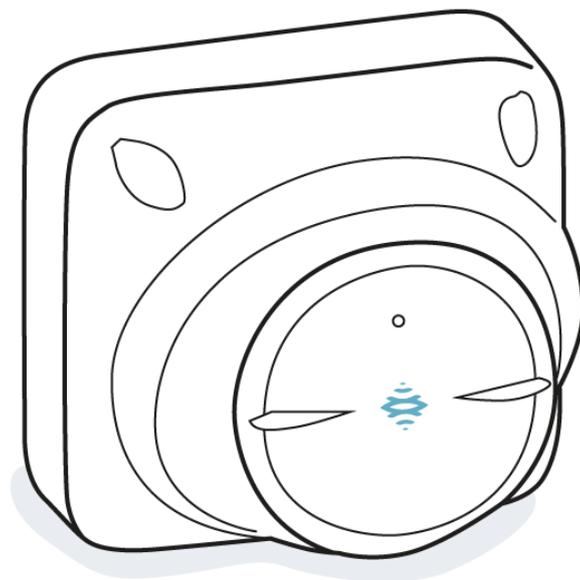




# MSK-101-MM

**Intelligent motion sensor**



**Installation instructions**  
**v1.7 - EN**

Carefully read this manual in its entirety.

You will find useful information to take full advantage of the product's potential, use it safely and obtain the best results.

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## Instruction updates

Publication date	Code	Updates
OCT 2018	msk-101-mm_instructions_en_us v1.7	Modified United Kingdom and France national restrictions Integrated examples of field of vision with animal tolerance limit Corrected field of vision corner dimensions Added list of interfering materials Integrated calibration (automatic and manual) Other minor changes UL certification
AUG 2018	msk-101_advanced_config_en_us v1.6	Modified dongle connection illustration Modified relay voltage
MAY 2018	msk-101_advanced_config_en_us v1.5	Specified interference with neon tubes Corrected illustrations of examples of the field of vision Specified need for shielded cable
APR 2018	msk-101_instructions_en_us v1.4	Modified and completed application illustrations Added chapter "Useful conventions for requesting assistance" on page 20
MAR 2018	msk-101_instructions_en_us v1.3	Added perforated base dimensions
FEB 2018	msk-101_instructions_en_us v1.2	Added barrier assembly accessory (MSK-101-BM) Added Dongle caddy accessory (MSK-101-DH)
JAN 2018	msk-101_instructions_en_us v1.0	First publication

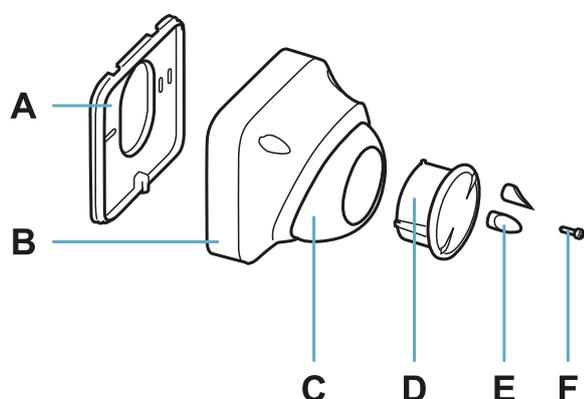
## Provided documentation

Document	Code	Date	Distribution format
Installation instructions (this manual)	msk-101-mm_instructions_en_us v1.7	OCT 2018	PDF online
Advanced configuration manual	msk-101-mm_advanced-config_en_us v1.7	OCT 2018	online manual PDF online

## Get to know MSK-101-MM

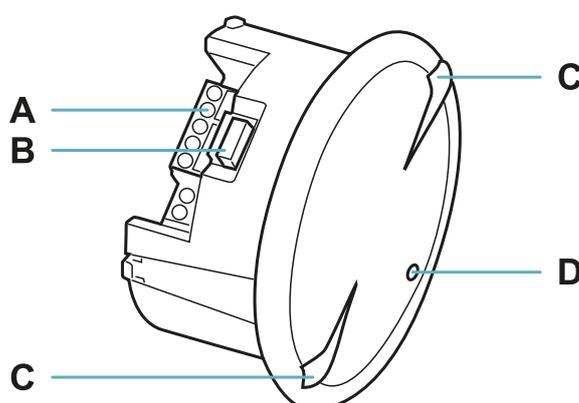
### MSK-101-MM

#### Main components



Part	Description
A	Perforated housing base for adaptation to the main junction boxes  <b>!</b> <i><b>IMPORTANT:</b> the base of the container is, together with the two fastening screws (not provided), an integral part of the sensor anti-removal and anti-tear system.</i>
B	Sensor housing
C	Adjustable support for the sensor with integrated fastening screws
D	Sensor
E	Caps to cover the fastening screws of the adjustable support
F	Box-base fastening screw  <i><b>Note:</b> the container-base fastening screw is not a part of the sensor anti-removal and anti-tear system.</i>

#### Sensor



Part	Description
A	Terminal block for connecting power supply and four relays
B	Connector for connecting the dongle
C	Sensor plane indicators (horizontal or vertical)
D	LED

### Applications

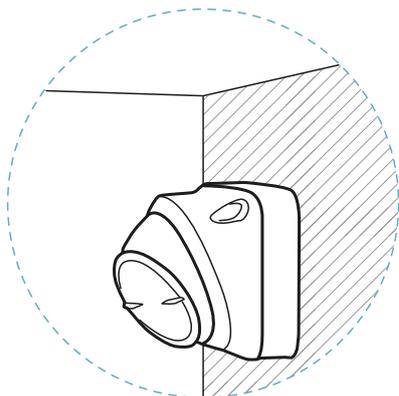
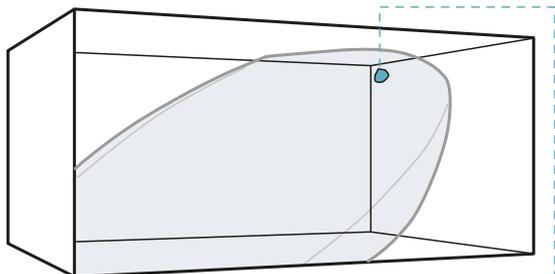
#### Types of applications

The sensor is suitable for indoor and outdoor installations and can be mounted on the wall or ceiling.

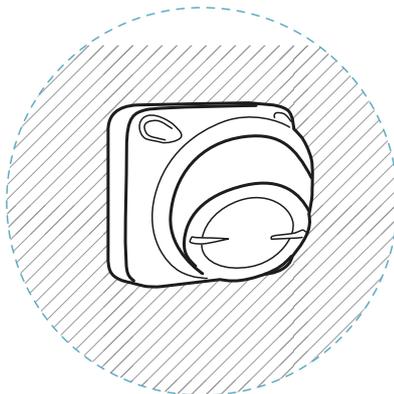
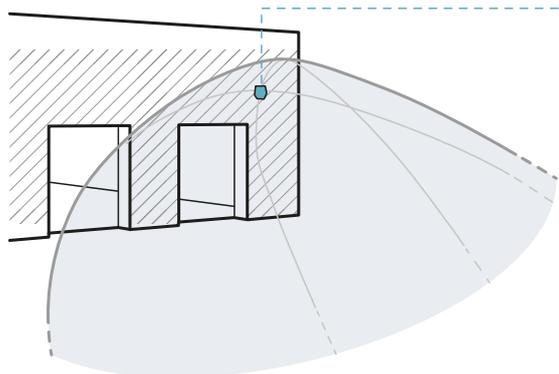
According to the direction, the sensor can be:

- a volumetric sensor to monitor a large area (horizontal direction).
- barrier sensor to monitor a perimeter area, creating a protective barrier against access along a wall or gate (vertical direction).

