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LZR[®]-FLATSCAN A

COMPACT LASER SENSOR FOR FACTORY &
LOGISTICS APPLICATIONS



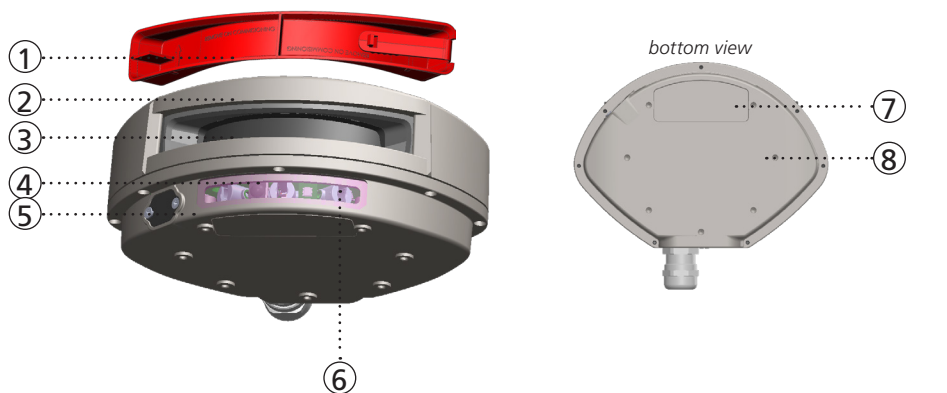
*Visit website for
available languages
of this document.*

User's Guide for product version 0101 and higher.
See product label for serial number.

DESCRIPTION

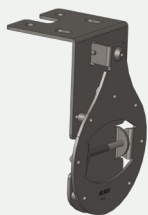
FLATSCAN A is a compact, single-curtain, laser sensor with an opening angle of 90°. The sensor provides high-resolution coverage with 400 spots and configurable object size detection according to the given application.

The laser sensor is CLASS 1 certified device according to IEC 60825-1. The visible laser beams are CLASS 2, and will automatically time out during normal operation.



1. Protective cover (to be removed after mounting)
2. Housing
3. Laser window
4. LED signal
5. USB connector (factory use only)
6. Visible laser beams
7. Internal calibration interface (DO NOT OPEN)
8. Screw hole

SOLD SEPARATELY - REQUIRED FOR INSTALLATION



LZR-FLATSCAN S Mounting Bracket
(10FSSMB)



Universal Remote Control
(10REMOTE)

TECHNICAL SPECIFICATIONS

TECHNOLOGY / PERFORMANCE

Technology	LASER sensor, time-of-flight measurement
Detection mode	presence
Max. detection range	max. 18' × 18' (13 1/8' @ 5% reflectivity)
Opening angle	90°
Tilt angles	±3° (with bracket)
Emission characteristics	wavelength 905nm; max. output pulse power 25W (CLASS 1) wavelength 635nm; max. output CW power 0.95mW (CLASS 2) visible spot
Angular resolution	0.23° (400 spots within 90°)
LEDs	1 tri-colored LED: detection / output status

ELECTRICAL

Supply voltage	12 – 24 VDC ±15%
Power consumption	≤ 2.3W, peak current: 1A
Response time	max. 50ms (+ output activation delay)
Output	1 opto (galvanic isolation - polarity free)
max. switching voltage	42 VAC/VDC
max. switching current	100mA
	1 relay (free of potential contact)
max. contact voltage	42 VAC/VDC
max. contact current	1A (resistive)
max. switching power	30W DC / 60 VAC

PHYSICAL

Dimensions	5" (L) × 3 1/2" (H) × 2" (D) (without bracket)
Color	black
Protection degree	IP66 (IEC 60529)
Temperature range (when powered)	-22 – 140 °F (-30 – 60 °C)
Humidity	0 – 95% non-condensing
Vibrations	< 2G





