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EN

LZR®-FLATSCAN 3D SW

SAFETY SENSOR FOR AUTOMATIC SWING DOORS

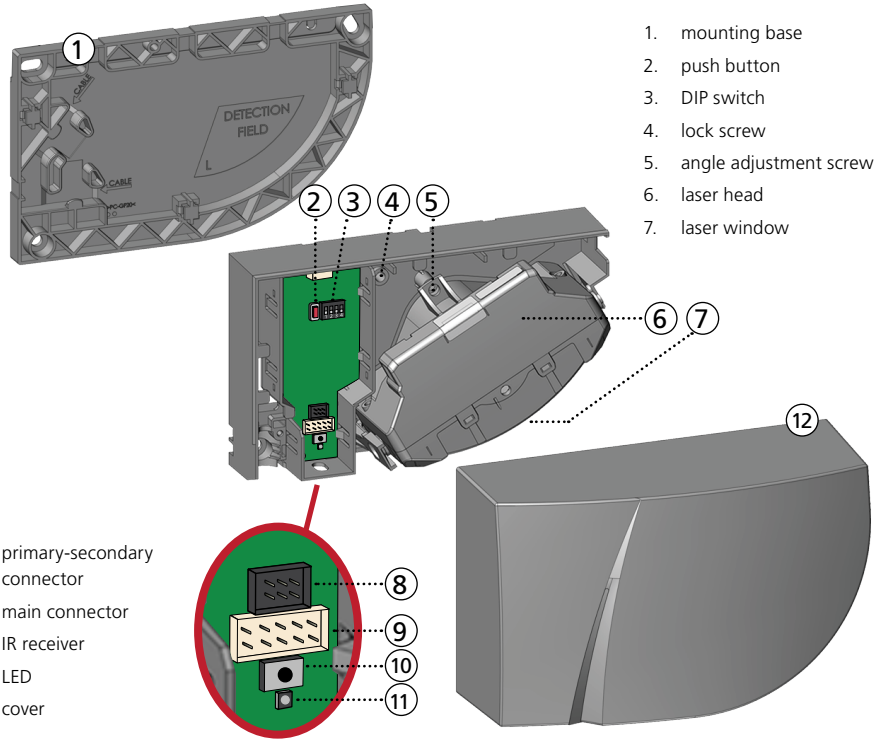
User's Guide for software version SW 0103 and higher

(refer to tracking label on product)

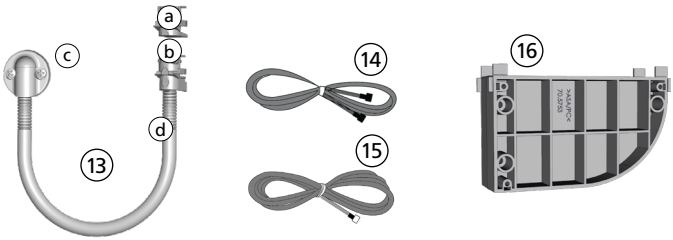
MISCELLANEOUS
FIRE DOOR ACCESSORY
< R39071 >
CLASSIFIED
c UL us

DESCRIPTION

The **LZR®-FLATSCAN 3D SW** is a safety sensor for automatic swing doors based on laser technology. It protects the moving door leaf as well as the pinch zone. To do so, a sensor must be installed in the upper corner of the door leaf(s).



1. mounting base
2. push button
3. DIP switch
4. lock screw
5. angle adjustment screw
6. laser head
7. laser window
8. primary-secondary connector
9. main connector
10. IR receiver
11. LED
12. cover



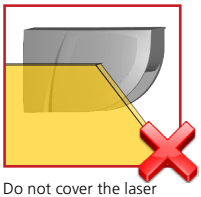
13. flex tube kit (79.0202)
    a) plug
    b) clamp
    c) cap and screws
    d) flexible tube
14. primary-secondary cable (35.1329)
15. power cable (20.5433)
16. spacer (70.5753)

REQUIRED TOOLS

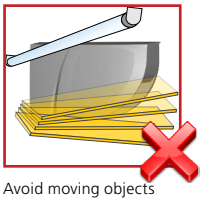
- pencil
- scissors
- level
- Philips #1 screwdriver
- Philips #2 screwdriver
- power drill (with 1/8" and 5/16" drill bits)
- wire cutters
- wire strippers
- sandpaper
- remote control

INSTALLATION TIPS

Avoid vibrations.

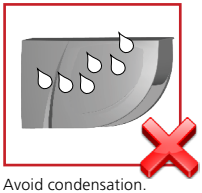


Do not cover the laser window.

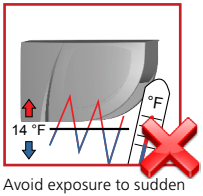


Avoid moving objects and light sources in the detection field.

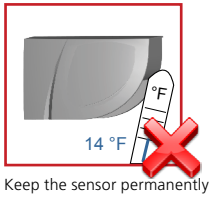
Avoid the presence of smoke and fog in the detection field.



Avoid condensation.

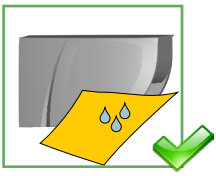


Avoid exposure to sudden and extreme temperature changes.



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

MAINTENANCE TIPS



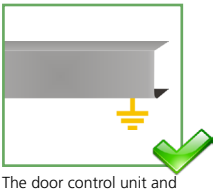
Clean the laser window with compressed air. If needed, wipe only with a soft, clean and damp microfiber cloth.