### Examples of volumetric sensor installation

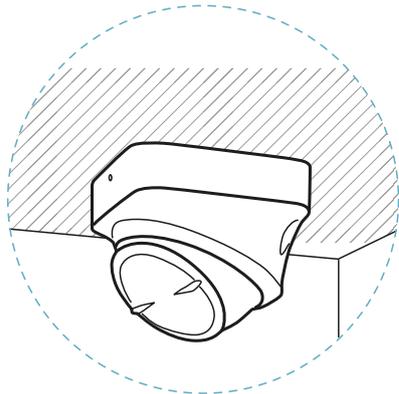
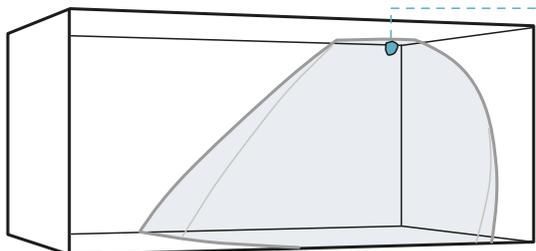


Indoor wall installation.

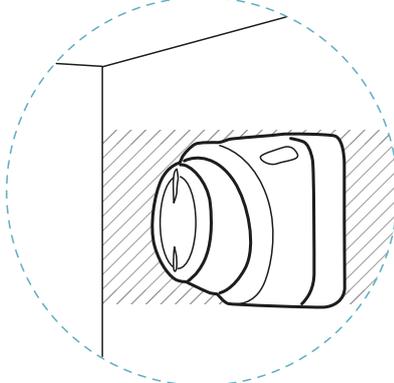
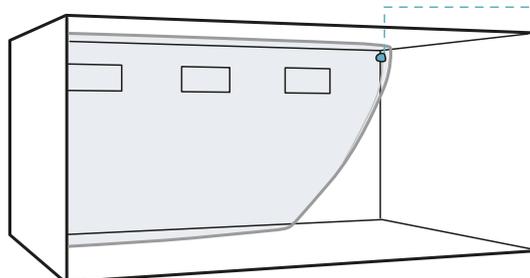


Outdoor installation.

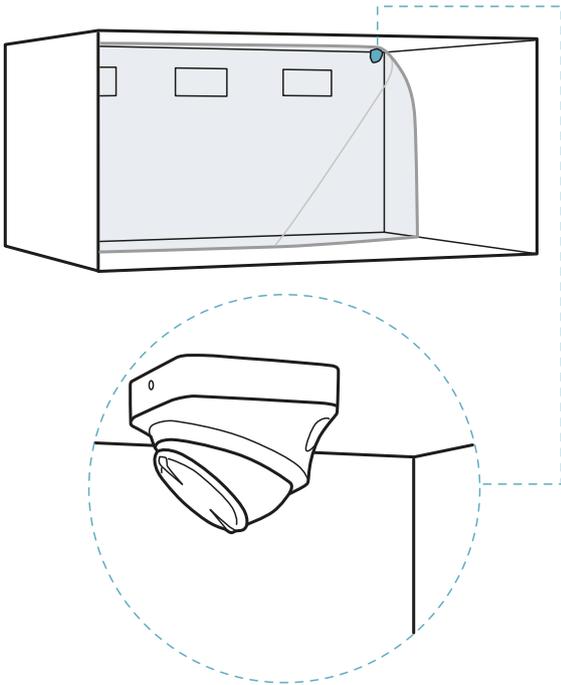
### Examples of barrier sensor installation



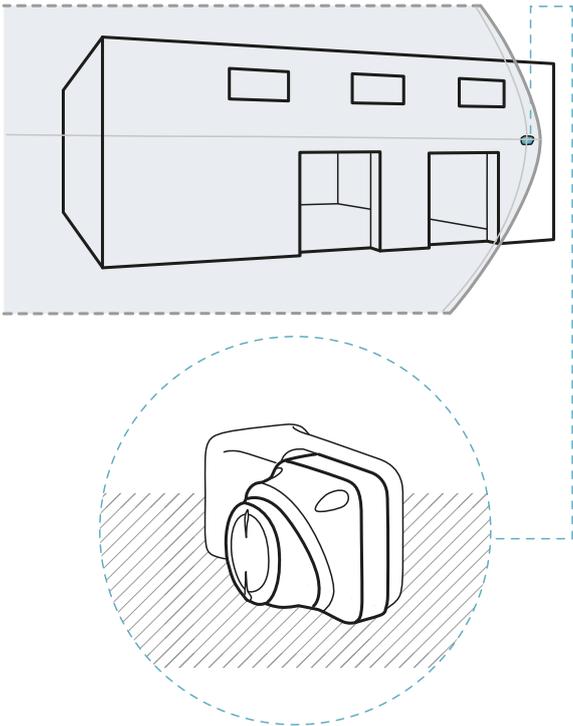
Indoor ceiling installation.



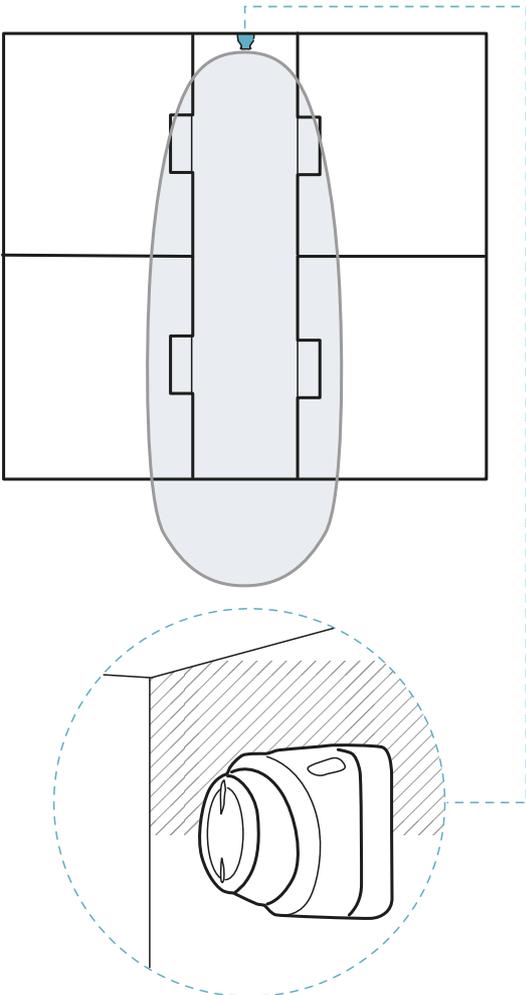
Indoor wall installation.



Indoor ceiling installation.



Outdoor installation with adapter.

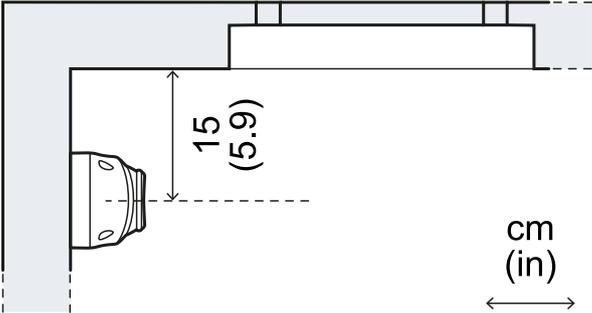


Indoor hallway installation.

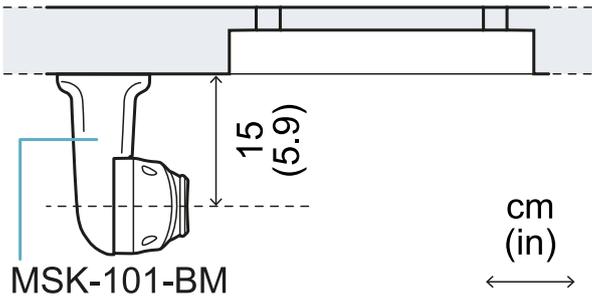
### Barrier configuration

#### Adapter for barrier assembly

Barrier installation for protection of a wall or window requires the sensor to be installed at approximately 15 cm (5.9 in) from the same wall. If other adequate supports are not available, an adapter is necessary for assembling the barrier (product code: MSK-101-BM).



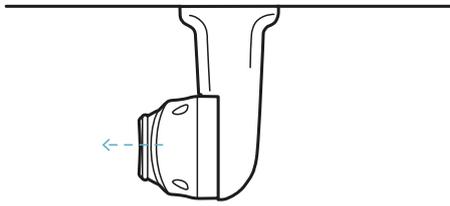
Example of installation without adapter.