COMPLIANCE

Compliance	IEC 60825-1, IEC 60950-1, IEC 61000-6-2, IEC 61000-6-3, IEC 60529:2001
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*Specifications are subject to change without prior notice.
All values measured in specific conditions.*

LED SIGNALS

COLOR

-  detection
-  power on
-  error LED
-  no power

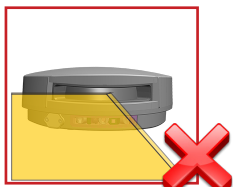
BEHAVIOR

-  LED flashes
-  LED flashes quickly
-  LED flashes slowly
-  LED is off

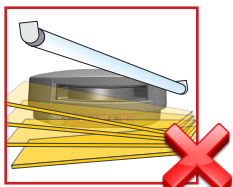
INSTALLATION AND MAINTENANCE NOTES



Avoid extreme vibrations.



Do not cover the laser window.



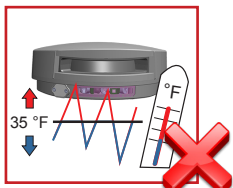
Avoid moving objects and light sources in the detection field.



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



Avoid condensation.



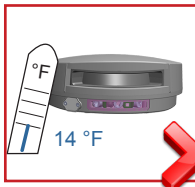
Avoid exposure to sudden and extreme temperature changes.



Avoid direct exposure to high pressure cleaning.



Do not use dry or dirty towels or aggressive products to clean the laser window.



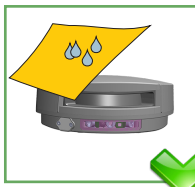
Keep the sensor permanently powered in environments where the temperature can drop below 14°F.



Do not look into the laser emitter or the visible red laser beams.



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



Clean the laser window with compressed air.

When needed, wipe the laser window only with a soft, clean, damp microfiber cloth.



Only trained and qualified personnel are recommended to install and set up the sensor.

SAFETY TIPS



The device contains IR and visible laser spots.

IR laser: wavelength 905nm; max. output pulse power 25W (Class 1 according to IEC 60825-1)

Visible laser: wavelength 635nm; max. output CW power 0.95mW (Class 2 according to IEC 60825-1)

The visible laser spots can be deactivated during normal operation. The installer can activate the visible spots if needed.



CAUTION!

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

Ensure compliance with applicable local, national, and international codes and standards.

SYMBOLS



Caution!
Laser radiation



Attention



Factory values



Note



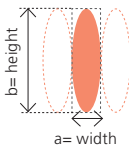
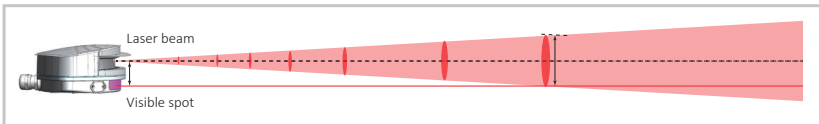
Remote control
sequence



Possible
remote control
adjustments

NOTES ON VISIBLE SPOTS

- Visible spots are used for the estimation of curtain coverage during the initial adjustment stage. For precise installation of the sensor, please evaluate your detection field and adjust curtain accordingly (see Detection Field, page 12).
- The shape of the laser spot is oval. The farther the laser spot emits, the more the spot diffuses. Refer to diagram below to calculate the position.
- A visible spot has around $\pm 1/2$ " deviation at 10' distance. Please ensure that the curtain is in the correct position.



Distance (ft)	b (in)	a (in)
3.28	0.49	0.06
6.56	0.98	0.12
9.84	1.48	0.18
13.12	1.97	0.24
16.40	2.46	0.30

1 MOUNTING

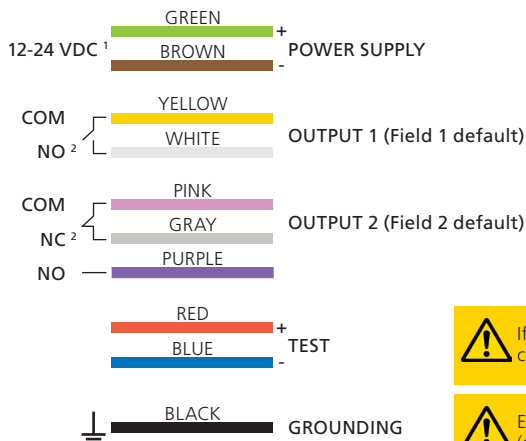
A mounting bracket is required for FLATSCAN A installation.

