

## LZR<sup>®</sup>-H100

### OPENING & SAFETY SENSOR FOR BARRIERS\*

\*Other applications of the device do not correspond to the intended purpose. The use on industrial doors is not permitted and infringe the patent EP 1 470 314 B1.

User's Guide for software version 0300 and higher  
(refer to tracking label on product)



## INTENDED USE

This sensor is designed to be used as a movement and presence sensor to control the opening and the closing process of a barrier.

## SAFETY



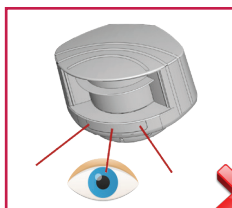
The device emits invisible IR and visible laser radiations.

The visible laser beams are inactive during normal functioning. The installer can activate the visible lasers if needed. Do not stare into the visible red laser beams.



### CAUTION!

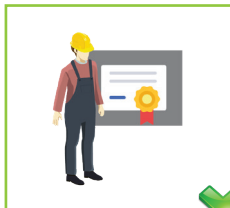
Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



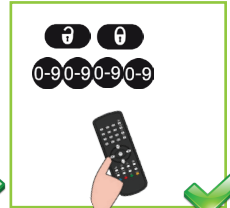
Do not stare into the visible red laser beams.



The warranty is void if unauthorized repairs are made or attempted by unauthorized personnel.



Only trained and qualified personnel may install and adjust the sensor.



After installation, enter an access code by remote control.



- 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.

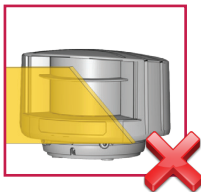
## INSTALLATION & MAINTENANCE



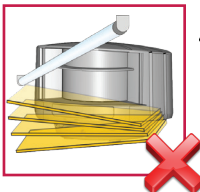
The presence of fog or smoke can cause the sensor to switch to detection to maintain the system's safety. This detection can therefore have consequences on the operation and availability of the system. Make sure that such occasional behaviour is compatible with your installation/application.



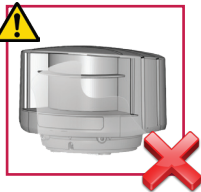
Avoid extreme vibrations.



Do not cover the laser windows.



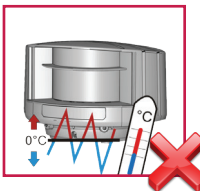
Avoid moving objects and light sources in front of the laser window.



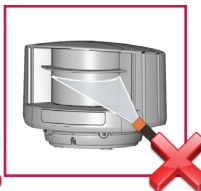
Avoid the presence of smoke and fog in the detection field.



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.

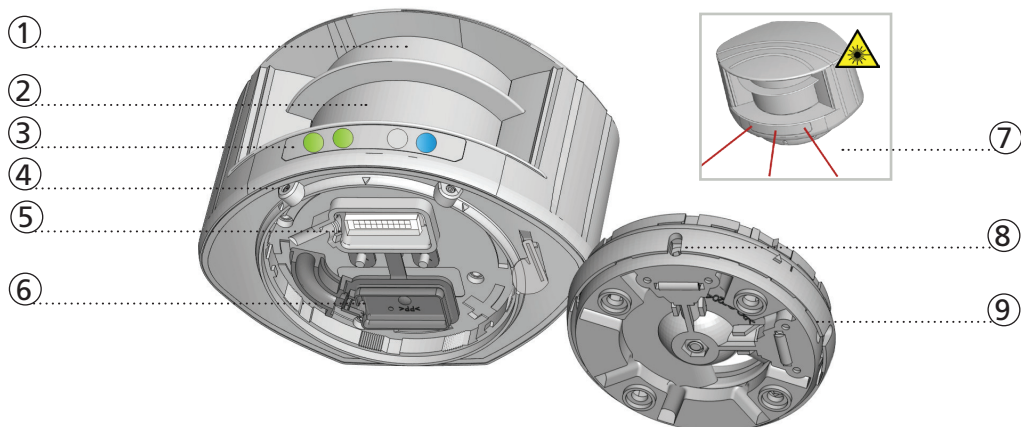


Clean the laser window with compressed air. If needed, wipe only with a soft, clean and damp microfiber cloth.



Keep the sensor permanently powered in environments where the temperature can descend below 0°C.








## DESCRIPTION



1. laser window - emission
2. laser window - reception
3. LED-signal
4. screws for position lock
5. connector
6. protection cover

7. visible laser beams
8. notch for tilt angle adjustment
9. adjustable bracket

## LED-SIGNALS

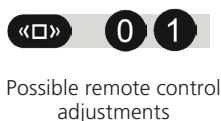
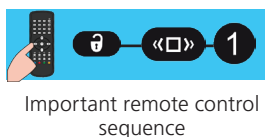
R1	R2	E	P	R1: Relay 1 - detection in opening field R2: Relay 2 - detection in safety field		detection		no detection
				E: Error status		error		no error
LED-signal at power-on				P: Power status		power		no power

	LED is on		LED flashes		LED flashes quickly		LED is off
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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.



