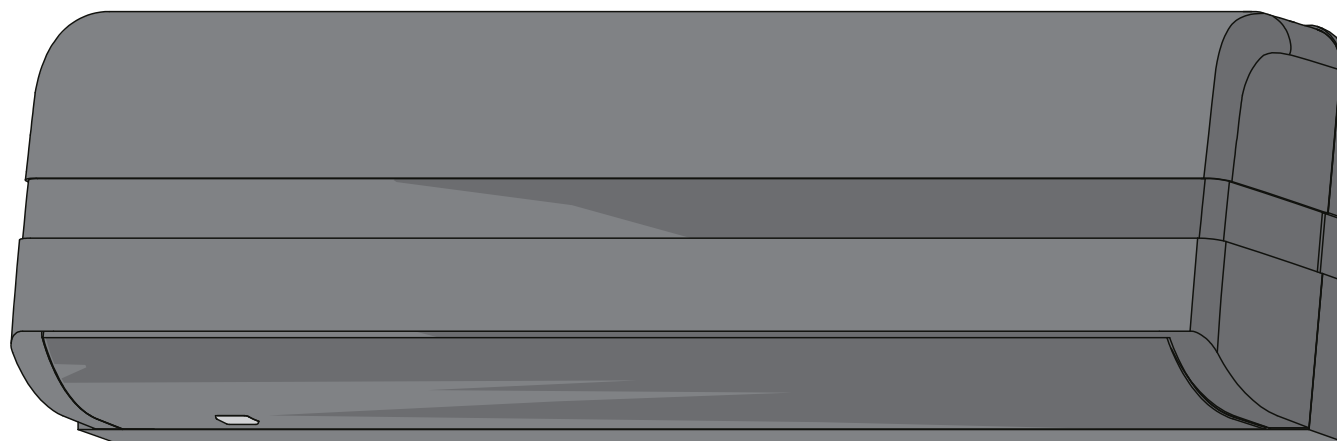




# RAP100S

USER / INSTALLER MANUAL








# 00. CONTENT

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# 01. SAFETY INSTRUCTIONS

## ATTENTION:

	This product is certified in accordance with European Community (EC) safety standards.
	This product complies with Directive 2011/65/EU of the European Parliament and of the Council, of 8 June 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
	(Applicable in countries with recycling systems). This marking on the product or literature indicates that the product and electronic accessories (eg. Charger, USB cable, electronic material, controls, etc.) should not be disposed of as other household waste at the end of its useful life. To avoid possible harm to the environment or human health resulting from the uncontrolled disposal of waste, separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources. Home users should contact the dealer where they purchased this product or the National Environment Agency for details on where and how they can take these items for environmentally safe recycling. Business users should contact their vendor and check the terms and conditions of the purchase agreement. This product and its electronic accessories should not be mixed with other commercial waste.
	
	This marking indicates that the product and electronic accessories (eg. charger, USB cable, electronic material, controls, etc.) are susceptible to electric shock by direct or indirect contact with electricity. Be cautious when handling the product and observe all safety procedures in this manual.

# 01. SAFETY INSTRUCTIONS

## GENERAL WARNINGS

- This manual contains very important safety and usage information, very important. Read all instructions carefully before beginning the installation/usage procedures and keep this manual in a safe place that it can be consulted whenever necessary.
- This product is intended for use only as described in this manual. Any other enforcement or operation that is not mentioned is expressly prohibited, as it may damage the product and put people at risk causing serious injuries.
- This manual is intended firstly for specialized technicians, and does not invalidate the user's responsibility to read the "User Norms" section in order to ensure the correct functioning of the product.
- The installation and repair of this product may be done by qualified and specialized technicians, to assure every procedure are carried out in accordance with applicable rules and norms. Nonprofessional and inexperienced users are expressly prohibited of taking any action, unless explicitly requested by specialized technicians to do so.
- Installations must be frequently inspected for unbalance and the wear signals of the cables, springs, hinges, wheels, supports and other mechanical assembly parts.
- Do not use the product if it is necessary repair or adjustment is required.
- When performing maintenance, cleaning and replacement of parts, the product must be disconnected from power supply. Also including any operation that requires opening the product cover.
- The use, cleaning and maintenance of this product may be carried out by any persons aged eight years old and over and persons whose physical, sensorial or mental capacities are lower, or by persons without any knowledge of the product, provided that these are supervision and instructions given by persons with experienced in terms of usage of the product in a safe manner and who understands the risks and dangers involved.
- Children shouldn't play with the product or opening devices to avoid

the motorized door or gate from being triggered involuntarily.