The instructions in this User's Guide assume the use of FLATSCAN S Mounting Bracket.

- Use the sensor mounting screws to secure the sensor to the bracket in the correct position (i.e. laser window at 90°).
- Use the Mounting Bracket mounting screws to secure bracket (with sensor) to the desired mounting location.
- If necessary, adjust the angle of the sensor by loosening and tightening the tilt angle screw of the FLATSCAN S Mounting Bracket. Fine-tuning the angle will be done later.
- Remove the red, protective cover from the laser window and ensure that nothing is obstructing the window.



2 WIRING



If test wires are not utilized, they must be connected to the sensor's power source.



Ensure that the sensor is properly grounded (connected to the earth).

- If only VAC power is available, a 12V transformer paired with a rectifier must be used. Do not use a 24V transformer and rectifier as this will cause damage to the product.
- Output status when sensor is operational (can be NO or NC). See page 14, OUTPUT CONFIGURATION.

3 FIELD POSITIONING

This section illustrates the field positioning in 3 possible applications (AGVs and AMRs, conveyor belts, and light curtains) and the respective field orientations (vertical or horizontal) for each.

Follow the instructions for your given application.

AGV & AMR: Horizontal Field

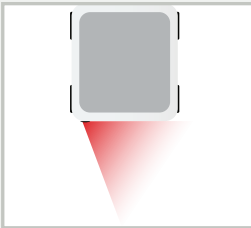
1. Activate visible spots.



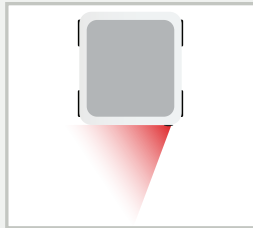
! Do not look directly into the visible beams!

This same key sequence will turn OFF the visible spots.

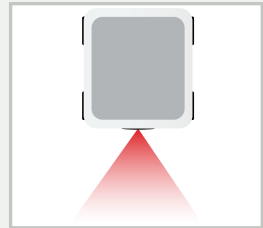
2. Select mounting side - left, right, or center.



LEFT
MOUNT



RIGHT
MOUNT



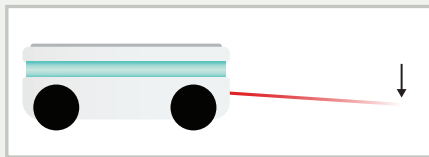
CENTER
MOUNT



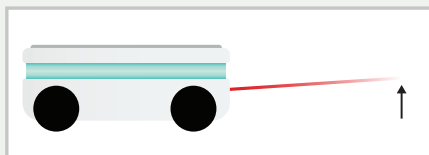
3. If necessary, position the field using the tilt angle screw. Loosen the screw to angle the field down and tighten the screw to angle the field up.

NOTE: See page 5 for more information on the visible spots.

LOOSEN
=
FIELD DOWN



TIGHTEN
=
FIELD UP



3 FIELD POSITIONING

CONVEYOR BELT: Vertical Field

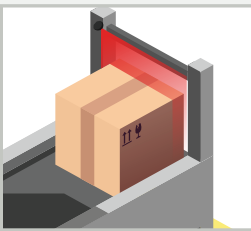
1. Activate visible spots.



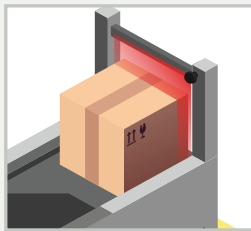
Do not look directly into the visible beams!