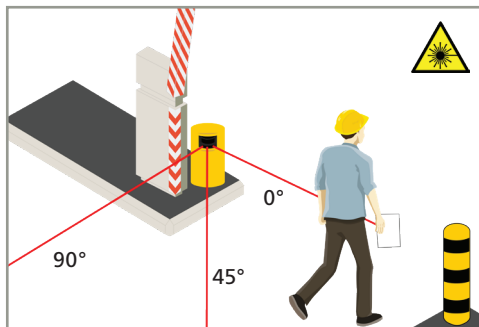
## SYMBOLS



## BASIC PRINCIPLES

It is important to understand some basic principles before installing the sensor and that all installation steps are carefully followed.

### VISIBLE RED LASER BEAMS



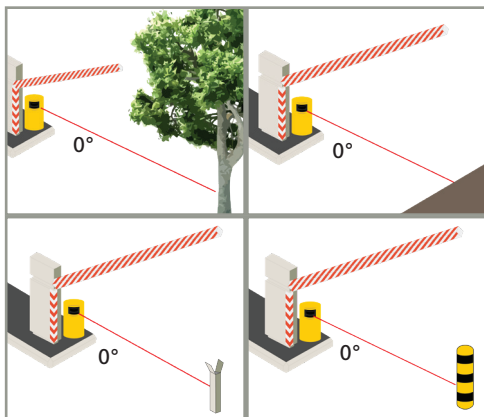
The sensor and detection field position are very important for the good functioning of the barrier.

In order to position the sensor correctly, it is possible to use a visual aid. 3 visible red laser beams can be activated by remote control:



The visible laser beams are also used to determine the reference of the sensor in order to ensure the safety of the barrier.

### REFERENCE



The sensor has to 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 boom or farther away than the end of the boom
- has a surface of  $\pm 10$  cm (min. 5 cm)
- is firmly fixed to the floor and not subject to vibrations.

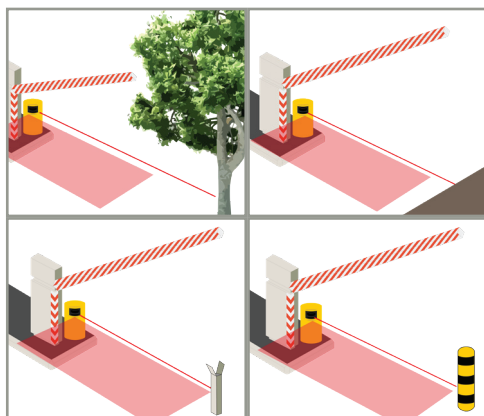
Always make sure the maximum distance for the teach-in of the reference is **9.90 m**. Above this distance, the teach-in won't be possible.

10 cm



Use reflective sticker when the distance between sensor and reference is higher than 5 m.

### SAFETY FIELD



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 boom.

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

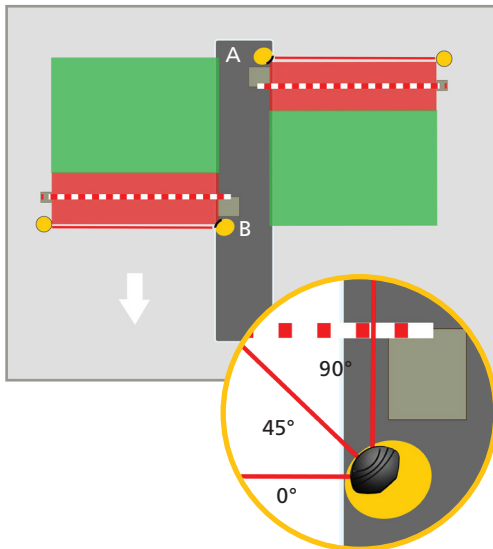
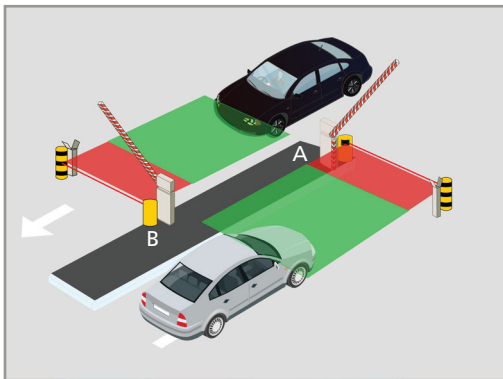
The detection field width must be adjusted to the hazardous area.

In order to maximise safety in case of mixed traffic (vehicles and trucks), an additional vertical detection zone is recommended (LZR-I100).