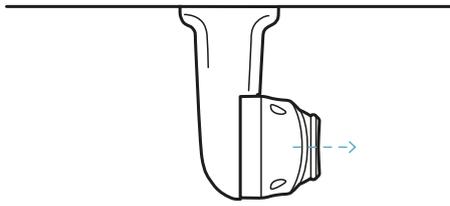
Example of installation with MSK-101-BM adapter.

### Sensor direction

The MSK-101-BM adapter, according to the installation method, allows directing the sensor to the left or the right.



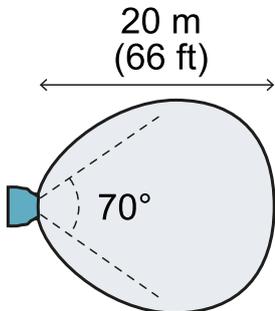
Sensor directed towards the left.



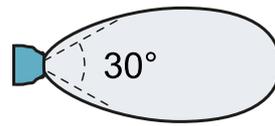
Sensor directed towards the right.

### Field of vision

#### Range of the field with horizontal sensor direction (volumetric)

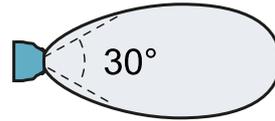
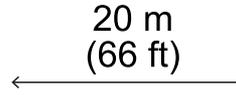


Top view.

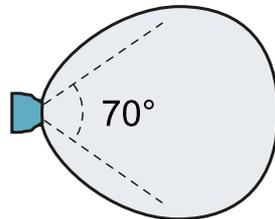


Side view.

#### Range of the field with vertical sensor direction (barrier)

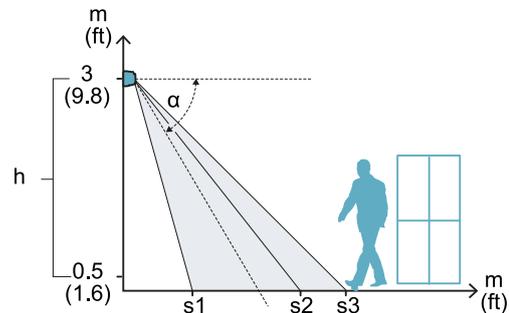


Top view.



Side view.

#### Calculation of the field of vision



The actual field of vision of the sensor (detection start and end -  $s_1$  e  $s_3$ ) depends on:

- sensor installation height ( $h$ )
- sensor direction (horizontal or vertical)
- sensor inclination ( $\alpha$ )

Within the field of vision, discernment of animals is guaranteed up to a certain distance from the sensor ( $s_2$ ). Per dettagli sulla discriminazione degli animali, fare riferimento al manuale di configurazione avanzata.

Based on a specific installation height, there are direction and inclination combinations that guarantee optimum performance. Some examples to better explain the effects of height and inclination are presented as follows.

## Examples of the field of vision with horizontal sensor direction (volumetric)

**NOTICE:** the detection start and end values do not guarantee detection of a standing person. The reported values may slightly vary based on the installation conditions.

**Note:** only some heights are reported, but every intermediate value is allowed and guarantees optimum performance.

The dimensions of the field of vision expressed in meters and feet are as follows.

h (m)	α (°)	s <sub>1</sub> (m)	s <sub>2</sub> (m)	s <sub>3</sub> (m)
1	0	0.5	*	20
1.5	0	0.5	20	20
2	-15	2.5	16	16
2	-30	2	7.5	10
2.5	-15	3	17	17
2.5	-30	2.5	7	10
2.5	-45	2	6.5	6.5
3	-30	2.5	7	10
3	-45	2	4.5	6.5

h (ft)	α (°)	s <sub>1</sub> (ft)	s <sub>2</sub> (ft)	s <sub>3</sub> (ft)
3.2	0	1.6	*	65
4.9	0	1.6	65	65
6.5	-15	8.2	52	52
6.5	-30	6.5	25	32
8.2	-15	9.8	55	55
8.2	-30	8.2	23	32
8.2	-45	6.5	21	21
10	-30	8.2	23	32
10	-45	6.5	15	21

**Note \*:** discernment of animals is not guaranteed in the entire field of vision.

## Examples of the field of vision with vertical sensor direction (barrier)

**NOTICE:** the detection start and end values do not guarantee detection of a standing person. The reported values may slightly vary based on the installation conditions.

**Note:** only some heights are reported, but every intermediate value is allowed and guarantees optimum performance.

The dimensions of the field of vision expressed in meters and feet are as follows.

h (m)	α (°)	s <sub>1</sub> (m)	s <sub>2</sub> (m)	s <sub>3</sub> (m)
1	0	0.5	*	20
1.5	0	0.5	20	20

h (m)	α (°)	s <sub>1</sub> (m)	s <sub>2</sub> (m)	s <sub>3</sub> (m)
2	-15	2	20	20
2	-30	1	16	16
2.5	-15	2	20	20
2.5	-30	1	20	20
2.5	-45	1	16	18
3	-15	2	20	20
3	-30	1	20	20
3	-45	1	12	15

h (ft)	α (°)	s <sub>1</sub> (ft)	s <sub>2</sub> (ft)	s <sub>3</sub> (ft)
3.2	0	1.6	*	65
4.9	0	1.6	20	65
6.5	-15	6.5	20	65
6.5	-30	3.2	16	52
8.2	-15	6.5	20	65
8.2	-30	3.2	20	65
8.2	-45	3.2	16	59
10	-15	6.5	20	65
10	-30	3.2	20	65
10	-45	3.2	12	49

**Note \*:** discernment of animals is not guaranteed in the entire field of vision.

## Interferences

### Introduction

The MSK-101-MM sensor is different from other traditional motion sensors. It is important to know what factors interfere in its correct functioning, to properly install, configure it and to obtain optimum performance, per informazioni dettagliate vedi Manuale di configurazione avanzata.

### Interference with neon tubes

In the presence of neon tubes, respect the minimum sensor inclination indicated so that the tube does not interfere with the sensor:

Sensor direction	Minimum inclination (α)*
Horizontal	- 15°
Vertical	- 30°

**Note \*:** see "Examples of the field of vision with horizontal sensor direction (volumetric)" above and "Examples of the field of vision with vertical sensor direction (barrier)" above.

## Interfering materials

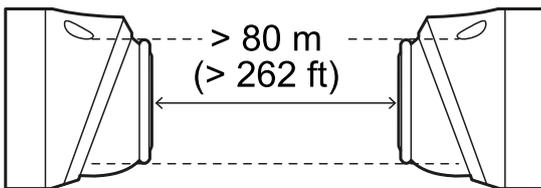
Below is a list of materials that could impact the sensor performance if they hide it:

- surfaces having metal-based paints or carbon-based paints
- tinted windows
- surfaces having EMI/RFI glasses or mirrors
- surfaces with water pipes, cables
- tiles having metal-based glaze including blue cobalt
- metal screen foil
- foil-backed insulation materials (e.g. foil)
- foil moist materials (e.g. cork)

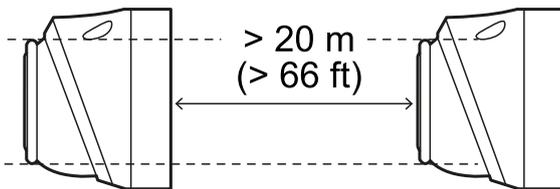
## How to install several sensors

Three possible combinations of sensor installation and the minimum distances to maintain between the sensors with the sensors aligned are presented as follows. Respecting these distances guarantees the performance levels indicated in section "Field of vision" on page 8.

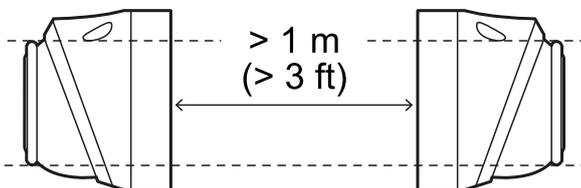
**NOTICE:** other combinations are possible, but their performance must be validated in the field.



Front-front combination



Front-back combination



Back-back combination

**Note:** the blind spot created in this combination is very wide. If possible, use the back-front configuration.

# 2

## Installation and use

### Before installation

#### Necessary components and tools

- Wi-Fi dongle (product code: WSYNC-RJ-WIFI or WSYNC-RJ-WIFI-US).
- Android or iOS device with Wi-Fi enabled and the Inxpect Security application installed (see "MSK-101-MM" on page 5).