This same key sequence will turn OFF the visible spots.

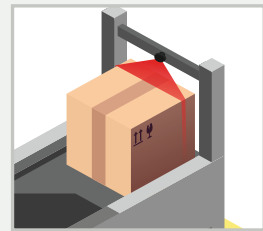
2. Select mounting side - left, right, or center.



LEFT
MOUNT



RIGHT
MOUNT



CENTER
MOUNT



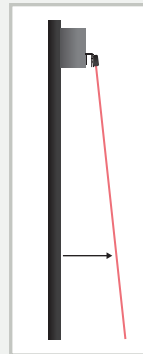
3. If necessary, position the field using the tilt angle screw. Loosen the screw to move the field closer to the opening and tighten the screw to move the field away from the opening.

NOTE: See page 5 for more information on the visible spots.

LOOSEN = FIELD IN



TIGHTEN = FIELD OUT



3 FIELD POSITIONING

LIGHT CURTAIN: Horizontal Field

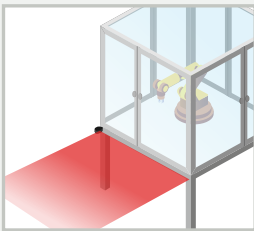
1. Activate visible spots.



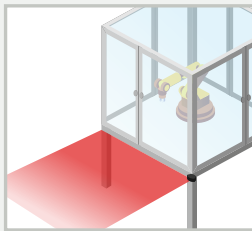
Do not look directly into the visible beams!

This same key sequence will turn OFF the visible spots.

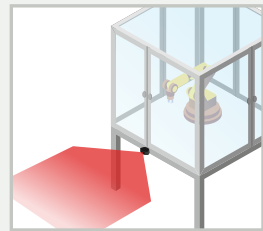
2. Select mounting side - left, right, or center.



LEFT
MOUNT



RIGHT
MOUNT



CENTER
MOUNT



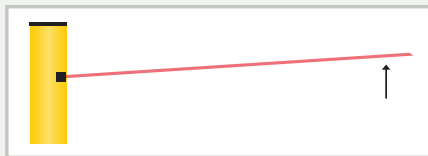
3. If necessary, position the field using the tilt angle screw. Loosen the screw to angle the field down and tighten the screw to angle the field up.

NOTE: See page 5 for more information on the visible spots.

LOOSEN
=
FIELD DOWN



TIGHTEN
=
FIELD UP



3 FIELD POSITIONING

LIGHT CURTAIN: Vertical Field

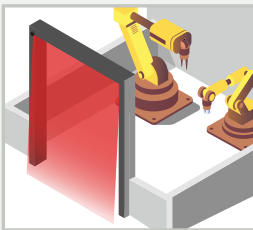
1. Activate visible spots.



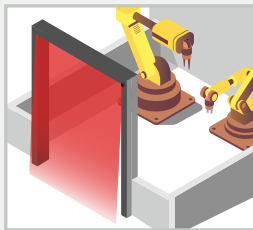
⚠ Do not look directly into the visible beams!

This same key sequence will turn OFF the visible spots.

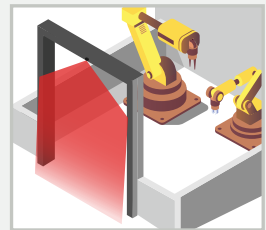
2. Select mounting side - left, right, or center.



LEFT MOUNT



RIGHT MOUNT



CENTER MOUNT



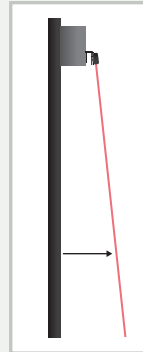
3. If necessary, position the field using the tilt angle screw. Loosen the screw to move the field closer to the threshold and tighten the screw to move the field away from the threshold.

NOTE: See page 5 for more information on the visible spots.