## APPLICATION REQUIREMENTS

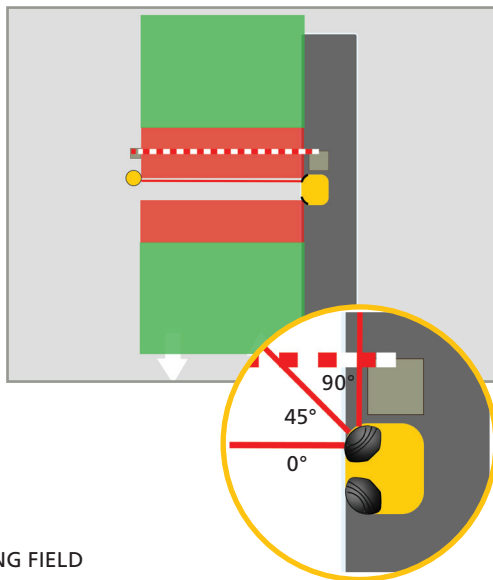
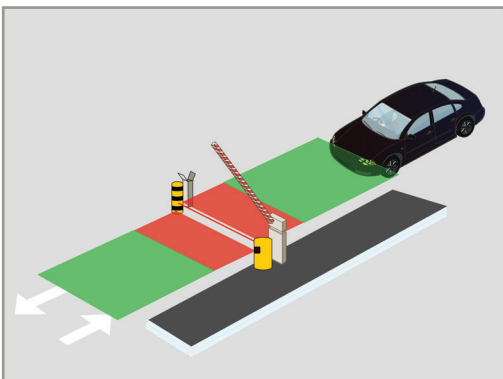
Below you can find our requirements to assure optimal safety of the barrier in order to protect against contact with the boom.

### DOUBLE ACCESS LANE



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

### SINGLE ACCESS LANE



- 2 LZR-H100
- 1 reference

 SAFETY FIELD

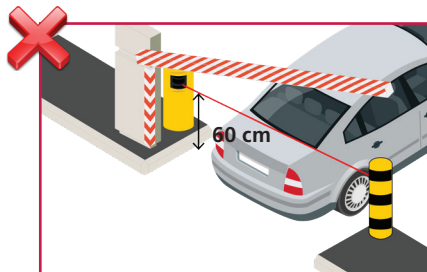
 OPENING FIELD



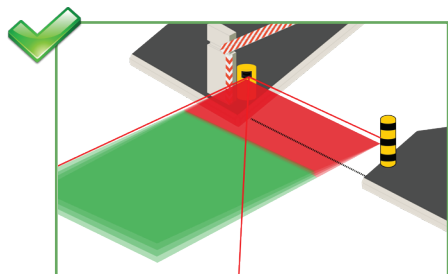
To optimize detection for high vehicles like trucks, add a vertical safety field just before the barrier (LZR-I100).



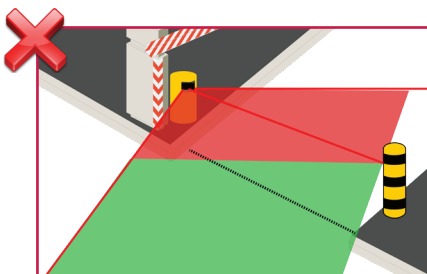
Install the sensor at a mounting height of 35 - 45 cm. If the barrier is only used by trucks, the mounting height can be increased.



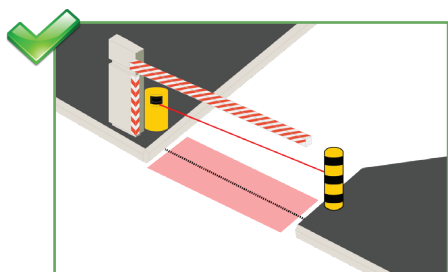
If the reference beam is too low or too high, contact with the boom cannot be excluded.



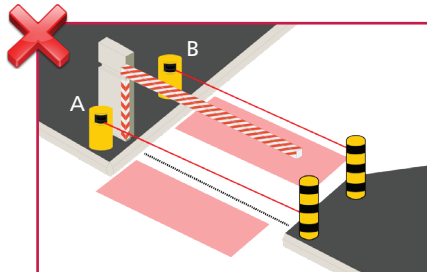
Make sure to place the detection field parallel to the boom.



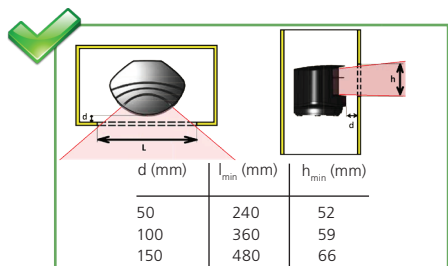
Do not position the detection field as shown.