## WARNINGS FOR TECHNICIANS

- Before beginning the installation procedures, make sure that you have all the devices and materials necessary to complete the installation of the product.
- You should note your Protection Index (IP) and operating temperature to ensure that is suitable for the installation site.
- Provide the manual of the product to the user and let them know how to handle it in an emergency.
- If the automatism is installed on a gate with a pedestrian door, a door locking mechanism must be installed while the gate is in motion.
- Do not install the product "upside down" or supported by elements do not support its weight. If necessary, add brackets at strategic points to ensure the safety of the automatism.
- Do not install the product in explosive site.
- Safety devices must protect the possible crushing, cutting, transport and danger areas of the motorized door or gate.
- Verify that the elements to be automated (gates, door, windows, blinds, etc.) are in perfect function, aligned and level. Also verify if the necessary mechanical stops are in the appropriate places.
- The central must be installed on a safe place of any fluid (rain, moisture, etc.), dust and pests.
- You must route the various electrical cables through protective tubes, to protect them against mechanical exertions, essentially on the power supply cable. Please note that all the cables must enter the central from the bottom.
- If the automatism is to be installed at a height of more than 2,5m from the ground or other level of access, the minimum safety and health requirements for the use of work equipment workers at the work of Directive 2009/104/CE of European Parliament and of the Council of 16 September 2009.
- Attach the permanent label for the manual release as close as possible

# 01. SAFETY INSTRUCTIONS

to the release mechanism.

- Disconnect means, such as a switch or circuit breaker on the electrical panel, must be provided on the product's fixed power supply leads in accordance with the installation rules.
- If the product to be installed requires power supply of 230Vac or 110Vac, ensure that connection is to an electrical panel with ground connection.
- The product is only powered by low voltage safety with central (only at 24V motors)

## WARNINGS FOR USERS

- Keep this manual in a safe place to be consulted whenever necessary.
- If the product has contact with fluids without being prepared, it must immediately disconnect from the power supply to avoid short circuits, and consult a specialized technician.
- Ensure that technician has provided you the product manual and informed you how to handle the product in an emergency.
- If the system requires any repair or modification, unlock the automatism, turn off the power and do not use it until all safety conditions have been met.
- In the event of tripping of circuits breakers or fuse failure, locate the malfunction and solve it before resetting the circuit breaker or replacing the fuse. If the malfunction is not repairable by consult this manual, contact a technician.
- Keep the operation area of the motorized gate free while the gate in in motion, and do not create strength to the gate movement.
- Do not perform any operation on mechanical elements or hinges if the product is in motion.

## RESPONSABILITY

- Supplier disclaims any liability if:
  - Product failure or deformation result from improper installation

use or maintenance!

- Safety norms are not followed in the installation, use and maintenance of the product.
- Instructions in this manual are not followed.
- Damaged is caused by unauthorized modifications
- In these cases, the warranty is voided.

## **MOTORLINE ELECTROCELOS SA.**

Travessa do Sobreiro, nº29  
4755-474 Rio Côvo (Santa Eugénia)  
Barcelos, Portugal

