voltage.

### Sensor exceeds temperature limits
- Verify the temperature of the environment. Protect the sensor from sunlight using a cover, if necessary.

### Internal error
- Wait a few seconds. If the LED remains ON, reset the power supply. If the LED turns on again, replace the sensor.

### 30 minutes after last use, sensor locks access to RC
- Cut and restore power supply. RC is accessible again for 30 minutes.

### Remote control batteries not installed properly or are dead
- Check battery orientation or replace the batteries.

### Remote control not pointed correctly
- Point the remote control towards the sensor, but with a slight angle. The RC should not be pointed in a right angle in front of the sensor.

### Reflective object is close to the sensor
- Avoid highly reflective material in proximity to the sensor.

### Access code needs entered or an incorrect code was used
- Cut and restore power supply. No code is required to unlock during the first minute after powering.

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Can’t find your answer? Visit www.beainc.com or scan QR code for Frequently Asked Questions!
BEA, Inc., the sensor manufacturer, cannot be held responsible for incorrect installations or inappropriate adjustments of the sensor/device; therefore, BEA, Inc. does not guarantee any use of the sensor outside of its intended purpose. BEA, Inc. strongly recommends that installation and service technicians be AAADM-certified for pedestrian doors, IDA-certified for doors/gates, and factory-trained for the type of door/gate system. Installers and service personnel are responsible for executing a risk assessment following each installation/service performed, ensuring that the sensor system installation is compliant with local, national, and international regulations, codes, and standards. Once installation or service work is complete, a safety inspection of the door/gate shall be performed per the door/gate manufacturer recommendations and/or per AAADM/ANSI/DASMA guidelines (where applicable) for best industry practices. Safety inspections must be performed during each service call – examples of these safety inspections can be found on an AAADM safety information label (e.g. ANSI/DASMA 102, ANSI/DASMA 107). Verify that all appropriate industry signage and warning labels are in place.

**BEA, INC. INSTALLATION/SERVICE COMPLIANCE EXPECTATIONS**

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Verify that all appropriate industry signage and warning labels are in place.

**TECHNICAL SPECIFICATIONS**

| Technology: | laser scanner, time-of-flight measurement (4 laser curtains) |
| Detection mode: | motion and presence |
| Max. detection field: | 32' x 32' (9 ¼ m) |
| Min. detection field (safety): | 1' 8" (½ m) |
| Remission factor: | > 2% |
| Angular resolution: | 0.3516° |
| Emission characteristics | wavelength 905 nm; output power 0.10mW (CLASS 1) |
| IR laser: | wavelength 635 nm; output power 0.95mW (CLASS 2) |
| Supply voltage: | 10 – 35 VDC |
| Power consumption: | < 5 W |
| Peak current @ power-on: | 1.8 A (max. 80 ms @ 35 V) |
| Cable length: | 33' |
| Response time: | Motion detection: typ. 200 ms (adjustable) |
| Presence detection: | typ. 20 ms (max. 80 ms) |
| Output: | 2 electronic relays (galvanic-isolated – polarity-free) |
| Max. switching voltage: | 35 VDC / 24 VAC |
| Max. switching current: | 80 mA (resistive) |
| Switching time: | $t_{ON} = 5$ ms; $t_{OFF} = 5$ ms |
| Output resistance: | typ 30 $\Omega$ |
| Voltage drop on output: | < 0.7 V @ 20 mA |
| Leakage current: | < 10 μA |
| Test input: | 2 optocouplers (galvanic-isolated – polarity-free) |
| Max. contact voltage: | 30 VDC (over-voltage protected) |
| Voltage threshold: | Log. H: > 8 VDC  Log. L: < 3 VDC |
| LED signal: | 1 blue LED: power-on status |
| | 1 orange LED: error status |
| | 2 bi-colored LEDs: detection/output status (green = no detection, red = detection) |
| Dimensions: | 3 ¼" x 2 ¼" x 5" (W x H x D)  mounting bracket: + ½" |
| Material: | PC/ASA |
| Color: | Black |
| Mounting angles on bracket: | -45°, 0°, 45° |
| Rotation angles on bracket: | -5 – 5° (lockable) |
| Tilt angles on bracket: | -3 – 3° |
| Protection degree: | NEMA 4 / IP65 |
| Temperature range: | powered: -22 – 140 °F (-30 – 60 °C)  unpowered: 14 – 140 °F (-10 – 60 °C) |
| Humidity: | 0 – 95% non-condensing |
| Vibration: | < 2G |
| Pollution on front screen: | max. 30%, homogenous |

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

Tech Support & Customer Service: 1-800-523-2462
General Tech Questions: techservices-us@beasensors.com | Tech Docs: www.BEAsensors.com

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