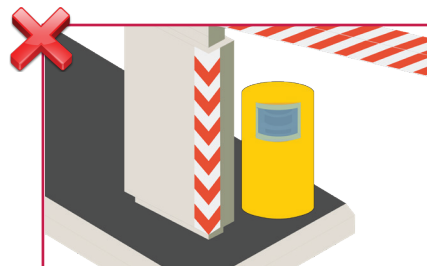
When using the safety, place the sensor just behind the barrier. This way the safety field protects the area around the boom.



When using the safety, do not place the sensor before the barrier (A) or more than 40 cm after the boom (B). The area around the boom is not safe.



Keep the front face of the sensor free!



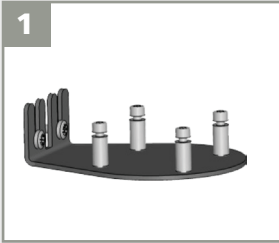
Do not cover the front face of the sensor with glass or plastic.

# 1 MOUNTING & WIRING



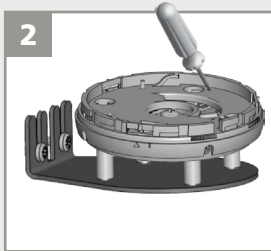
Carefully read the application requirements and tips before mounting the sensor.  
The mounting position of the sensor is crucial for the good functioning of the barrier.

1



Use a mounting post or a mounting bracket to fix the sensor on the pole.

2



Position the mounting bracket and fasten the 4 screws firmly in order to avoid vibrations.

3



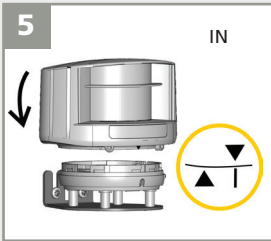
Open the protection cover, plug the connector and position the cable in the slit.

4



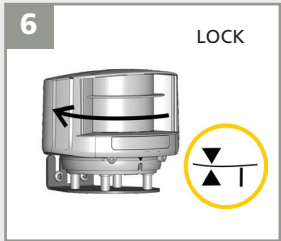
Close the protection cover and fasten it firmly.

5

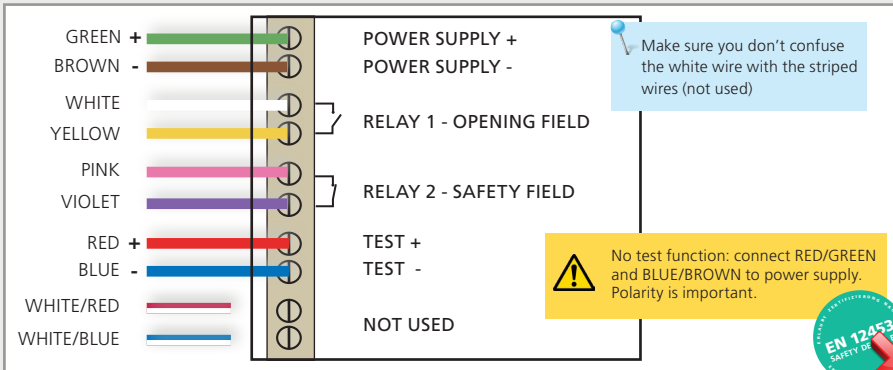


Position the housing on the mounting base.

6



Turn the sensor until the two triangles are face to face.



LED-signal at power-on: correct positioning is needed



Power on without test signal: connect red + blue to test or power supply.



No detection



Safety & opening detection

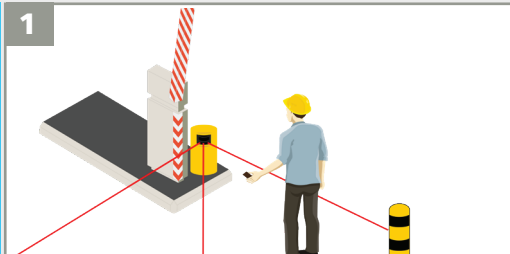


## 2 SENSOR POSITIONING



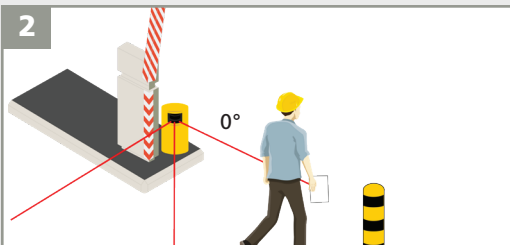
The detection field and reference position are very important for the good functioning of the barrier.

1



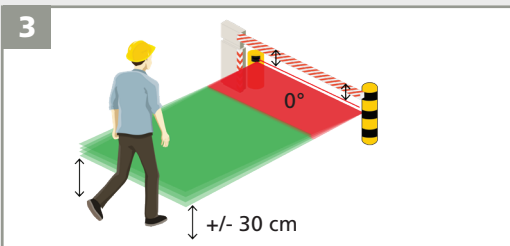
Activate the visible laser beams by remote control to position the sensor correctly.