## SYMBOLS LEGEND:



• Important safety notices



• Useful information



• Programming information



• Potentiometer information



• Connectors information



• Buttons information

## 02. THE PRODUCT

### RAP100S



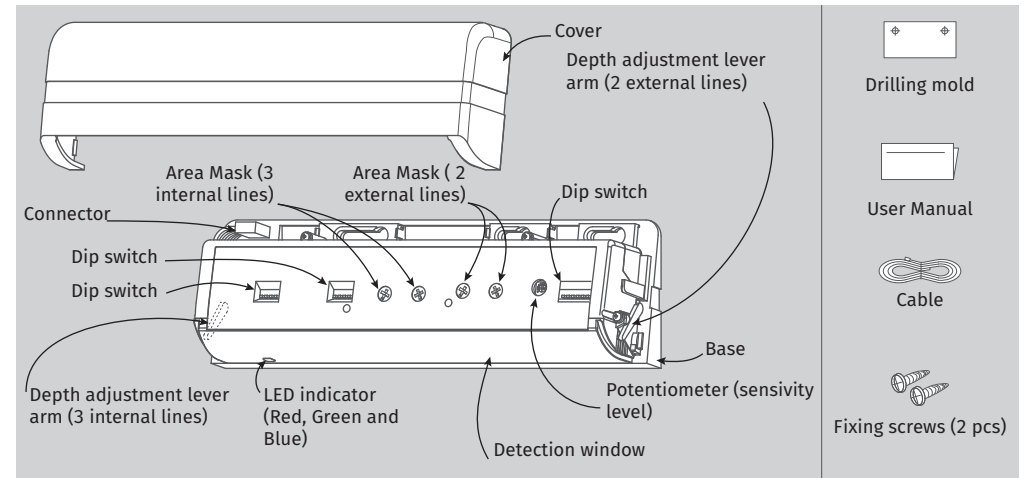
The RAP100S is an infrared radar designed to activate automatic doors at a height of up to 3m.

### TECHNICAL CHARACTERISTICS

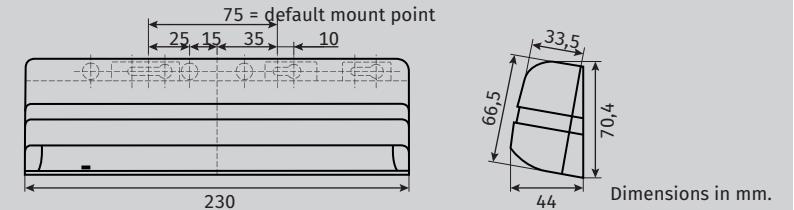
• Detection method	Active infrared reflection	
• Installation height	3m (max.)	
• Power supply	12-24Vac/dc 50/60 Hz	
• Consumption	12Vac: 1.5 VA(max.)   24Vac: 80 mA(max.) 12Vdc: 2 VA(max.)   24Vdc: 50 mA(max.)	
• Output time delay	aprox. 0.5 sec.	
• Time response	0.1 - 0.2 sec.	
• Presence timer	2 external lines: 1 sec.	
	3 internal lines: 2 sec. / 30 sec. / 60 sec. / ∞	
• Output	Line 1, 2	Open collector: 7.5 mA electrical resistance load (max.) Optical coupler (NPN) Voltage: 55 Vdc   max current: 50mA Darkness current: 100nA (max.) (resistance load)
	Lines 2, 3, 4 e 5	Optical relay (without polarity): 50Vdc 0.1A electrical resistance load
• Input test	6 mA (max.) to 24 Vdc	
• Operating temperature	-20°C to +60°C	
• Operating humidity	< 80%	
• Protection degree	IP54	
• Category	2, income D level according to the policy EN ISO 13849-1:2015	
• Weight	250 g	
• Color	Black	

## 02. THE PRODUCT

### DESCRIPTION



### DIMENSIONS



### LED INDICATIONS

<b>Green</b>	In standby
<b>Flashing green</b>	Entrance recognition (when $\text{Z}$ switch 5 is on)
<b>Flashing green (1x)</b>	When it responds to the TEST signal
<b>Blue</b>	Detection on line 4, 5
<b>Red</b>	Detection on line 3
<b>Flashing red (slow)</b>	Detection on line 2
<b>Flashing red (fast)</b>	Detection on line 1
<b>Orange</b>	The "Line 1" detection line ("Line 2" when entrance recognition is activated) detects door movement
<b>Flashing orange (fast)</b>	Indicates dip switch settings change
<b>Flashing orange (slow)</b>	Door held in "open" position (when $\text{Z}$ switch 4 is activated)
<b>Flashing green/red (fast)</b>	Internal sensor error
<b>Flashing green/red (slow)</b>	Infrared signal reflected from the ground is too short