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

Avoid direct exposure to high-pressure cleaning.

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

SAFETY TIPS



The door control unit and the header cover profile must be correctly grounded.

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

Always test for proper operation before leaving the premises.

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.
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.

It is recommended to use a different access code for each sensor in order to avoid changing settings on both sensors at the same time.

SAVING AN ACCESS CODE

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

DELETING AN ACCESS CODE

Enter the existing code

ADJUSTING ONE OR MORE PARAMETERS

CHECKING A VALUE

x = number of flashes = value of the parameter

= field width: 2.35 m

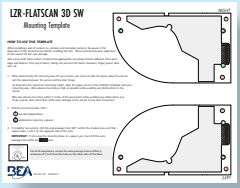
RESTORING TO FACTORY VALUES

The FLATSCAN 3D SW can be paired with another FLATSCAN 3D SW or a FLATSCAN SW. The installation steps are identical for both product versions. For optimum safety and to access all features (e.g. opening functions), the FLATSCAN 3D SW must be the primary sensor.

1 MOUNTING ON DOOR

MISCELLANEOUS FIRE DOOR ACCESSORY < R39071 > CLASSIFIED c UL us

For UL10 compliance, ensure the wire passage hole (see step 7) is offset a minimum of 1 inch from the hole on the other side of the door.



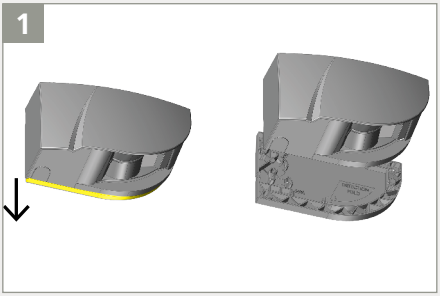
In low-profile applications in which the mounting base is not used, use the provided Mounting Template (78.7001) and then skip steps 1 – 7 of this section.

Additionally, for applications requiring a spacer, use the provided Mounting Template (78.7001) to mount spacer to door, and then install the sensor onto the spacer, starting with step 8 of this section.

The instructions in this section are for installing a pair of sensors. If you are only installing one sensor, only use steps 1 and 4.

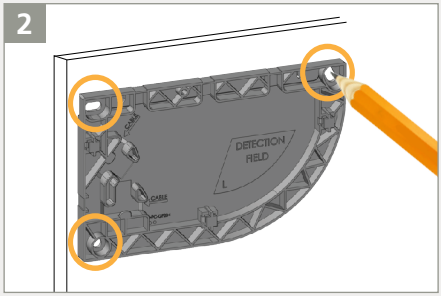
Note: The primary sensor is the main sensor that connects directly to the door controller, and the secondary sensor connects to the primary sensor by the pass-through cable.

1



Slide the base off of the sensor.

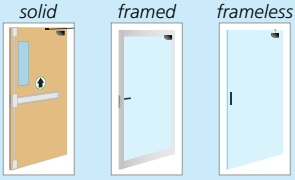
2



Consider the criteria below to determine the appropriate mounting location on the door, and then mark the mounting holes on the door.

POSITIONING TIPS

solid *framed* *frameless*



SOLID DOOR:

- side of the base is 5" from the door hinge
- top of base is 6" from the top of the door (or more, if needed to avoid interference with the swing closer arm)

FRAMED GLASS DOOR:

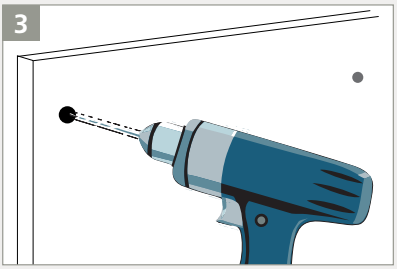
- base is away from the door hinge to avoid crushing during door movement
- base is below the path of the swing arm to avoid false detections

FRAMELESS GLASS DOOR:

- use the LZR-FLATSCAN SW GLASS DOOR ACCESSORY (see Application Note 78.6021)

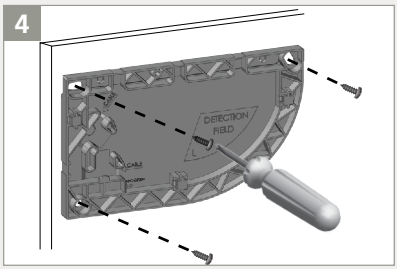
1 MOUNTING ON DOOR

3



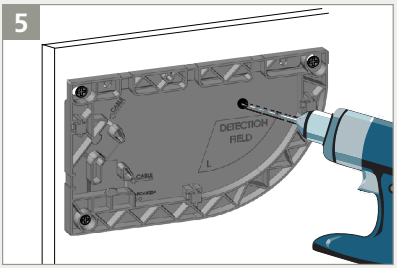
Remove the base and drill 1/8" pilot holes.

4



Fasten the 3 screws using a screwdriver. The base must be secure!

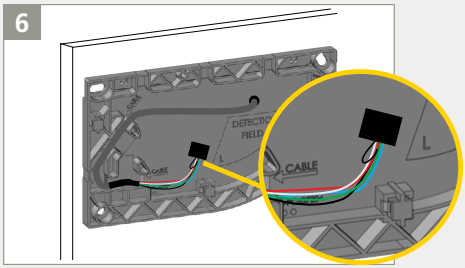
5



Drill through the 2 bases and the door using a 5/16" drill bit in order to pass the primary-secondary cable. Soften the edges using sandpaper.