2



Use a white paper to verify the position of the 0° laser beam. The reference point can be adjusted on any object at the end of the boom or farther away. Its surface should be +/- 10 cm and it must be firmly fixed. Use the reflective sticker when the distance between sensor and reference is higher than 5 m (see p. 4)

3

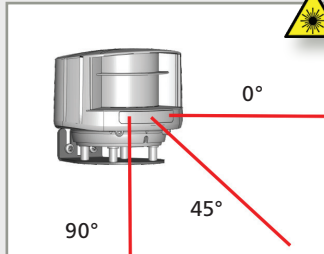


- The 0° spot must be parallel to the boom.
- The beginning of the opening field should be at midcalf height.

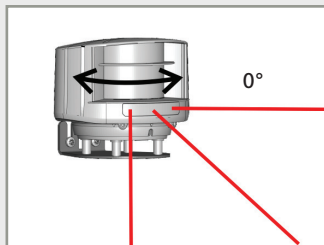
4



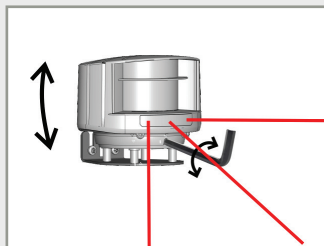
To finish, lock the sensor position by using a PH1 screwdriver.



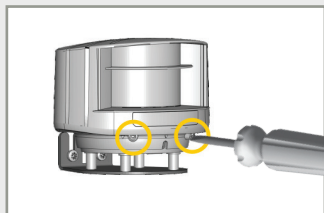
To turn them off, use the same sequence. After 15 min. the beams switch off automatically.



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



Adjust the tilt angle of the detection field with the hex key if necessary.





### 3 SENSOR CONFIGURATION

Follow the 5 next steps in order to correctly configure the sensor

#### 3 - 1/5 MOUNTING SIDE & REFERENCE

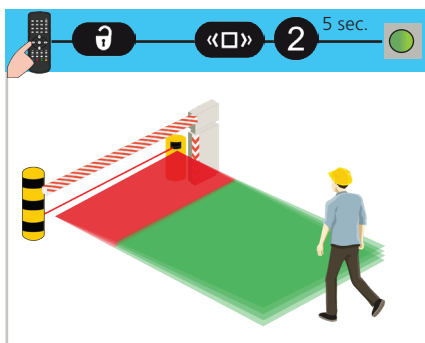
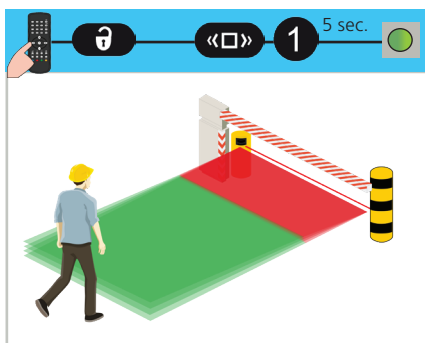
The first step consists in selecting the correct mounting side with or without reference

##### WITH REFERENCE

(RECOMMENDED)



The safety field secures the area around the boom and protects against contact with the boom in accordance with EN 12453 - safeguarding level E.

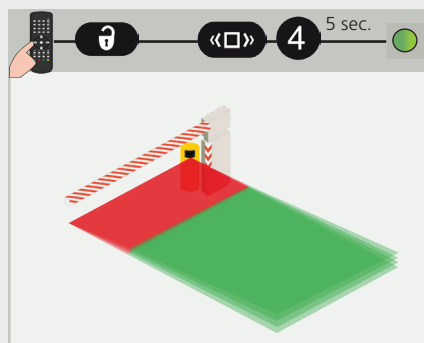
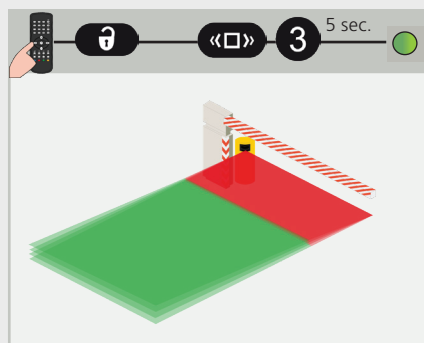


By default, the sensor automatically adjusts the width of the safety and opening field based on the reference distance minus an operational margin.

##### WITHOUT REFERENCE



The safety field detects the presence of a car, but the area around the boom is not secured according to EN 12453. Contact with the boom can not be excluded!



Install complementary safety devices for EN12453 compliance or use a mounting with reference point.