**IMPORTANT:** to ensure correct functioning, allow all requested permissions for the application.

- Only for barrier applications and if necessary, adapter for assembly (product code: MSK-101-BM) (see "Barrier configuration" on page 7).
- Two screws up to M4 (No.6) for fastening to the wall or to the junction box.
- Screwdriver, wire stripper and fastening tools not provided.

#### Prepare for installation

**NOTICE:** to ensure effective functioning, the sensor must be installed in the best possible position and configured correctly. Carefully follow the instructions below.

Before installing the sensor, perform the following operations:

1. Define the sensor application type (see "Applications" on page 5).
2. Define the installation position, considering possible interferences (see "Interferences" on page 9).
3. Define the height of installation for the sensor to obtain the desired field of vision (see "Field of vision" on page 8).
4. Run a shielded cable with the necessary conductors from the alarm control unit to connect the sensor (power supply and relay outputs).
5. Only for installations with MSK-101-BM adapter, define the direction of the sensor (see "Barrier configuration" on page 7).

#### Warnings

**NOTICE:** damage to the device. Do not let dust or water near the sensor during installation.

#### Install MSK-101-MM

1. Assemble the sensor:

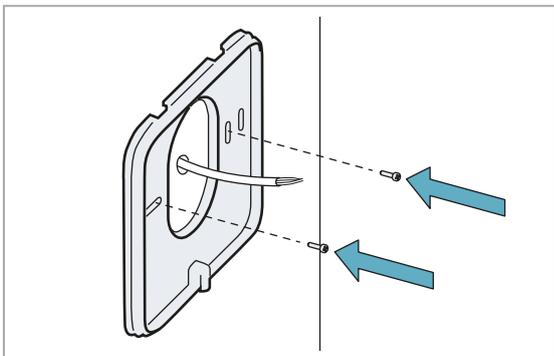
For...	And...	See...
barrier applications with adapter MSK-101-BM	sensor directed to the right	"Assemble the sensor with the MSK-101-BM adapter (sensor directed to the right)" on the next page
barrier applications with adapter MSK-101-BM	sensor directed to the left	"Assemble the sensor with the MSK-101-BM adapter (sensor directed to the left)" on page 13
all other cases	-	"Assemble the sensor" on the next page

2. "Connect the sensor to the alarm control unit" on page 14.
3. "Direct the sensor" on page 15.
4. "Connect the dongle and configure the sensor" on page 15.
5. "Fasten the sensor" on page 16.

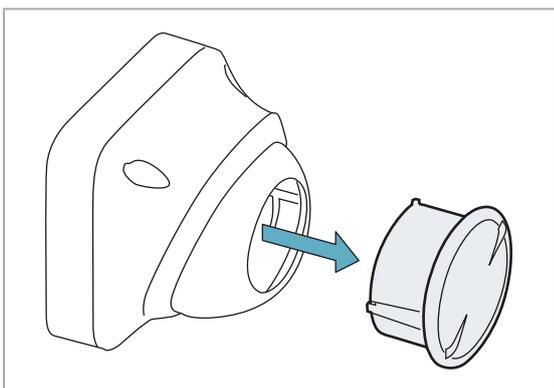
## Install and configure the sensor

### Assemble the sensor

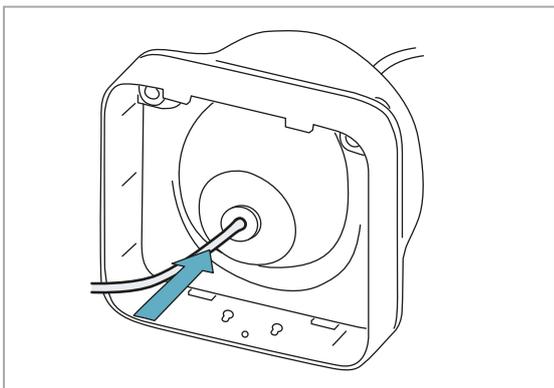
1. Using the prepared holes, fasten the base to the wall or to the junction box with two screws (not provided). See "Perforated base dimensions" on page 21.



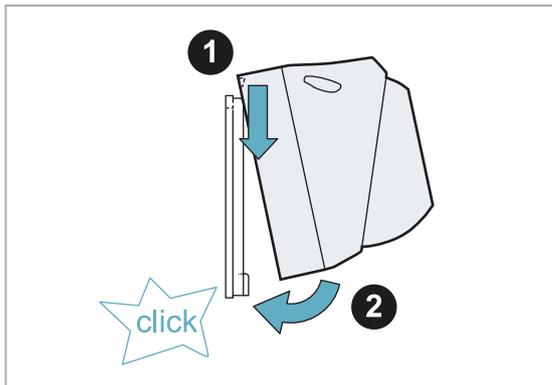
2. Extract the sensor from the adjustable support.



3. Pass the cable with the wires coming out of the alarm control unit into the sensor housing.

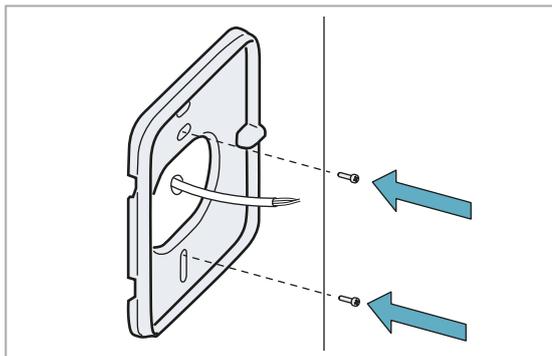


4. Fasten the sensor housing to the base.

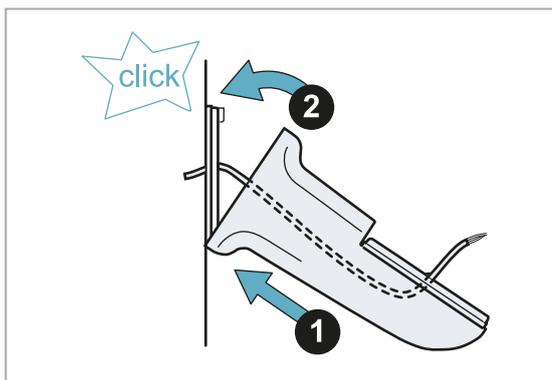


### Assemble the sensor with the MSK-101-BM adapter (sensor directed to the right)

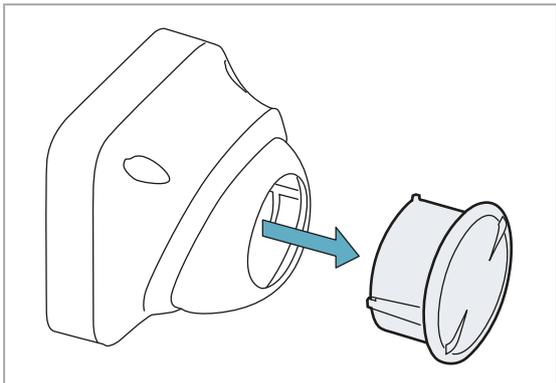
1. Using the prepared holes, direct the base of the sensor as shown in the figure and fasten it to the wall or to the junction box with two screws (not provided). See "Perforated base dimensions" on page 21.



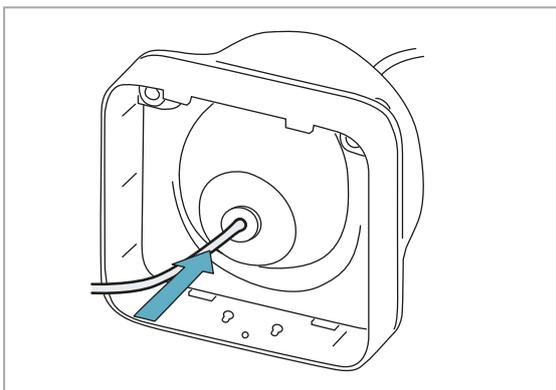
2. Assemble the adapter to the base, passing the cable with the wires coming out of the alarm control unit into the adapter.