# 03. INSTALLATION

## INSTALLATION AND CONNECTIONS



To ensure the right operation of RAP100S, be aware of the following instructions:

- Prevent the installation site from accumulating snow or water on the ground.
- Install in a protected area so that rain or snow does not fall directly on the unit. If the sensor has to be exposed, install it with a protection;
- Install 3 meters high at most;
- Install in a place where there is no vibration;
- Check for moving objects in the detection area;
- Ensure minimal sunlight is reflected from the ground;
- Use different frequency settings for sensors close to each other;
- To maximize the effectiveness of entrance detection, install the radar outside and inside.

### 1 DRILLING

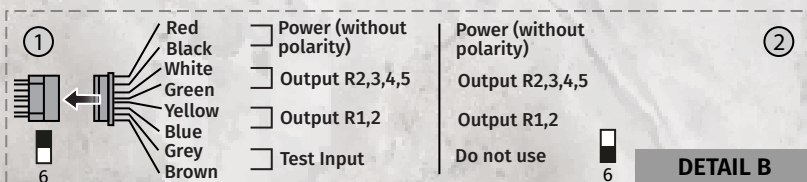
Attach the mounting template so the bottom edge lines up with the bottom edge of the door motor cover.  
Drill the fixing holes (3.5 mm) and the wires passage (10 mm).

### 2 FIX THE RADAR

Remove the sensor cover and secure the sensor with the supplied mounting screws. **NOTE** • If you need to remove the sensor body from the base, lift it up (a) and tilt it forward (b). See detail A.

### 3 PROGRAM THE RADAR

Connect the cable to the radar and configure all the necessary parameters: with test (1), without test (2).  
Set the Z DIP switch setting according to each case. See detail B.



4 Install the connectors in the space provided.

5 Put the cover on the radar and clean.



Do not touch the depth adjustment lever arms when replacing the cover.

## 04. CONFIGURATION

### DIP SWITCH SETTINGS



### PRESENCE TIMER

The sensor will detect a immovable object for setting the pre-set presence timer on the 3 internal lines.

To comply with DIN18650 standard, set the presence timer to a minimum of 30 seconds.

Dip switch #1 e #2 (X)					
	#1: ON   #2:ON	#1: OFF   #2:ON	#1: ON   #2:OFF	#1: OFF   #2:OFF	
Time	2s	30s (factory value)	60s	∞	

### QUANTITY OF DETECTION LINES

The quantity of detection lines can be set to 5, 4, 3 or 2 depending on the detection area requirements.

Dip switch #3 e #4 (X)				
	#3: ON   #4:ON	#3: OFF   #4:ON	#3: ON   #4:OFF	#3: OFF   #4:OFF
Detection lines	R5 - 5 active lines (factory value)	R4 - 4 active lines	R3 - 3 active lines	R2 - 2 active lines

## 04. CONFIGURATION

### FREQUENCY

When two or more sensors are installed next to each other , select different frequency configurations for each sensor to avoid cross interference.

Dip switch #1 e #2 (Y)				
	#1: ON   #2:ON	#1: OFF   #2:ON	#1: ON   #2:OFF	#1: OFF   #2:OFF
Sensors	A (factory value)	B	C	D

### SAFETY OUTPUT

See the "Event time table" for more details on the safety output.

Dip switch #3 (Y)		
	#3: ON	#3: OFF
Safety output	N.O. (factory value)	N.C.

### REFLECTION DIAGNOSIS

A slowly red/green LED flashing indicates a low infrared signal for reflection. To ignore the low reflection error state, set this DIP switch to "Low Reflection" (activated).

To comply with EN16005, set to "Normal".



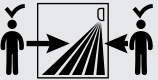


Dip switch #4 (Y)		
	#4: ON	#4: OFF
Mode	Normal (factory value)	Low Reflection

## 04. CONFIGURATION

### DIRECTION DETECTION






When activated, pedestrians that walk away won't be detected by the sensor.

To ensure pedestrians safety with the activated "entrance recognition", the 1st and 2nd lines of detection will detect the pedestrians, regardless of the direction of movement.