LOOSEN = FIELD IN



TIGHTEN = FIELD OUT



4 TEACH-IN

Use the following remote control key sequence to learn the detection area.

IMPORTANT: Be sure to clear the detection field before the teach-in process begins.

NOTE: If the Detection Field size is changed from the default, you must perform the appropriate teach-in for the given field.



REMOTE CONTROL SETTINGS (OPTIONAL)

DETECTION FIELD

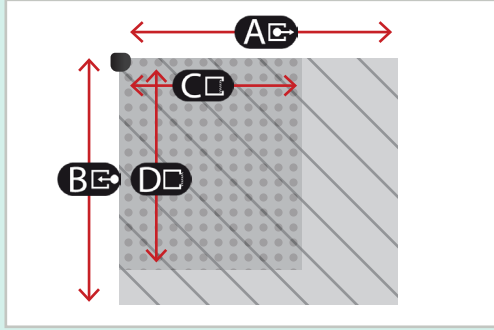
Customize the detection field by increasing/decreasing distances on both sides for both fields.

AE = FIELD 1, side 1

CE = FIELD 2, side 1

BE = FIELD 1, side 2

DE = FIELD 2, side 2



The FLATSCAN A sensor is configured to understand metric measurements.

If necessary, please convert your measurements from imperial to metric by multiplying your imperial measurements by 0.3.

FIELD 1	AE side 2	0 0 0	-	5 5 0	550 cm
	BE side 1	0 0 0	-	5 5 0	550 cm
FIELD 2*	CE side 2	0 0 0	-	5 5 0	550 cm
	DE side 1	0 0 0	-	5 5 0	550 cm

* Please note that the detection range can be guaranteed with 5% reflectivity at 13' diagonal when fog filter value is set to 0, if the fog filter value is not 0, then the guaranteed detection distance will be shortened with 5% reflectivity.

REMOTE CONTROL SETTINGS (OPTIONAL)

IMMUNITY FILTER

Increasing the immunity filter decreases false detections caused by environment interference such as rain and snow.

	1	2	3	4
	low	>	>	high

UNCOVERED ZONE

Uncovered zone allows the sensor to ignore the area close to ground (leaves, snow, etc).


F2	0	1	2	3	4	5	6	7	8	9
	2"	4"	6"	8"	10"	12"	14"	16"	18"	20"

Measured in specific conditions and determined by application and installation.

FOG FILTER

Fog filter helps increase sensor performance in areas with fog. Increasing the fog filter decreases interference from fog.

e.g. Environments with dense fog should choose higher settings.


	0	1	2	3	4	5	6
	158"	147"	137"	128"	118"	108"	98"

Note 1: The sensor will automatically launch teach-in with every adjustment. Ensure that the detection field is clear before the teach-in process begins.

Note 2: Measurements are max detection distances with a 5% reflective object.

MINIMUM OBJECT SIZE


Rejects object smaller than the specified object size.

	0	1	2	3	4	5	6	7	8	9
	off	2"	3"	4"	6"	8"	10"	12"	14"	16"

Based on full field size, not the current field size.

OUTPUT ACTIVATION DELAY

Output triggered when detection lasts longer than the specified time.

	0	1	2	3	4	5	6	7	8	9
	0 ms	100 ms	200 ms	300 ms	400 ms	500 ms	600 ms	700 ms	800 ms	900 ms

REMOTE CONTROL SETTINGS (OPTIONAL)

DETECTION AREA ACTIVATION

Turns on/off detection fields 1 or 2.

	0	1	2	9
	off	field 1	field 2	field 1 & field 2

DETECTION FIELD REDIRECTION

Redirects outputs of detection fields 1 or 2.

	F1	0	1	2	3
OUTPUT 1		field 1	field 2	field 1 or field 2	error alarm*
RELAY		field 2	field 1	error alarm*	field 1 or field 2

* errors associated with the LED behavior identified in TROUBLESHOOTING

OUTPUT CONFIGURATION (when powered)

		1	2	3	4
OUTPUT 1		NO	NC	NC	NO
RELAY*		NC	NO	NC	NO

NO = normally open
NC = normally closed

* RELAY default connection: pink/gray

ANTIMASKING & BACKGROUND

Antimasking: when laser window is covered, the sensor will go into error mode.