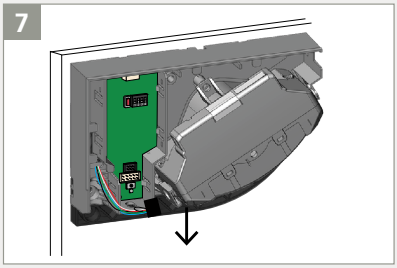
REMINDER: For UL10 compliance, ensure that the wire passage hole is offset a minimum of 1 inch from the hole on the other side of the door.

6



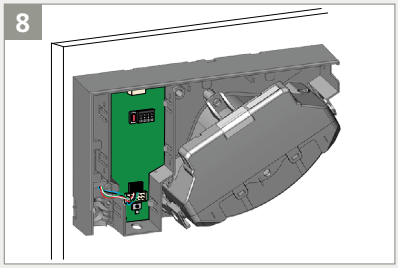
Pass the primary-secondary cable through the hole and then position the cable in the notch of the base and ensure it is secure.

7



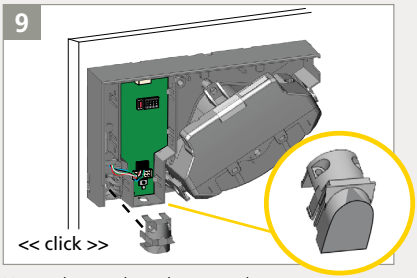
Pass the cable through the hole on the back of the sensor and secure the sensor to the base by sliding it down.

8



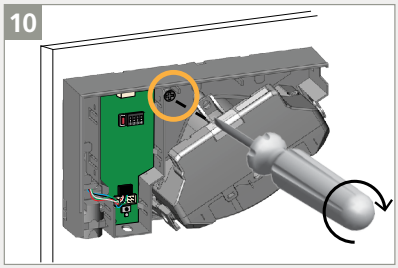
Connect the black plug to the black connector. Ensure that all wires are secured within the notch to avoid damage from the cover.

9



Use a plug to close the secondary sensor.

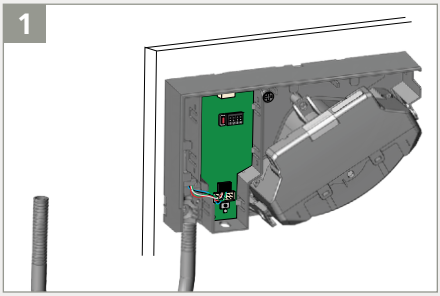
10



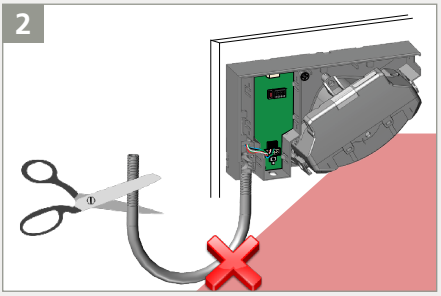
Secure the lock screw to avoid vibrations during door movement.

2 WIRING TO DOOR CONTROLLER

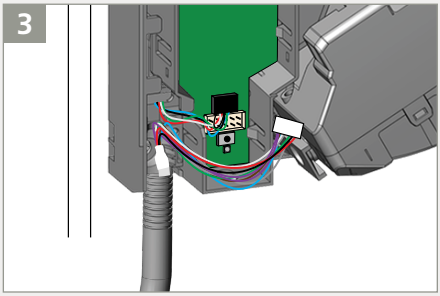
BEA recommends using a FLATSCAN 3D SW as the primary sensor.



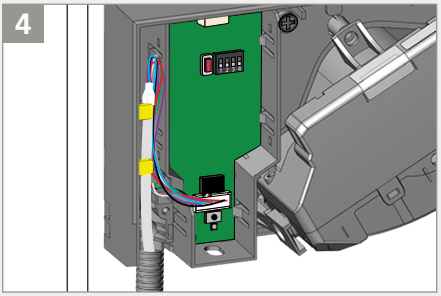
Determine the appropriate length for the door loop.



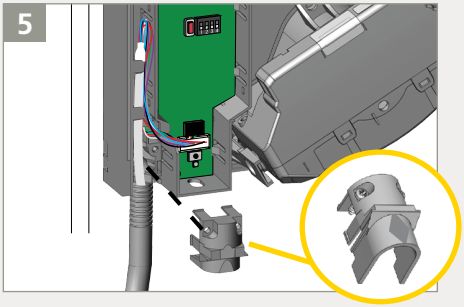
Cut the excess to avoid undesired detections caused by the flexible tube.



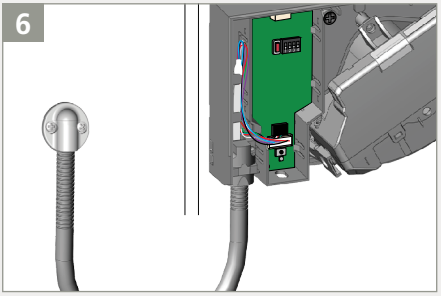
Pass the power cable through the flexible tube and connect the white plug to the white connector.



Create a loop with the wires of the power cable and pass them through the notch as indicated.
Use the other part of the cable to block the wires.