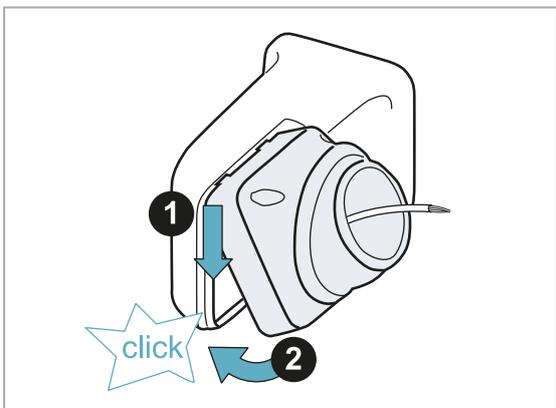
3. Extract the sensor from the adjustable support.



4. Pass the cable into the sensor housing.

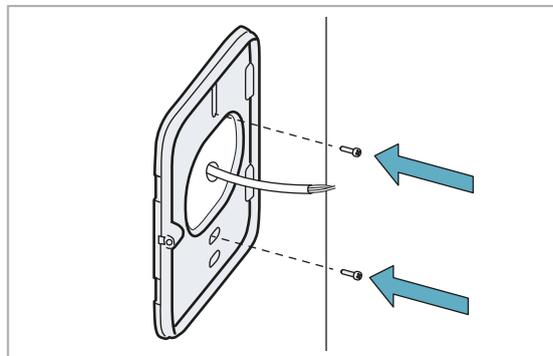


5. Assemble the sensor housing to the adapter.

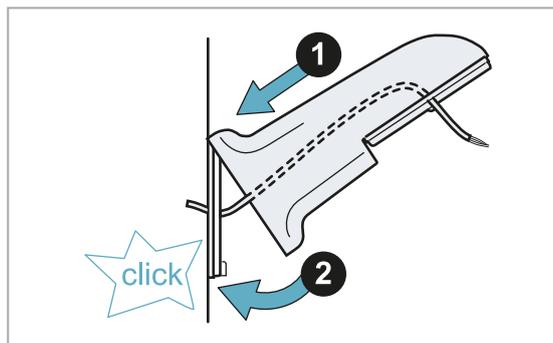


### Assemble the sensor with the MSK-101-BM adapter (sensor directed to the left)

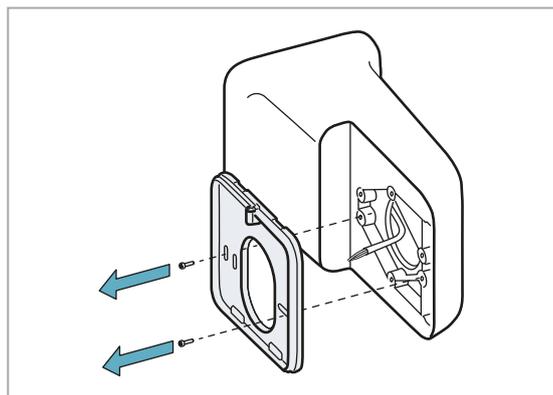
1. Using the prepared holes, direct the base of the sensor as shown in the figure and fasten it to the wall or to the junction box with two screws (not provided). See "Perforated base dimensions" on page 21.



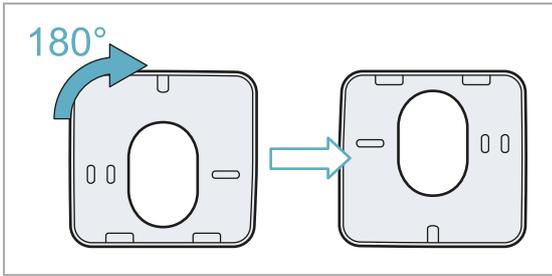
2. Assemble the adapter to the base, passing the cable with the wires coming out of the alarm control unit into the adapter.



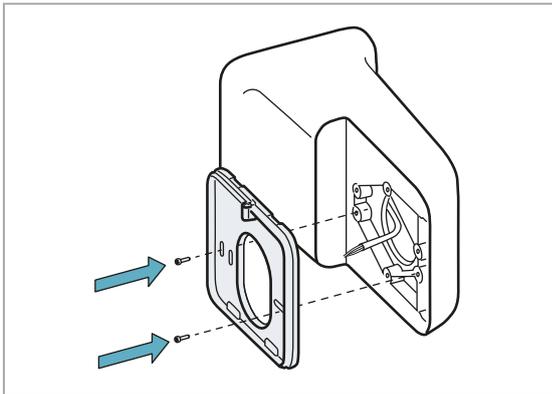
3. Unscrew the fastening screws on the pre-assembled base of the adapter.



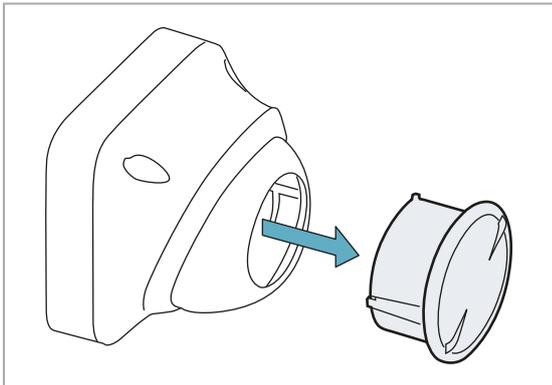
4. Turn the base 180°.



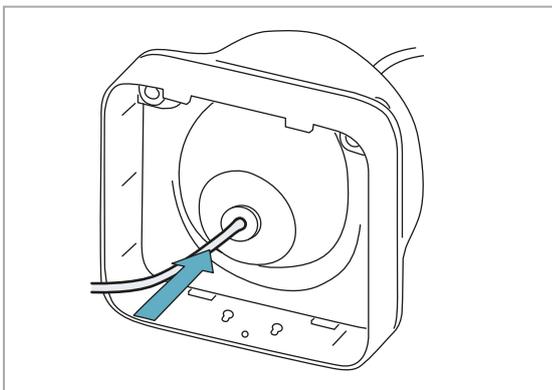
5. Tighten the screws.



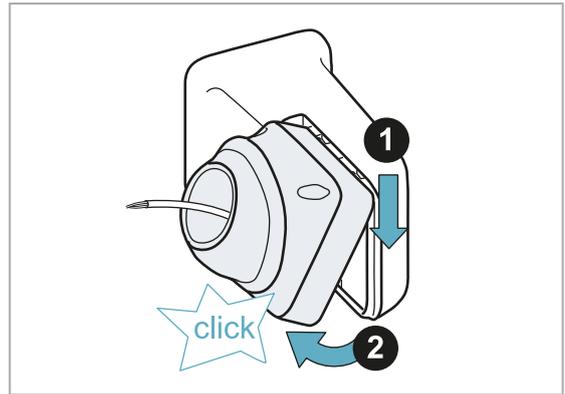
6. Extract the sensor from the adjustable support.