Dip switch #1 	 	 
	#1: ON	#1: OFF
Direction detection	Deactivated (factory value)	Activated



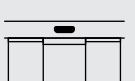


### ACTIVATION OUTPUT

Check the "Event time table" for more details about activation output.

Dip switch #2 	 	 
	#2: ON	#2: OFF
Activation output	N.O. (factory value)	N.C

### SUPERVISION MODE

Set to "Snow" in situations where false door activations may occur, caused by falling snow, falling leaves, or debris in the area near the door.




Dip switch #3 	 	 
	#3: ON	#3: OFF
Mode	Normal (factory value)	Snow

## 04. CONFIGURATION

### DOOR OPENING





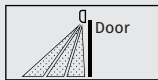
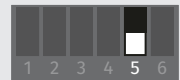
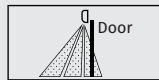
Switch to OPEN to keep the door in open position.

Dip switch #4 		
	#4: ON	#4: OFF
Mode	Automatic (factory value)	Open

### ENTRANCE RECOGNITION

Door recognition allows the first detection line to be oriented within the area close to the door without door detection movement.

When input recognition is enabled, the sensitivity level of the internal detection line is only at maximum when the external detection lines are enabled.

Dip switch #5 	 	 
	#5: ON	#5: OFF
Direction detection	Disabled (factory value)	Enabled


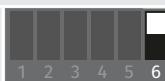
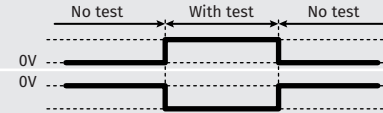

### DOOR CONTROLLER TEST INPUT CONFIGURATION

When connected to a door controller without a TEST input, set to "high".

When connected to a door controller with a TEST input, set to "low". See the "Event time table"



Set to "Low" to comply EN16005 standard.

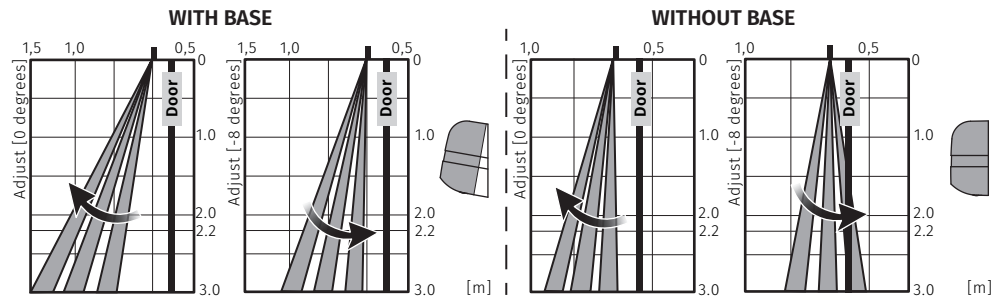
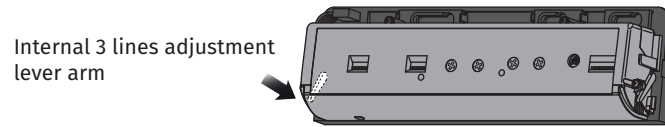
Direction detection	Dip switch #6 		
High (factory value)	#6: ON		
Low	#6: OFF		



## 04. CONFIGURATION

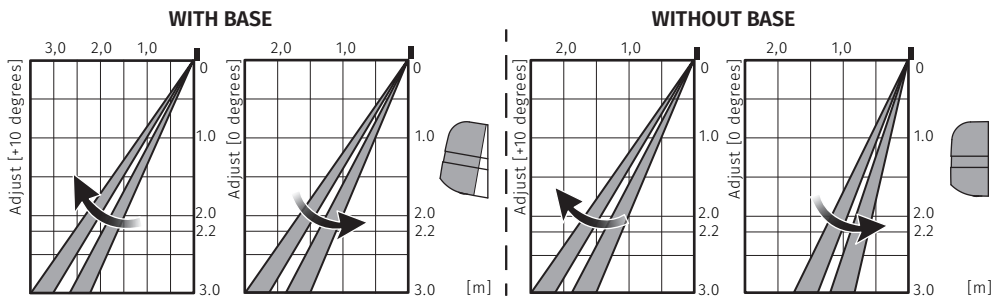
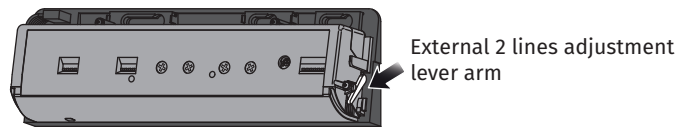
### DETECTION AREA DEPTH ADJUSTMENT: 3 INTERNAL LINES