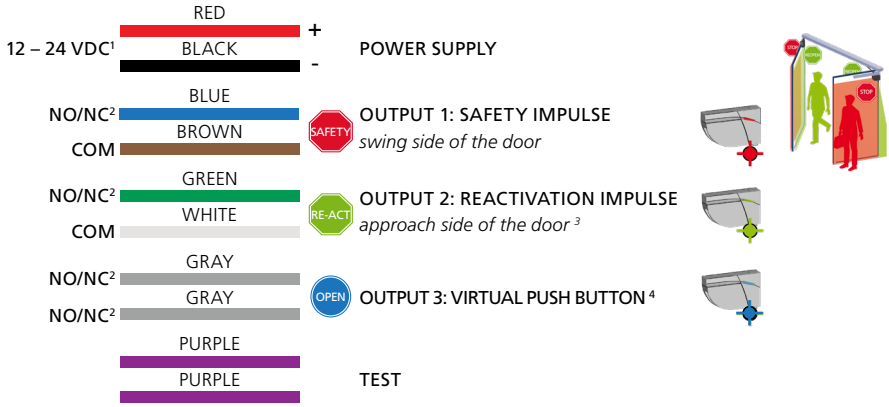
Secure the door loop to the sensor, using the clamp.
Secure the 2 screws to avoid pulling out the cable.



Tighten the other side of the flexible tube using the cable cap and pass through the remaining length of the power cable towards the door controller.

2 WIRING TO DOOR CONTROLLER

7 Cut the power cable to the correct length, strip the 10 wires, and connect the power supply, output 3, and test wires as indicated. Observe polarity. Wiring for outputs 1 and 2 will occur after teach-in. If the door control is N.C., jump the wires for outputs 1 and 2.



1 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.

2 Output status when sensor is operational (can be NO or NC; NO = default). See page 10.

3 Knowing-act door and control does not have secondary activation. Use a BR3-X (function 22) or an LE21.

4 O3 is only operational when the gray wires of the FLATSCAN 3D SW are connected to activation on the door controller, from the primary sensor.

3 DIP SWITCH 1: DOOR SIDE

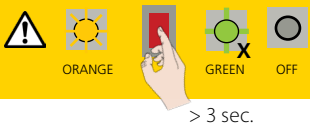
Make sure the setting of DIP 1 is correct on all modules according to the door side.

ON (switch ↑) **DEFAULT**

RELAY 1: SAFETY impulse on the **swing side** of the door

OFF (switch ↓)

RELAY 2: REACTIVATION impulse on the **approach side** of the door



After changing a DIP switch, the orange LED flashes. A LONG push on the push button confirms the settings. Afterwards, a number of green flashes (x) indicates the number of connected modules.

LED SIGNALS

Relay 1

Relay 2

Learn in progress
Exit the zone and wait

Relay 3
(3D SW only)

LED flashes

LED flashes
x times

LED flashes
red/green

LED flashes
slowly

LED flashes
quickly

LED off

4 TEACH-IN

Before launching a teach-in, make sure that:

- **glass surfaces near the door are covered**
- DIP 1 is set to OFF for sensors on the approach side, and/or set to ON for sensors on the swing side
- when in low-energy applications, caution is taken related to a static-mode learn (see Appendix)
- the door controller is set up first
- the door is closed (use Service Mode if needed, see below)
- reactivation and safety relay outputs are not connected to door control, and only gray wires are connected to primary activation. If the door control is N.C., ensure that reactivation and safety relays are jumped.
- Output Configuration is set correctly (see 13)
- the primary-secondary cable is connected between the modules
- the detection field is free of snow buildups, heavy rain, snowfall, fog or other objects or people

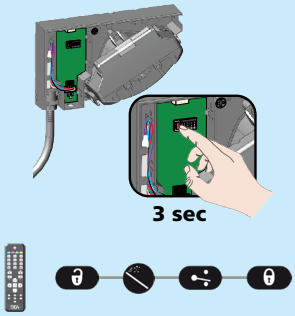
SERVICE MODE

BEA recommends setting the sensor in Service Mode before performing a teach-in.

Service Mode **deactivates all detection fields** for 15 minutes and can be useful during an installation, a mechanical learn of the door, or maintenance work.

- To enter Service Mode, push and hold the button for at least 3 seconds. The LED will turn off.
- To exit Service Mode, push and hold again for at least 3 seconds.

Service Mode is deactivated automatically when a teach-in is completed.



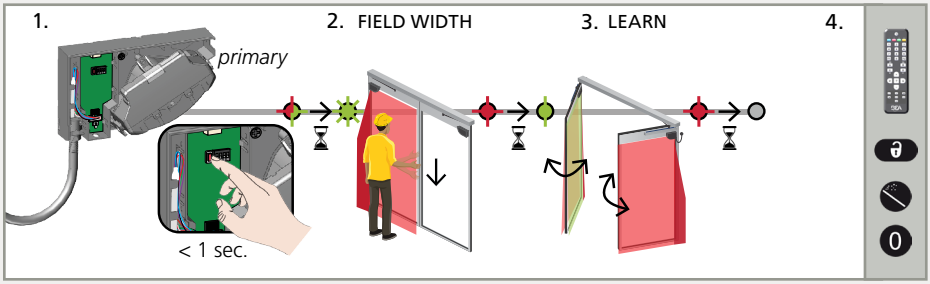
continued...

4 TEACH-IN

TEACH-IN

NOTE: A teach-in on the primary sensor configures both the primary sensor and secondary sensor. A teach-in on the secondary sensor only configures the secondary sensor. In case the primary and secondary sensors are not aligned, first launch a teach-in on the primary sensor and then on the secondary sensor.