MOUNTED ON YOUR LEFT

MOUNTED ON YOUR RIGHT

INSTALLATION STEPS

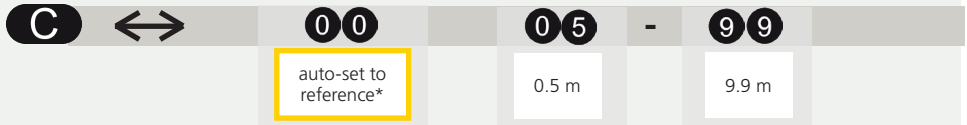
The next two steps consist in configuring the safety field

### 3 - 2/5

### SAFETY FIELD DIMENSIONS

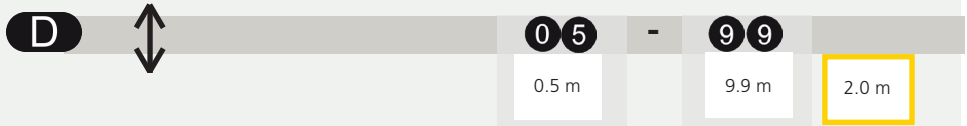
The field dimensions must be checked and, if necessary, must be adjusted by remote control.  
The width ( C ) must cover the hazardous area.

WIDTH



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

DEPTH



EX:



You can also increase or decrease the field by 10 cm:



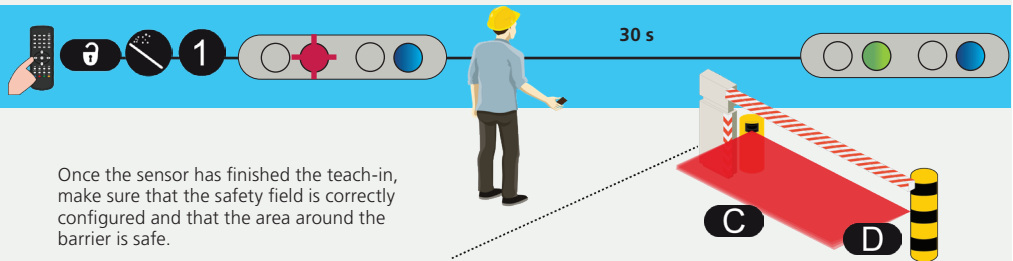
### 3 - 3/5

### SAFETY FIELD TEACH-IN

To cut out any objects inside the safety field like trees, fences, hedges it is required to perform a safety field teach-in.

Launch a teach-in 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 teach-in, the detection field must be free of snow buildups, heavy rain, snowfall, fog or other moving objects.



Once the sensor has finished the teach-in, make sure that the safety field is correctly configured and that the area around the barrier is safe.



Always launch a new teach-in 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 boom. 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 covering of the hazardous area before leaving the premises.

The next two steps consist in configuring the opening field

### 3 - 4/5

### OPENING FIELD DIMENSIONS

By default, the opening field width is equal to the safety field width.

If necessary, the field dimensions can be adjusted by remote control.

WIDTH



0 0

same width as  
safety field

MIN

0 5

0.5 m

-

MAX

9 9

9.9 m

DEPTH



0 0

if no opening  
field is  
needed

0 5

0.5 m

-

9 9

9.9 m

EX:



🔒 B 5 0

for a field depth of 5 m

You can also increase or decrease the field by 10 cm:



### 3 - 5/5

### OPENING FIELD TEACH-IN

To cut out any objects inside the opening field like trees, fences, hedges it is required to perform an opening field teach-in.

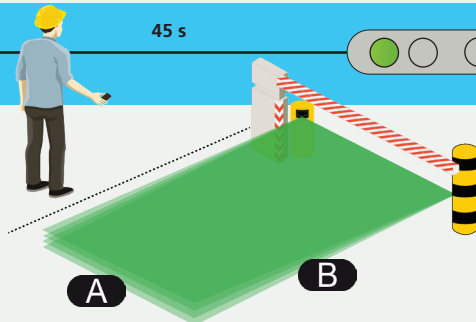
Launch a teach-in by remote control. You have 3 seconds to step out of the detection field.

Then wait for the sensor to learn its environment (45 seconds).

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



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 teach-in.

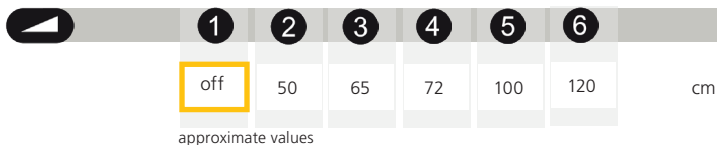


## 4 REMOTE CONTROL ADJUSTMENTS (OPTIONAL)

### PEDESTRIAN FILTER

opening field

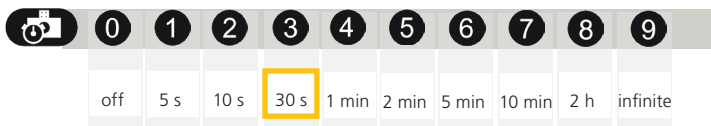
Select value 3 or higher to reject pedestrians. All objects wider than the chosen will be detected.