- 01 • Angle Adjustment - Adjust the detection pattern  $0^\circ$  or  $-8^\circ$  by moving the angle of the body.
- 02 • Adjust the detection width by adjusting the 3 internal lines adjustment lever arm, marked in the image below.



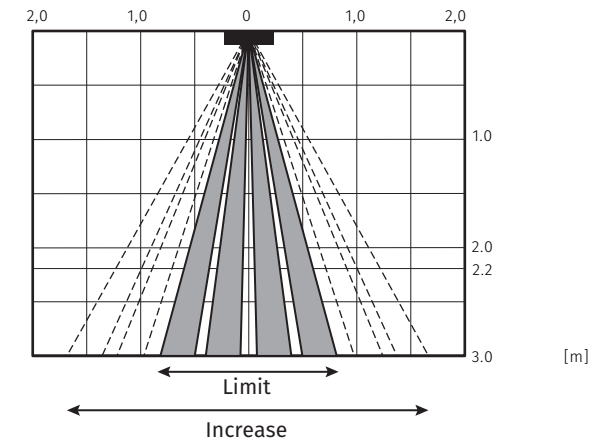
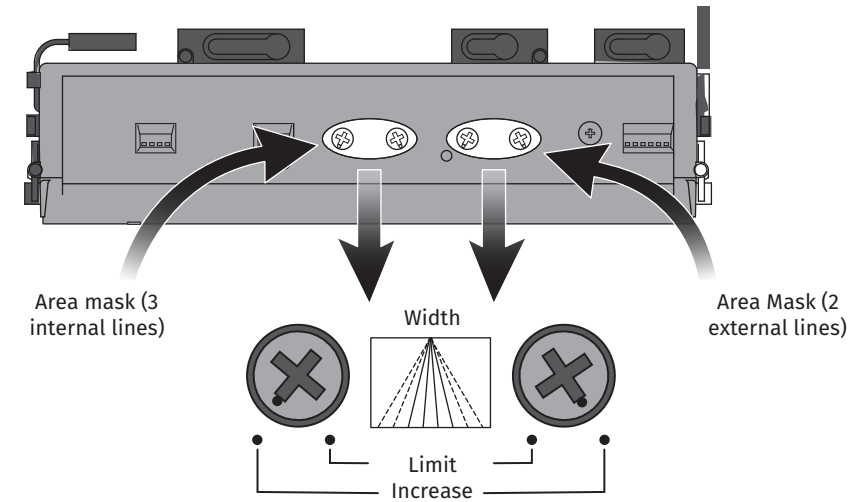
### DETECTION AREA DEPTH ADJUSTMENT: 2 EXTERNAL LINES

- 01 • Angle Adjustment - Adjust the detection pattern  $0^\circ$  or  $-8^\circ$  by moving the angle of the body.
- 02 • Adjust the detection width by adjusting the adjustment lever arm of the 2 external lines, marked in the image below.



## 04. CONFIGURATION

### DETECTION AREA WIDTH ADJUSTMENT



The detection areas shown in the illustration above represent the actual position of the infrared rays. The actual detection area observed will vary depending on the sensor installation environment, the object being detected and the sensor settings. Check that the detection area is set to comply with EN16005.