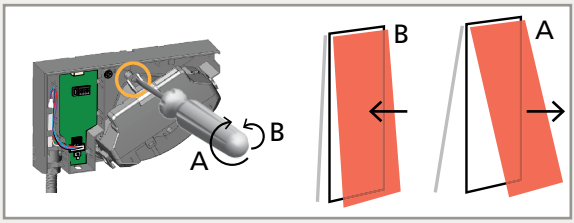
1. Press the primary sensor push-button briefly. The LED will begin quickly flashing red/green. When installing the sensor on a pair of doors, repeat this on the second primary sensor.
2. When the sensor (or both sensors, if two primaries) flash green, position yourself in front of the door(s) and stretch out your arm in front of you. Make an up-and-down motion at the leading-edge to mark the limit of the detection zones. IMPORTANT: Ensure that hand movements are strictly vertical, especially in applications with a pair of doors.
3. Once the LED begins flashing red, **remove yourself from the detection zone**. The LED will continue to flash red while calculating the width of the door leaves.
4. When the sensor(s) flash green again, **remain out of the detection field** and cycle the doors open to allow the sensors to learn the environment. The sensor(s) will flash red during the closing of the door(s).
5. Once the door is completely closed again and the LED is off, the teach-in is complete.



6. If the swing side of the door opens against a glass wall or guide rail, initiate an Artificial Wall Teach-in (see 11).
7. Once teach-in and artificial walls are complete, remove the jumpers and connect the reactivation and safety wires to the door control.

5 TESTING AND ADJUSTING

Check the correct positioning of the safety fields by walk-testing according to ANSI 156.10 standards.



If necessary, adjust the tilt angle of the laser curtain by turning the tilt angle adjustment screw (from 0° to 5°)

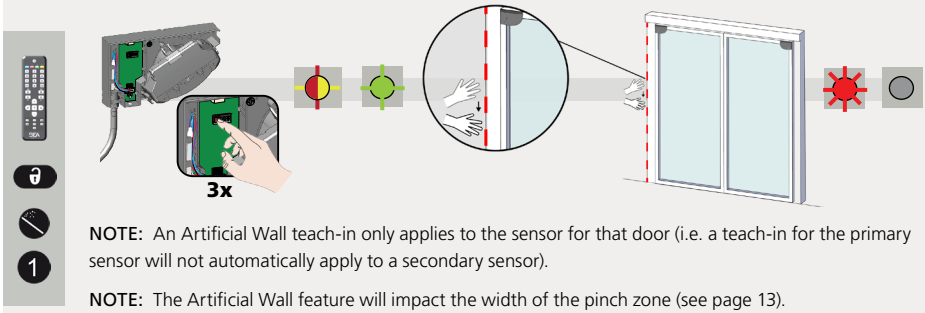
⚠ After changing the angle, the sensor position or the environment, always launch a teach-in and test the correct positioning of the detection fields.

Verify that the sensor system complies with ANSI 156.10 per the AAADM walk test. Make appropriate adjustments to the sensor and/or door control, if necessary, to ensure that the system is ANSI 156.10 compliant.

6 Artificial WALL (installation aid)

Use the Artificial Wall feature to ensure that the sensor operates reliably in environments with nearby glass surfaces or guide rails. Before beginning the Artificial Wall teach-in, ensure that a door teach-in (see page 10) has been completed.

1. To activate the Artificial Wall, press the push button 3x.
2. When the green LED flashes, wave your hand up and down in the hinge zone. Hand gestures should be done at a distance where you desire the artificial wall.
3. Now, the area behind the artificial wall will be ignored by the sensor to prevent unwanted detection.
4. The red LED will flash to confirm that the artificial wall has been established.



NOTE: An Artificial Wall teach-in only applies to the sensor for that door (i.e. a teach-in for the primary sensor will not automatically apply to a secondary sensor).

NOTE: The Artificial Wall feature will impact the width of the pinch zone (see page 13).

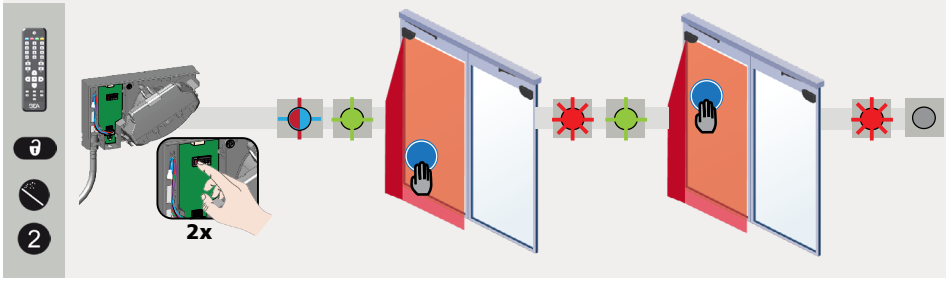
7 VIRTUAL PUSH BUTTONS (OUTPUT 3)

Always verify compliance with ANSI 156.10, 156.19, and 156.38.

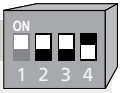
If desired and in addition to ANSI 156.10, 156.19, and 156.38 Knowing Act requirement, you can add a Virtual Push Button option (max. 2 per sensor) within the second (C2) curtain simulating the performance of a knowing-act device.