Background: sensor movement can cause a compromised background, sending the sensor into error mode

	0	1	2	3
antimasking	OFF	OFF	ON	ON
background*	OFF	ON	OFF	ON

* Do not set background to ON when sensor is mounted in a horizontal orientation. If done, this will cause the sensor to go into error mode.

LED ACTIVATION

	0	1
	LED off	LED on



IMPORTANT: Ensure compliance with applicable local, national, and international codes and standards.

HOW TO USE THE REMOTE CONTROL

The remote control is most effective within 13 feet of the sensor.



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. If you do not know the access code, **cycle the power**. During 1 minute, you can access the sensor without introducing any access code.



To end an adjustment session, always lock the sensor.

ADJUSTING ONE OR MORE PARAMETERS



CHECKING A VALUE



x = number of flashes = value of the parameter



RESTORING TO FACTORY VALUES



SAVING AN ACCESS CODE

The access code is recommended for sensors installed close to each other and can be established to prevent unauthorized operation



DELETING AN ACCESS CODE



* Please complete this setting within 1 minute after power on.





RESTORING TO DEFAULTS

Full: resets all parameters to factory settings
Partial: resets all parameters except detection field, output configuration, and output redirection to factory settings



If unused for 30 minutes, the sensor will time out of the remote control session. Cut and restore power supply. The remote control session is accessible again within 30 minutes.

TROUBLESHOOTING

	The ORANGE LED is on permanently.	The sensor has encountered a memory problem.	Contact BEA Technical Services.
	The ORANGE LED flashes 1x / 2x / 3x every 3 seconds.	The sensor signals an internal fault. <i>If the internal error still exists after 3 resets, the LED will flash 9 times and the sensor will be locked.</i>	Cut and restore power supply. If orange LED flashes again, send the sensor back to manufacturer.
	The ORANGE LED flashes 4x every 3 seconds.	Error for antimasking or boundary.	Check if there's pollution on front window and clean the window if necessary. Check sensor orientation and that background setting is appropriate for the given orientation.
	The ORANGE LED flashes 5x every 3 seconds.	Error occurred during the teach-in process.	Relaunch a teach-in.

BEA, INC. INSTALLATION/SERVICE COMPLIANCE EXPECTATIONS

The installation is provided by CUSTOMER or its affiliates. BEA is not affiliated with CUSTOMER or any of its affiliates. BEA has no liability to CUSTOMER or the end user for any and all liability, claims, demands, obligations, actions, losses, costs, damages, fees or expenses (including attorneys' fees and legal costs) arising out of or in connection with product installation, or the end user's use of or inability to use the product, the installation services, product defects or malfunctions, including, but not limited to, any actual or alleged injury, damage, death or other consequence occurring to any person or property as a result, directly or indirectly, of installation, possession, or use of any product or services provided by CUSTOMER or any individual or entity acting for or on behalf of CUSTOMER, whether claimed by reason of breach of warranty, negligence, product defect or otherwise, and regardless of the form in which any such claim is made (collectively, the "Released Matters"). You, on behalf of yourself and each of the Releaser Parties, hereby releases and absolutely and irrevocably discharges each Hippo Party and their respective officers, directors, employees, representatives and agents from and against any Released Matters. You acknowledge and agree that the foregoing is a full and final release of all Released Matters, including those that are unknown, unanticipated or unsuspected or that may hereafter arise as a result of the discovery of new and/or additional facts, and you expressly waive all rights under Section 1542 of the Civil Code of California as well as any similar statutes of any other jurisdictions, which you acknowledge you have read and understood and which provides as follows: A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS SETTLEMENT WITH THE DEBTOR.