7. Pass the cable into the sensor housing.

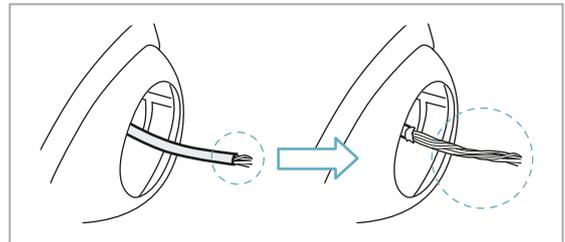


8. Assemble the sensor housing to the adapter.

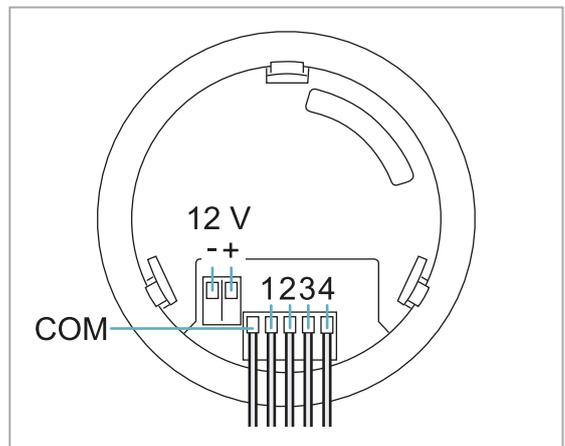


### Connect the sensor to the alarm control unit

1. Remove the sheath and the hose by at least 5 cm (2 in).

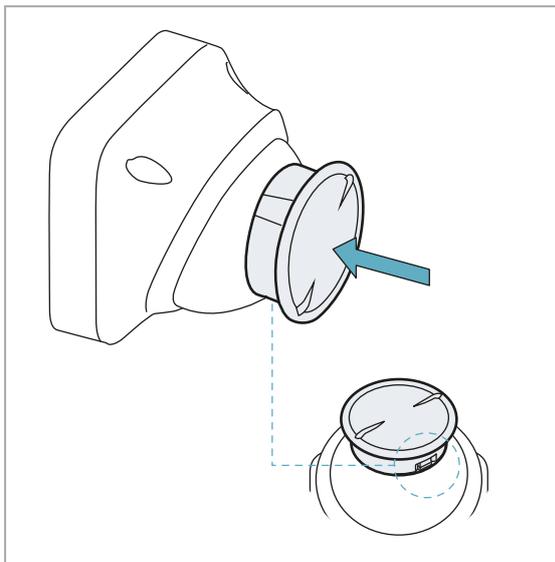


2. Connect the power supply and relay outputs. It is recommended to connect relay 3 (tampering) and 4 (fault) to a 24 h line from the alarm control unit.

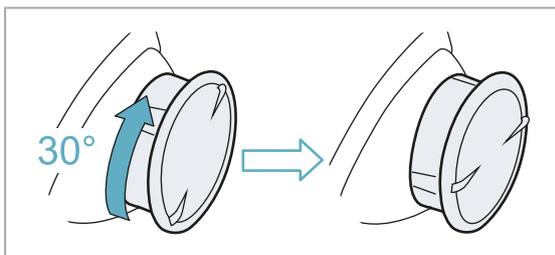


## Direct the sensor

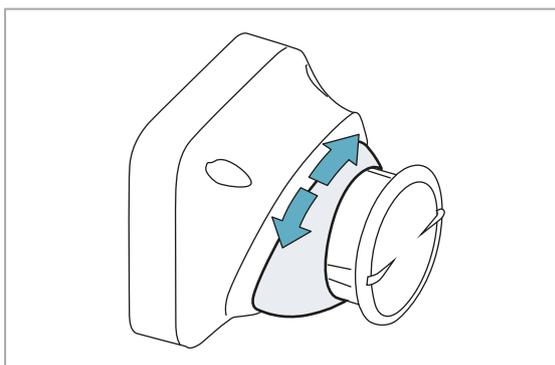
1. Insert the sensor into the adjustable support, leaving the connector in sight.



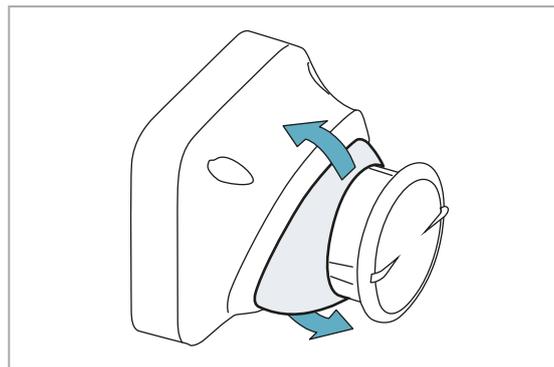
2. Turn the sensor to lock it into the adjustable support.



3. Turn the adjustable support to orient the sensor direction vertically (barrier application) or horizontally (volumetric application).

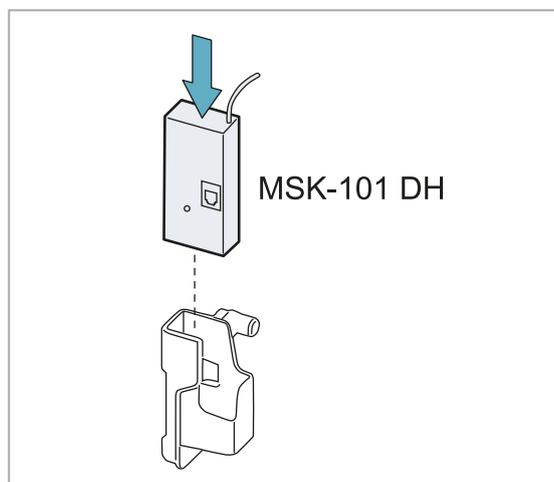


4. Tilt down the adjustable support to reach the desired sensor inclination.

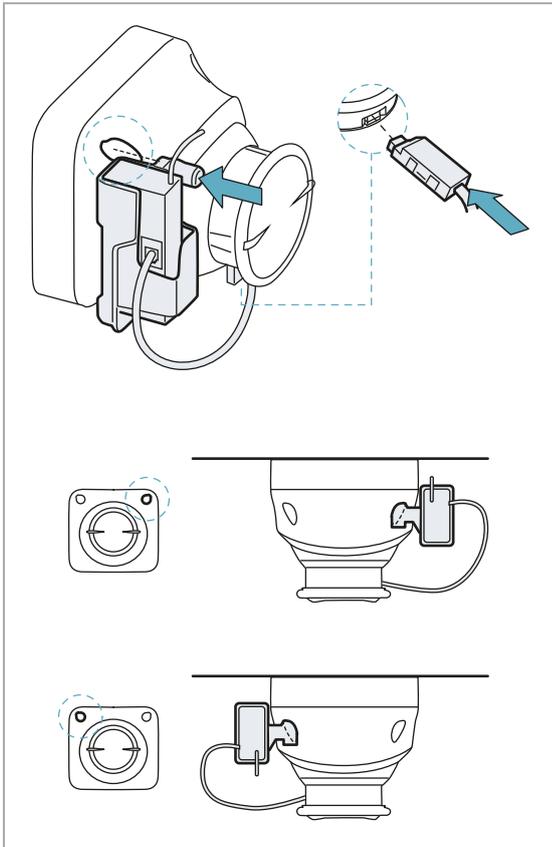


## Connect the dongle and configure the sensor

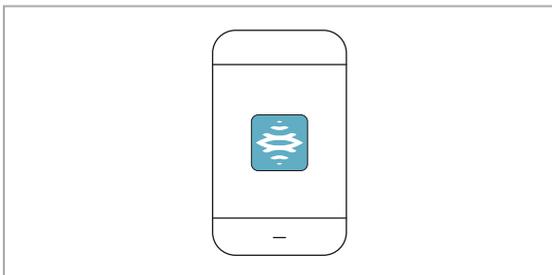
1. Insert the dongle into its caddy.



2. Connect the dongle and fasten it to the sensor. For 45° sensor inclinations downwards, see "45° downward inclination" below. It can be fastened to the right or left of the sensor.

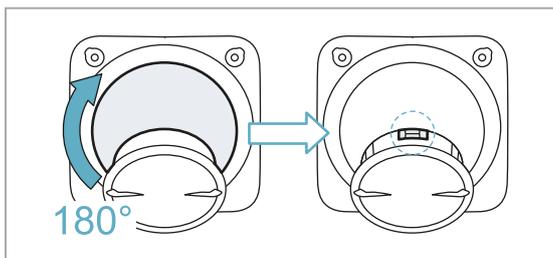


3. Use the Inxpect Security application to configure the sensor.



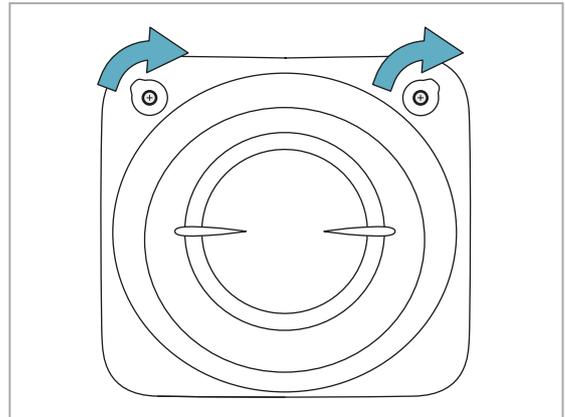
### 45° downward inclination

To make the connector for connecting the dongle accessible, turn the adjustable support by 180°.