The Virtual Push Button(s) may be placed outside of the detection field but within a limit of maximum detection field range specifications. To operate, the two gray wires of the FLATSCAN 3D SW must be connected (as the primary sensor) to the activation on the door controller with the 10-wire cable provided.

1. When the green LED flashes, hold your hand in the desired position within C2 to learn the Virtual Push Button.
2. When the LED flashes red to confirm the teach-in, remove yourself and hand.
3. When the LED flashes green again, you can either learn another Virtual Push Button or wait 10 seconds for the end of the teach-in.

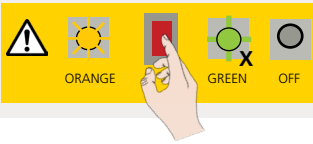


8 DIP SWITCH SETTINGS (optional)



In order to adapt these parameters by remote control, set the corresponding DIP switch to ON.

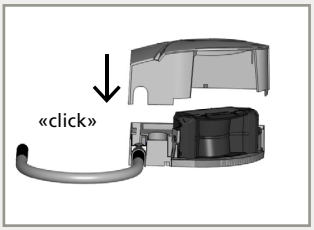
	ON (switch up)	OFF (switch down)	
DIP 2 ENVIRONMENT	standard	critical	Switch to CRITICAL when external disturbances are likely to cause unwanted detections (min. obj size, immunity, and uncovered zone are increased).
DIP 3 BACKGROUND	on	off	Switch to OFF when there is no background (glass floor, pedi-mat, etc).
DIP 4 PINCH ZONE	on	off	Switch to ON when the pinch zone needs to be secured.



After changing a DIP switch, the orange LED flashes. A LONG push on the push button confirms the settings. Afterwards, a number of green flashes (x) indicates the number of connected modules.

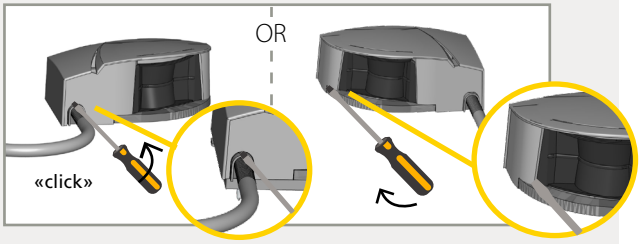
9 CLOSE SENSOR

CLOSING



Close the cover starting on the narrow side. Do not hesitate to push.

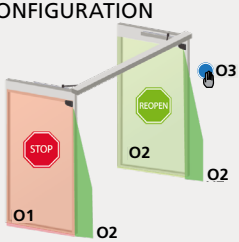
OPENING



To remove the cover, position a flathead screwdriver in the notch and pull upward until the cover loosens.

10 REMOTE CONTROL SETTINGS (optional)

OUTPUT CONFIGURATION



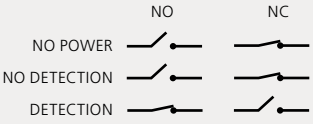
1 1 1

O1 O2 O3

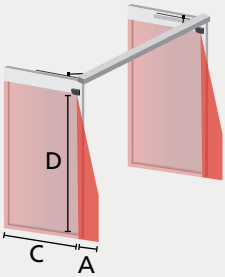
1 NO (normally open)

2 NC (normally closed)

Always enter 3 digits for output parameters:
- 1st digit refers to Output 1 (O1) = SAFETY
- 2nd digit refers to Output 2 (O2) = REACTIVATION
- 3rd digit refers to Output 3 (O3) = ARTIFICIAL PUSH BUTTON



DIMENSIONS OF ZONES



Width of the pinch zone

A ↔ 0 0 0 0 0 1 – 0 4 0

no field	1"	40" *	7"

Width of the door zone

C ↔ 0 0 0 0 0 1 – 1 5 7

no field	1"	157"

Height of all zones

D ↕ 0 0 0 0 0 1 – 1 5 7

no field	1"	157"

Always enter 3-digits when adjusting detection zone dimensions.

C and D: a teach-in overwrites these values automatically.

*The actual dimensions depend on the mounting height (40 in at 13 ft).
In order to change these settings by remote control, adjust **DIP switch 4** to **ON**.

UNCOVERED ZONE

In order to change these settings by remote control, ensure that **DIP switch 2** is set to **ON**

F2

1	2	3	4	5	6	7	
¾	1 ½	2 ⅜	3 ¼	4	4 ¾ *	5 ½ *	in**

Increase in case of snow, debris, etc.

* utilizing this setting cannot ensure hinge zone protection
** measured in specific conditions and dependant on application and installation.

10 REMOTE CONTROL SETTINGS (optional)

BACKGROUND / ANTIMASKING

In order to change these settings by remote control, ensure that **DIP switch 3** is set to **ON**

	0	1	2	3
ANTIMASKING	OFF	OFF	ON	ON
BACKGROUND	OFF	ON	OFF	ON

This is a protective function that detects an unwanted object near the laser window that is masking the vision field.

DETECTION FIELD DEPTH

1	2	3	4
1 curtain	2 curtains	3 curtains	4 curtains

Upon door movement, the approach side sensor always extends the detection field depth to 4 curtains.