### MAX. PRESENCE TIME

opening field

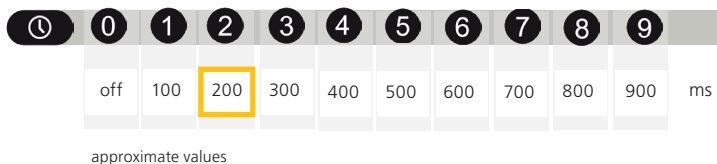
STANDSTILL IN OPENING FIELD: select the amount of time relay 1 should stay active in case a detected object stops in the opening field.



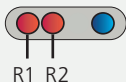
### DETECTION DELAY

opening field

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



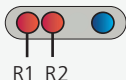
### OUTPUT FUNCTION



	F1	0	1	2	3
RELAY 1		motion	motion or presence	motion + presence	motion*
RELAY 2		presence	presence	presence	presence

\*Motion detection criteria automatically switch to safety detection criteria as soon as an object has met the conditions of the pedestrian filter, detection delay, detection trajectory and also if the object is in both the opening and safety fields

### OUTPUT CONFIGURATION



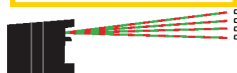
Test Response on R1 + R2					Test Response on R2			
	1	2	3	4	5	6	7	8
RELAY 1	NO	NC	NC	NO	NO	NC	NC	NO
RELAY 2	NC	NO	NC	NO	NC	NO	NC	NO

NO = normally open  
NC = normally closed

R1 = RELAY 1  
R2 = RELAY 2

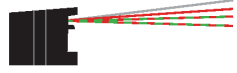
Ex1: All curtains are active on both fields (recommended)

F2 9 9 9 9



Ex2: C1 + C2 are active on both fields and C3 only for safety fields

F2 9 9 2 0



### ACTIVE DETECTION CURTAINS

F2 X X X X  
CURTAIN C1 C2 C3 C4

- 0 curtain is inactive on both fields
- 1 curtain is active on opening field
- 2 curtain is active on safety field
- 9 curtain is active on both fields

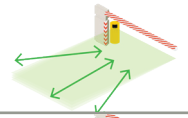
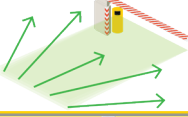
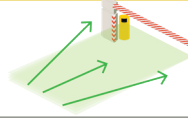
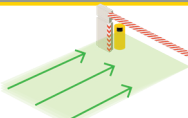
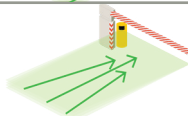
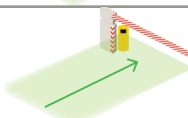
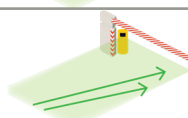
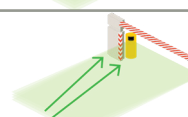
Always use maximum number of active curtains according to your environment and the objects to be excluded from the detection field

Active for safety field  
Active for opening field  
Inactive

## REMOTE CONTROL ADJUSTMENTS (OPTIONAL)

### DETECTION TRAJECTORY

opening field

←--→ 1 2 3 4 5 6 7 8			
BIDIRECTIONAL	bidirectional detection approaching + going away		1
UNI 400%	unidirectional detection only approaching in any direction		2
UNI 200%	unidirectional detection only approaching towards the barrier		3
UNI 100%	unidirectional detection only approaching within width of barrier		4
UNI 50%	unidirectional detection only approaching towards central zone of barrier		5
UNI CENTRE	unidirectional detection only approaching towards centre of barrier		6
UNI RIGHT	unidirectional detection only approaching towards right side		7
UNI LEFT	unidirectional detection only approaching towards left side		8

### IMMUNITY

	1	2	
	standard	high	select high if fog is causing unwanted detections

### MAGIC WAND

	1	2	9	
	teach-in safety field	teach-in opening field	factory values	visible laser beams

## HOW TO USE THE REMOTE CONTROL



After unlocking, the first LED flashes red 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