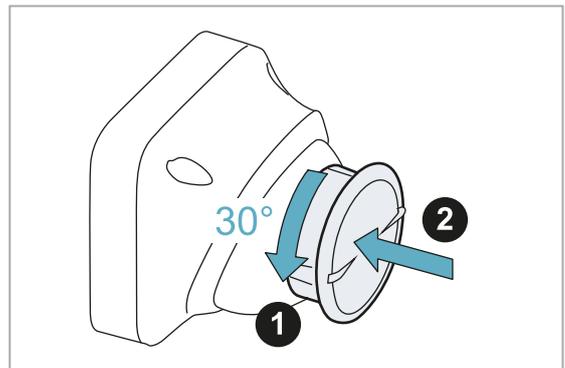


### Fasten the sensor

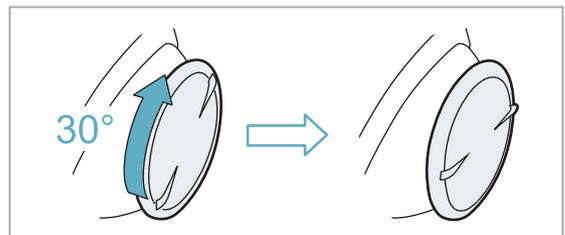
1. Tighten the screws to fasten the adjustable support. Check in the application that the adjustable support has not moved.



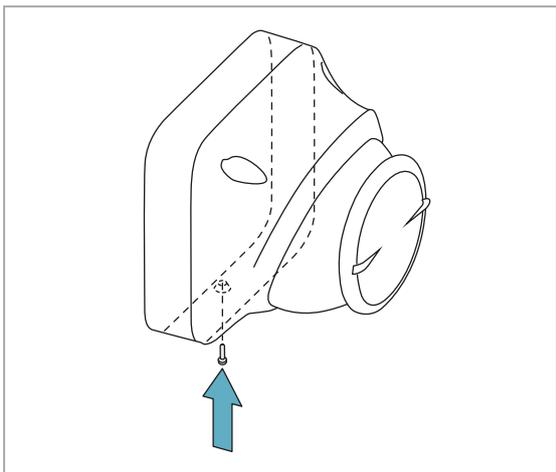
2. Disconnect the dongle. Hold the adjustable support firmly and completely insert the sensor.



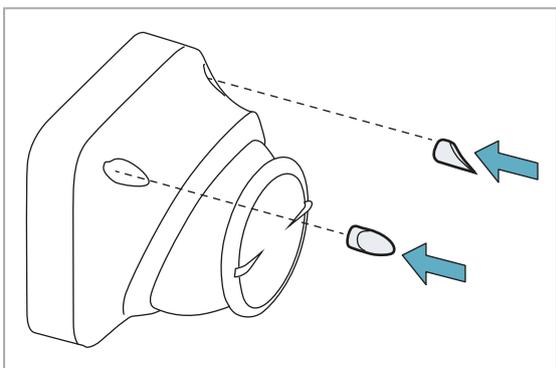
3. Turn the sensor to bring it back to the horizontal/vertical position.



4. Fasten the body of the sensor to the base using the provided screw.



5. Insert the provided caps.



# 3

## Appendix

### Technical data

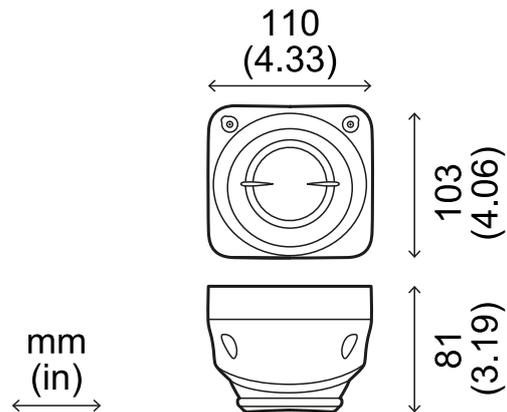
#### General specifications

<b>Detection method</b>	Inxpect motion detection motor based on FMCW radar
<b>Frequency</b>	Working band: 24–24.25 GHz Transmission power: ≤ 13 dBm Modulation: FMCW
<b>Detection interval</b>	From 0.5 to 20 m (from 2 to 66 ft), depending on the installation conditions. Configurable in 30 cm (1 ft) increments.
<b>Field of vision</b>	Sensor horizontal plane: 90° Sensor vertical plane: 30° Height: from 0.5 to 3 m (from 1.6 to 10 ft)
<b>Detection speed</b>	> 0.05 ms (2 in/s)
<b>Relays</b>	4 solid state relays, each max. 400 mA, 40 V dc(NO or NC configurable, default NC)
<b>Power supply</b>	12 V dc *
<b>Absorption</b>	max. 100 mA
<b>Electrical protections</b>	Inverted polarity Overcurrent through integrated fuse (max. 5 s @ 3 A)
<b>Dimensions</b>	103 x 110 x 81 mm (4.06 x 4.33 x 3.19 in)
<b>Material</b>	Technopolymer
<b>Operating temperature</b>	From -40 to +70 °C (from -40 to +158 °F)
<b>Degree of protection</b>	IP66 and IP68
<b>Cable diameter</b>	4–7 mm (0.16–0.27 in)
<b>Approvals</b>	  Contains FCC ID: UXS-SMR-3X4 Compatible with EN50131-2-3 class IV grade 3**

**Note \***: the device has been designed to be supplied by an external power supply unit for alarm systems, internally protected by a short-circuit.

**Note\*\***: the instructions presented in this manual are sufficient for meeting the requirements of standard UL639. Installations not consistent with these instructions could also comply with the standard.

#### MSK-101-MM dimensions



#### Perforated base dimensions

See "Perforated base dimensions" on page 21.

#### Disposal



MSK-101-MM contains electrical parts. Dispose separately using the relative recycling centers specified by the government or local public authorities.

Correct disposal and recycling will contribute to the prevention of potentially harmful consequences to the environment and population.

## Conformity and restrictions

### Declaration of conformity and certifications

The manufacturer, Inxpect SpA, declares that the type of radio equipment MSK-101-MM complies with the directive 2014/53/EU. The full EU declaration of conformity text is available on the company's website at the address [www.inxpect.com](http://www.inxpect.com).

At the same address all updated certifications are available for download.

### FCC Certification

MSK-101-MM complies with FCC CFR title 47, part 15, subpart B. It contains FCC ID: UXS-SMR-3X4.

Operation is subject to the following two conditions:

- this device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation

**NOTICE:** changes or modifications made to this equipment and not explicitly approved by Inxpect SpA may void the FCC authorization to operate this equipment.

### National restrictions

MSK-101-MM is a short range device in class 2 in accordance with the directive 2014/53/EU (RED - Radio equipment) and is subject to the following restrictions:

	UK	FR
---	----	----

In Regno Unito e in Francia, l'allocazione nazionale delle frequenze non permette il libero uso dell'intera banda 24-24,25 GHz. Impostare correttamente il paese nell'applicazione Inxpect Security e la banda autorizzata verrà automaticamente selezionata.

Restrictions in UK. In the United Kingdom, the national allocation of frequencies does not allow the free use of the whole band 24-24.25 GHz. Set the country correctly in the Inxpect Security application and the authorized band will be automatically selected.

Restrictions en FR. En France, la répartition nationale des fréquences ne permet pas la libre utilisation de la bande entière 24-24,25 GHz. Définissez le pays correctement dans l'application Inxpect Security et la bande autorisée sera automatiquement sélectionnée.

## Service and warranty

### Customer service

MAGNASPHERE Corp.  
N14 W23777 Stone Ridge Dr., Suite 160  
Waukesha, WI 53188  
Tel: (262) 347-0711  
Fax: 262.347.0710  
e-mail: [info@magnasphere.com](mailto:info@magnasphere.com)  
website: [www.magnasphere.com](http://www.magnasphere.com)

### How to return the product

If necessary, **pay to ship the product in its original packaging** to the area distributor, or directly to the exclusive distributor.