## 04. CONFIGURATION

### POWER CONNECTION AND RECOGNITION ADJUSTMENT



See page 7B of the manual, to configure the **Z** #5

LED	Behavior	Entrance Recognition Offline
Green		When connected to power, the green LED turns on, indicating that the sensor is in standby mode and ready to start detection.
		<b>Presence detection:</b> Presence detection on all detection lines starts 10 seconds after switching on the sensor. If within 10 seconds someone is walking through the detection area, about 5 seconds will be added after the person leaves the detection area, after which presence detection will be operational.
LED	Behavior	Entrance Recognition Online
Red		When connected to power, the red LED indicates an open relay output from the door to start the entrance recognition process.
Green (flashing)		The green LED flashes for 37 seconds while the "door recognition" process is in progress. The door opens/closes.
Green		Door recognition process completed, sensor in standby mode.
		<b>Presence detection:</b> during the "entrance recognition" process, the sensor's four external lines switch from motion detection to presence detection, 10 seconds after connecting to power. The internal detection line of "door recognition" will be changed from motion detection to presence detection after the "entrance recognition" process.  Allocation and execution of "entrance recognition": if a person enters the detection area during the "entrance recognition" process, it may not be performed correctly. In this case, the sensor will go through the process of entrance recognition in three door activations by one person to create an accurate image of the open and closed position of the door.

## 04. CONFIGURATION

### POWER CONNECTION AND RECOGNITION ADJUSTMENT



When entrance recognition is active, the sensitivity level of the internal detection line is only at maximum when the external detection lines are enabled.

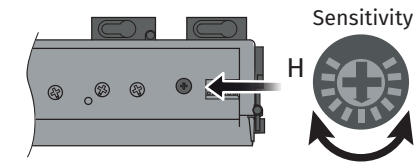
Turn off sensor power when performing the following work:

- When the floor is changed by placing a carper, etc.;
- By adjusting detection area pattern or sensor sensitivity.

### OPERATION CHECK

After the installation is complete, execute a walk test on the detection area to verify the location. If the detection area is not as expected, adjust it as described on page 8A or 8B increase the detection lines using Dip switch X #3 and #4.

If the detection area still does not work as expected, you can increase the sensitivity of the sensor by turning the potentiometer clockwise. When the sensor detects even when there is nothing in the detection area, the sensitivity of the sensor can be lowered by turning the potentiometer counterclockwise.