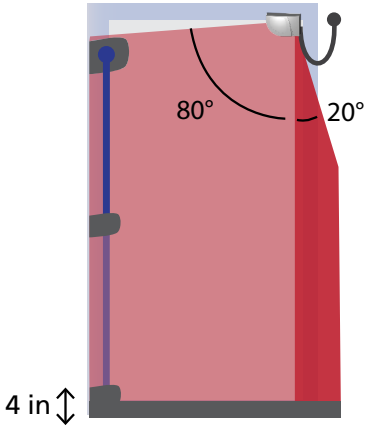
GENERAL

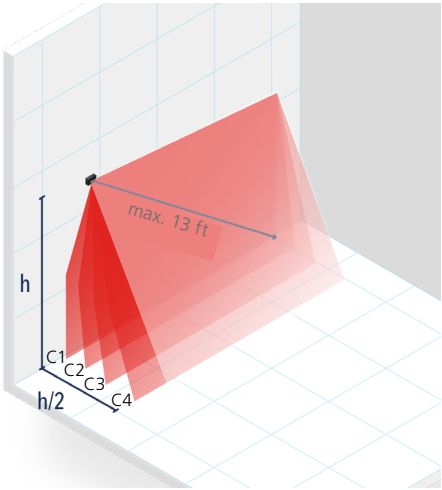
0	1	2	8	9
teach-in	teach-in AW	teach-in VPB	full reset	partial reset

0 Teach-in - see page 10
1 Teach-in Artificial Wall - see page 11
2 Teach-in Virtual Push Button - see page 11
8 Full reset - factory reset of all values
9 Partial reset - factory reset of all values exept field dimensions and output configurations

FACTORY VALUE

DETECTION FIELDS





DOOR LEAF SAFETY

PINCH ZONE SAFETY

UNCOVERED ZONE
adjustable by remote control
factory value: 4 in

Check the detection fields using our online sizer tool:
https://eu.beasensors.com/sizer/flatscan/

TROUBLESHOOTING

In case of unwanted reactions of the door, verify whether the problem is caused by the sensor, the door controller, or a nearby radar sensor. To do so, activate Service Mode (no safety) and cycle the door open. *Be sure to exit Service Mode when finished with troubleshooting activities.*

If the door cycle is completed successfully, check the sensor. If not, verify the door controller, the wiring, or a radar sensor.

Keep a minimum distance of 6 inches between the FLATSCAN SW and radar sensors or use the LZR®-Flatscan protective cover to avoid unwanted reactions of the door.

The red, green, or blue LED is ON sporadically or permanently and the door does not react as expected	Bad teach-in		Launch a new teach-in (closed door).
	Unwanted detections (due to environment or external conditions)	1	Make sure the flexible cable does not cause detections.
		2	Verify if the laser window is dirty and clean it with compressed air. Then wipe it carefully with a damp and clean microfiber cloth if necessary. **Attention:** The surface of the laser window is delicate).
		3	Launch a new teach-in (closed door).
		4	Switch DIP 2 to off (critical environment).
The red LED blinks quickly when trying to unlock the sensor.	The sensor is protected by a password		Enter the right password. If you forgot the code, cut and restore the power supply to access the sensor without entering a password during 1 minute.

The sensor does not react at power-on	Inverted power supply	Check wiring (red +, black -).
	Faulty cable	Replace cable.
	Faulty sensor	Replace sensor.
The sensor does not react when powered	Test/Monitoring error	If using purple wires for monitoring, ensure they are connected to the door control test/monitoring inputs and that test/monitoring is enabled. The purple wires are auto-sensing and not polarity sensitive.
	Service Mode is activated	Press the push button for at least 3 seconds to exit Service Mode.

It is not possible to adjust background and pinch zone by remote control.	Incorrect DIP switch position	Adjusting background: Ensure DIP switch 3 is ON. Adjusting pinch zone: Ensure DIP switch 4 is ON.
The remote control does not react.	Dead batteries / faulty remote control	Replace batteries or remote control.

TROUBLESHOOTING (cont.)

	The ORANGE LED is on permanently.	The sensor encounters a memory problem.		Replace sensor.
	The ORANGE LED flashes quickly.	DIP switch setting awaiting confirmation.		Confirm the DIP switch setting: long push on the push button.
1	The ORANGE LED flashes 1x every 3 seconds.	The sensor signals an internal fault.		Cut and restore power supply. LED flashes again, replace sensor.
2	The ORANGE LED flashes 2x every 3 seconds.	Power supply is out of limit.	1	Check power supply (voltage).
			2	Reduce the cable length or change cable.
		Internal temperature is too high.		Protect the sensor from any heat source (sun, hot air...)
3	The ORANGE LED flashes 3x every 3 seconds.	Communication error between modules	1	Check wiring between primary and secondary modules.
			2	Check wiring between interface card and laser head.
			3	Press the push button during 3 seconds if the Primary-Secondary cable is permanently removed.
4	The ORANGE LED flashes 4x every 3 seconds	The sensor does not see its background.		Turn off DIP 3 (deactivate background).
		Something close to the sensor is masking part of the detection field.	1	Ensure the laser window is not scratched. If it is, replace sensor.
			2	Remove all masking elements (insects, spider web, flexible tube, window protection).
			3	Verify if the laser window is dirty and clean it with compressed air. Then wipe it carefully with a damp and clean microfiber cloth if necessary. **Attention:** The surface of the laser window is delicate.
			4	Switch antimasking setting to off.
5	The ORANGE LED flashes 5x every 3 seconds.	Teach-in error	1	Check whether all teach-in requirements are fulfilled (see page 10) and launch a new teach-in (closed door).
			2	Adjust the tilt angle of the laser curtain and launch a new teach-in (closed door).
			3	Adjust the field dimensions by remote control.
		Permanent faulty measurements of door position.	1	Launch a new teach-in (closed door).
			2	If orange LED flashes again, contact BEA.
6	The ORANGE LED flashes 6 x every 3 seconds.	Sporadic faulty measurements of door position.	1	Clear field and wait until the door closes.
			2	If the door does not close, cut power supply and restore it once the door is fully closed.
			3	Launch a new teach-in (closed door).