4 1 2 = field width: 4.2 m

3 = field width is defined by teach-in

### RESTORING TO FACTORY VALUES

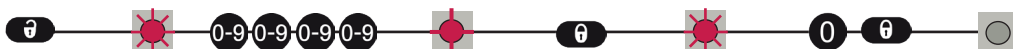


### SAVING AN ACCESS CODE

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



### DELETING AN ACCESS CODE













Enter the existing code



X = NUMBER OF FLASHES = VALUE OF THE PARAMETER

## TROUBLESHOOTING

	No blue LED	There is no power.	1 Check cable and connexion.
		The polarity of the power supply is inverted.	1 Check the polarity of the power supply.
		All LEDs have been deactivated by remote control.	1 Activate the LEDs by remote control:   4
	Only blue LED	Power on without test signal	1 Connect red and blue wires to test entrance or power supply.
	The detection LED remains green.	The detection field is too small or deactivated.	1 Check the size of the fields. 2 Launch a teach-in.
		The object size is too small.	1 Decrease the min. object size defined by the pedestrian filter.
	The detection LED remains red.	Someone or something is in the detection field.	1 Step out of the field and/or remove any object(s) from the field.
		The field is touching the floor, the wall or the barrier, which leads to detection.	1 Activate the 3 red beams and check if the position of the sensor is correct. If not, adjust the hex screws. 2 Verify the field size. 3 Launch a teach-in.
		No reference point is found.	1 Check the position of the sensor. 2 Check the position of the 0° red laser beam. 3 Check the size of and distance to the reference point and add a reflective sticker if needed. 4 Check the mounting side setting. If no reference is needed, set the mounting side to value 3 or 4. 5 Launch a new teach-in.
	The orange LED is flashing and the detection LEDs are red.	The sensor is masked.	1 Verify and clean the front screens with a damp cloth.
		The power supply voltage is exceeding the acceptable limits.	1 Check the power supply voltage.
	The orange LED is on.	The sensor exceeds its temperature limits.	1 Verify the outside temperature where the sensor is installed. Optionally protect the sensor from sunlight using a cover.
		Internal error	1 Wait a few seconds. If the LED remains ON, reset the power supply. If the LED turns on again, replace the sensor.
		The batteries in the remote control are not installed properly or dead.	1 Verify or replace the batteries.
	The sensor does not respond to the remote control.	The remote control is badly pointed.	1 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.
		A reflective object is in close proximity to the sensor.	1 Avoid highly reflective material in proximity to the sensor.
		You have to enter an access code or the wrong code was entered.	1 Cut and restore power supply. No code is required to unlock during the first minute after powering. Delete or change code.
	The sensor does not unlock.		

## TECHNICAL SPECIFICATIONS

<b>Technology</b>	LASER scanner, time-of-flight measurement (4 laser curtains)
<b>Detection mode</b>	Motion and presence
<b>Max. detection field</b>	9.9 m x 9.9 m
<b>Remission factor</b>	> 2 %
<b>Angular resolution</b>	0,3516 °
<b>Optical characteristics</b> (IEC/EN 60825-1)	IR LASER: Wavelength 905 nm; output power <0.10mW; Class 1 Visible LASER: Wavelength 635 nm; output power <1mW; Class 2
<b>Supply voltage</b>	10-35 V DC @ sensor side (to be operated from SELV compatible power supplies only)
<b>Power consumption</b>	< 5 W
<b>Peak current at power-on:</b>	1.8 A (max. 80 ms @ 35 V)
<b>Cable length:</b>	5 m (standard), max.: 10 m
<b>Response time</b>	
Motion detection:	typ. 200 ms (adjustable)
Presence detection:	typ. 20 ms; max. 80 ms
<b>Output:</b>	2 electronic relays (galvanic isolated - polarity free)
Max. switching voltage:	35 V DC / 24 V AC
Max. switching current:	80 mA (resistive)
Switching time:	$t_{ON}=5\text{ ms}$ ; $t_{OFF}=5\text{ ms}$
Output resistance:	typ 30 $\Omega$
Voltage drop on output:	< 0.7 V @ 20 mA
Leakage current:	< 10 $\mu$ A
<b>Test input:</b>	1 optocoupler (galvanic isolated - polarity free)
Max. contact voltage:	30 V DC (over-voltage protected)
Voltage threshold:	Log. H: >8 V DC; Log. L: <3 V DC
<b>LED-signal:</b>	1 blue LED: power-on status; 1 orange LED: error status; 2 bi-coloured LEDs: detection/output status (green: no detection; red: detection)
<b>Dimensions:</b>	125 mm (D) x 93 mm (W) x 70 mm (H) (with mounting bracket + 14 mm)
<b>Material / Colour:</b>	PC/ASA / black
<b>Mounting angles on bracket:</b>	-45 °, 0 °, 45 °
<b>Rotation angles on bracket:</b>	-5 ° to +5 ° (lockable)
<b>Tilt angles on bracket:</b>	-3 ° to +3 °
<b>Protection degree:</b>	IP65 (IEC/EN60529)
<b>Temperature range:</b>	-30 °C to +60 °C if powered; -10 °C to +60 °C unpowered
<b>Humidity:</b>	0-95 % non-condensing
<b>Vibrations:</b>	< 2 G
<b>Pollution on front screens:</b>	max. 30 %; homogenous
<b>Conformity:</b>	EN 12453 (level E) EN ISO 13849-1 (Pl "d" CAT 2); EN 62061 (SIL 2); EN 12978

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



BEA hereby declares that this product is in conformity with the European directives 2014/30/EU, 2006/42/EC, 2011/65/EU.

EC-type examination certificate from TÜV NORD CERT : 44 205 13089620

The complete declaration of conformity is available on our website.

This product should be disposed of separately from unsorted municipal waste