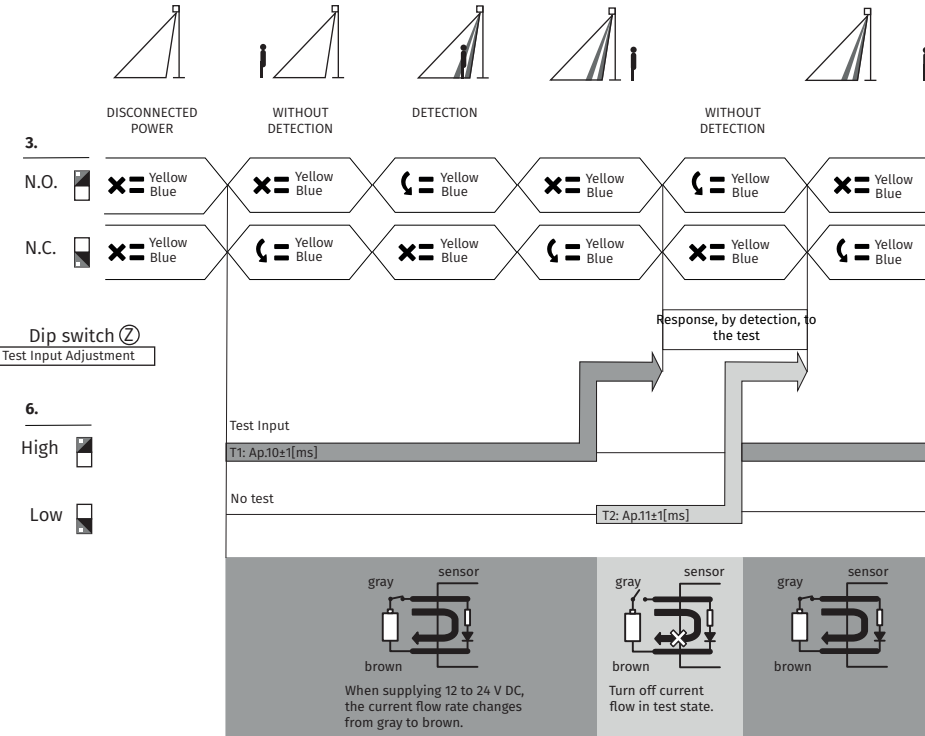


# 04. CONFIGURATION

## EVENT TIME DIAGRAM

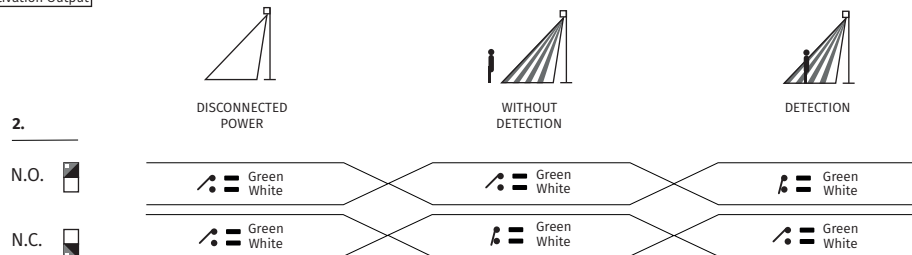
### Safety Output Line 1, 2/ Test Input

Dip switch ①  
Safety output



### Activation output line 2, 3, 4, 5

Dip switch ②  
Activation Output

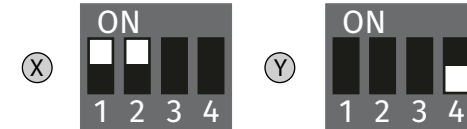


# 05. MAINTENANCE

## DOOR MAINTENANCE TASKS

When performing door maintenance with the sensor connected to the power, on the door controllers connected to "test" the sensor, be sure to set the DIP switches.

**Note** • Remember to return the DIP switch settings to their original state when door maintenance is performed.



## AUTO-DIAGNOSIS

Technical sensor problems are indicated by a flashing green/red LED. The flashing frequency indicates the type of problem.

Flashing frequency	LED	Cause
Fast		Replace the sensor.
Slow		Confirm the sensitivity potentiometer is set and reconnect the sensor. If the error persists, set Dip switch Y #4 to "Low Reflection".

## 06. TROUBLESHOOTING

### INSTRUCTIONS FOR FINAL CONSUMERS / SPECIALIZED TECHNICIANS

Anomaly	LED	Probable cause	Solution
The door doesn't open when a person enters in detection area	Deactivated	The sensor's connector isn't properly connected.	Tighten or reconnect the connector.
		Incorrect supply voltage.	Apply the proper voltage to the sensor (12-24V ac/dc).
		Incorrect sensor connection.	Recheck sensor connection.
The door opens and closes for no apparent reason	The door opens, red The door closes, green	Move object in detection area.	Remove the moving object from the detection area.
		Very high sensitivity for the installation environment.	Lower the sensor sensitivity setting.
		Dust, ice or water drops in the sensor lens.	Clean the sensor lens and install a protection cover if necessary.
		The detection area corresponds to another sensor.	Check if the frequency setting of each sensor is different.
		Snow detection, insects, leaves, etc.	Set supervision mode switch ②3 to "snow".
When the door opens or closes	Orange	The detection line "line 1" "line 2" when "entrance recognition" is activated is oriented very close to the door.	Adjust the detection depth to 3 internal lines furthest from the door.
The door opens and remains opened	Red	The detection area changes while the infinite presence timer setting is in use.	Turn the sensor back on or change the presence timer settings from 30 to 60 seconds.
		Incorrect sensor connection.	Recheck sensor wiring.
		Reflected signal saturation.	Remove very bright objects from the detection area. Decrease the sensor sensitivity setting.
	Green/red fast flashes	Internal sensor error.	Replace the sensor.
	Green/red slow flashes	The reflection of the infrared signal transmitted from the ground is very low.	Increase the sensitivity of the sensor or change the dip switch Y 4 of "Reflection Diagnostics" from "Normal" to "Low".
	Orange slow flashes	Adjustment mode (dip switch ②4 active).	Disable dip switch ②4 of "Adjust mode".