TECHNICAL SPECIFICATIONS

TECHNOLOGY / PERFORMANCE

Technology	LASER scanner, time-of-flight measurement
Detection mode	Presence
Max. detection range	13′ (diagonal) with reflectivity of 2% e.g. at 36″ width, H_{min} = 75″ H_{max} = 151.8″ e.g. at 42″ width, H_{min} = 75″ H_{max} = 150.2″ e.g. at 48″ width, H_{min} = 75″ H_{max} = 148.4″ Use the FLATSCAN Sizer Tool for custom door widths and mounting heights.
Detection field coverage	Door leaf safety: 80° Pinch zone safety: 20°
Opening angle	80° minimum
Angular resolution	Curtain 1: 0.2° Curtain 2: 1° Curtain 3: 1.7° Curtain 4: 2.5°
Tilt angles	0 – 5°
Typ. min. object size	¾″ @ 13′ in curtain C1
Min. door leaf speed	2°/sec
Emission characteristics (IEC 60825-1)	IR LASER: wavelength 905 nm; output power < 0.1mW; Class 1

ELECTRICAL

Supply voltage *	12 – 24 VDC ±15% (to be operated from SELV-compatible power supplies only)
Power consumption	< 2 W
Response time	Typ. <120 ms (max. 220 ms)
Output	3 electronic relays (galvanic isolation - polarity free)
max. switching voltage	42 VAC/VDC
max. switching current	100 mA

PHYSICAL

Dimensions	5 ¾″ (L) × 3 ½″ (H) × 2 ⅓″ (D) mounting base: D + ¾″ spacer: D + 1 ½″
Material - Color	PC/ASA - black
Protection degree	IP44 (IEC 60529)
LED signals	1 RGB LED: detection/output status
Temperature range	-13 – 140 °F
Humidity	0 – 95% non-condensing
Vibrations	< 2 G

COMPLIANCE

Compliance	ISO 13849-1 Pl “d”/ CAT2; IEC 60825-1; IEC 62061 SIL 2 UL10 – file # R39071

*** This sensor is powered by DC voltage only. 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.**

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

SIZER TOOL

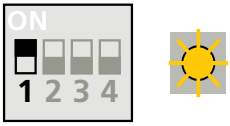
APPENDIX: STATIC MODE

Static Mode is the default teach-in for low-energy applications that do not use the secondary sensor.

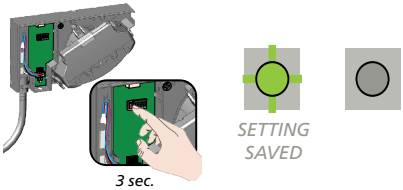
This teach-in learns the door width and height, and excludes environment surroundings (e.g. guide rails, trash cans, etc).

> *In static mode, the sensor will not learn its surroundings (e.g. guiderails, trash cans, etc).*
>
> *Exercise caution in low-energy applications when programming the sensor stand-alone on the swing side of the door.*

1: SET DIP SWITCH

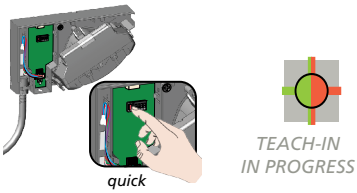


Ensure that DIP 1 is set to OFF (down) for the reactivation side (see caution note above).
After changing a DIP switch, the orange LED flashes.



Press the push button for 3 seconds to save the setting.
The LED will blink green once to confirm the setting and then turn off.

2: BEGIN TEACH-IN

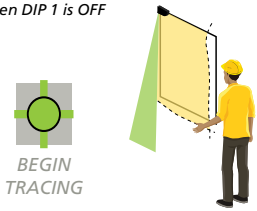


Once the LED turns off, press the push button again to begin the teach-in.
The LED will blink red/green indicating the learn is in progress.

The LED will then turn green to indicate that it is time to begin the hand-gesture setup.
Trace the leading edge of the door to learn the door width.
The LED will blink red to indicate that the width is learned.
NOTE: The sensor will automatically learn the height.

3: CUSTOM TRACING?

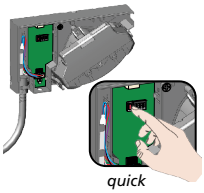
NOTE: Only available when DIP 1 is OFF (set to approach side).



When the LED blinks green, you may custom-trace the detection field's height and/or leading edge. Ensure that the gray wires are not connected to primary activation.

If customizing is not needed, simply wait out the 30-second, green blinking LED.

4: END TEACH-IN



If no custom shape is desired or the learn process is complete, press the push button to end the teach-in process.

NOTES

BEA, INC. INSTALLATION/SERVICE COMPLIANCE EXPECTATIONS

BEA, Inc., the sensor manufacturer, cannot be held responsible for incorrect installations or incorrect adjustments of the sensor/device; therefore, BEA, Inc. does not guarantee any use of the sensor/device 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/device system performance 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's 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, UL294, UL325, and International Building Code).

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

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Tech Support: 1-800-407-4545 | Customer Service: 1-800-523-2462
General Tech Questions: techservices-us@BEAsensors.com | www.BEAsensors.com

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