Area distributor	Exclusive distributor for North America
<i>Note distributor information here:</i>	MAGNASPHERE Corp. N14 W23777 Stone Ridge Dr., Suite 160 Waukesha, WI 53188 T. (262) 347-0711 F. 262.347.0710 <a href="mailto:info@magnasphere.com">info@magnasphere.com</a> <a href="http://www.magnasphere.com">www.magnasphere.com</a>

### Service and warranty

To find out about the terms of the warranty, exclusions and cancellation of the warranty, refer to the website [www.tsec.it](http://www.tsec.it).

## Download

### Download the application

[www.inxpect.com/stores.php](http://www.inxpect.com/stores.php)

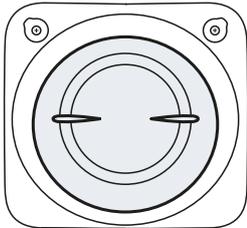


## Useful conventions for requesting assistance

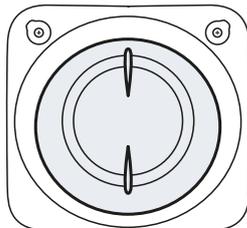
### Conventions

Some useful conventions to communicate with Inxpect SpA technical assistance are provided below.

### Type of application



**Volumetric**

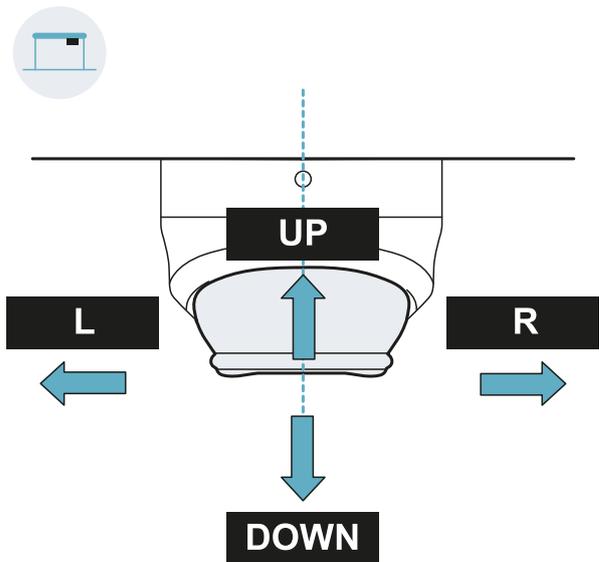
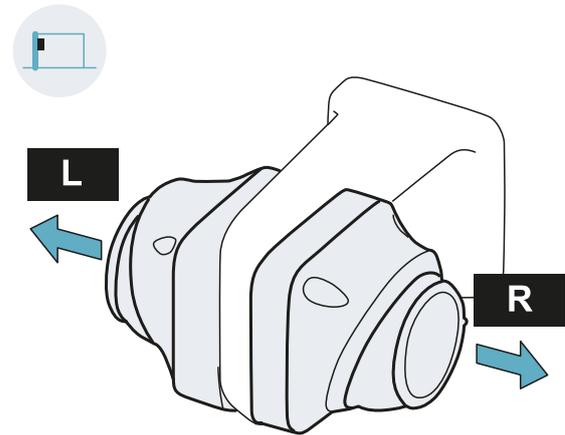
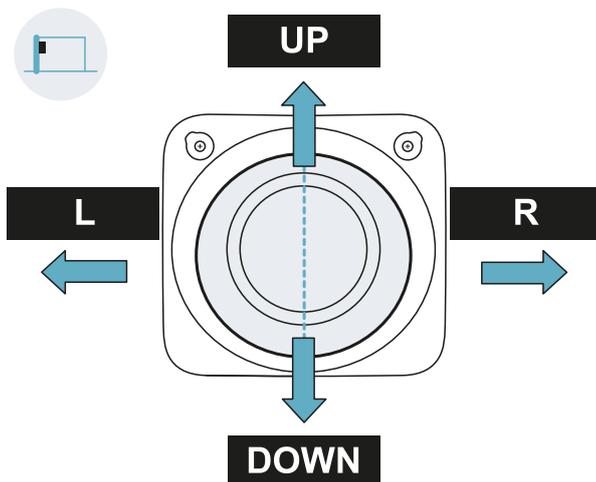


**Barrier**

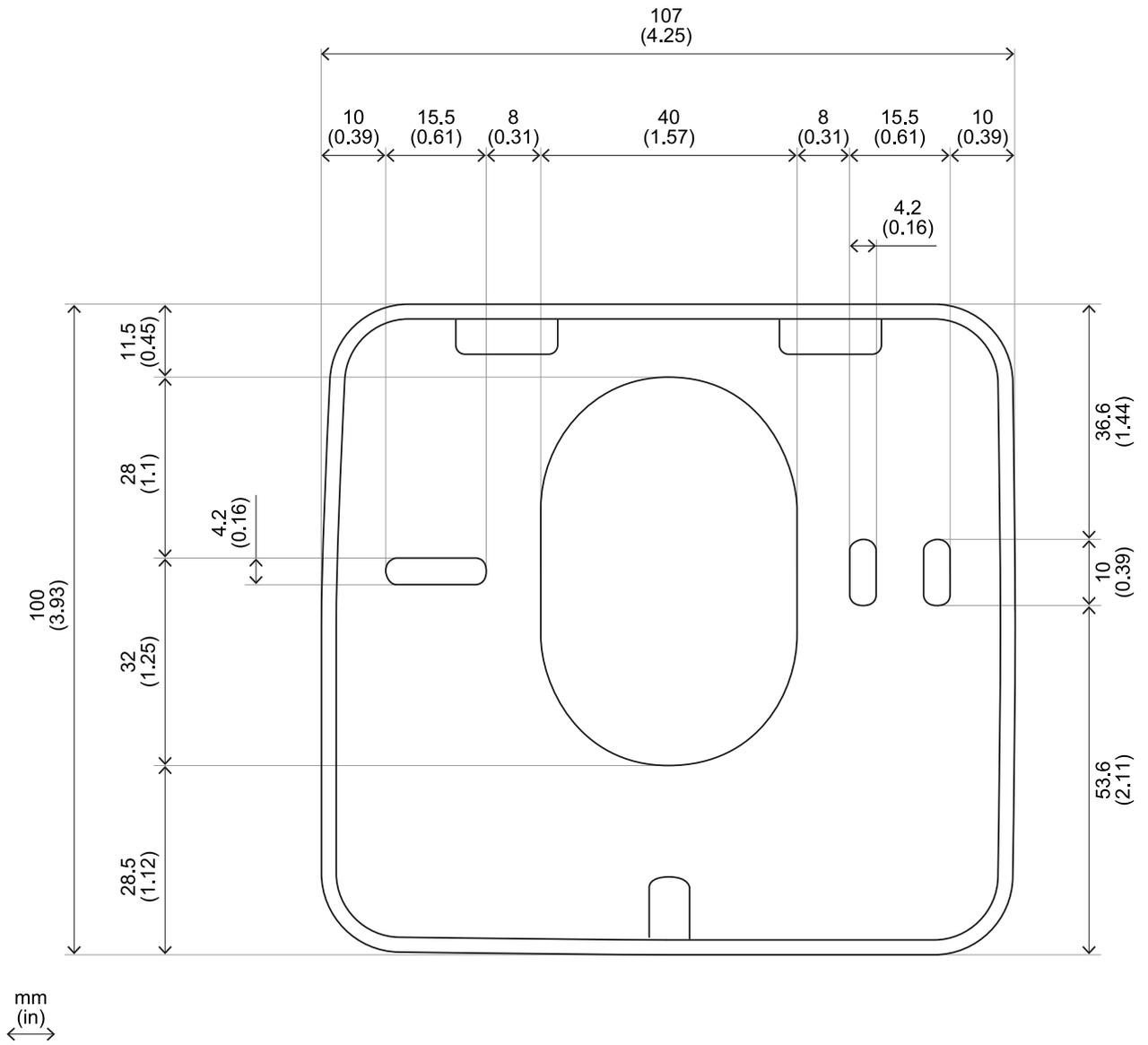
### Spatial direction

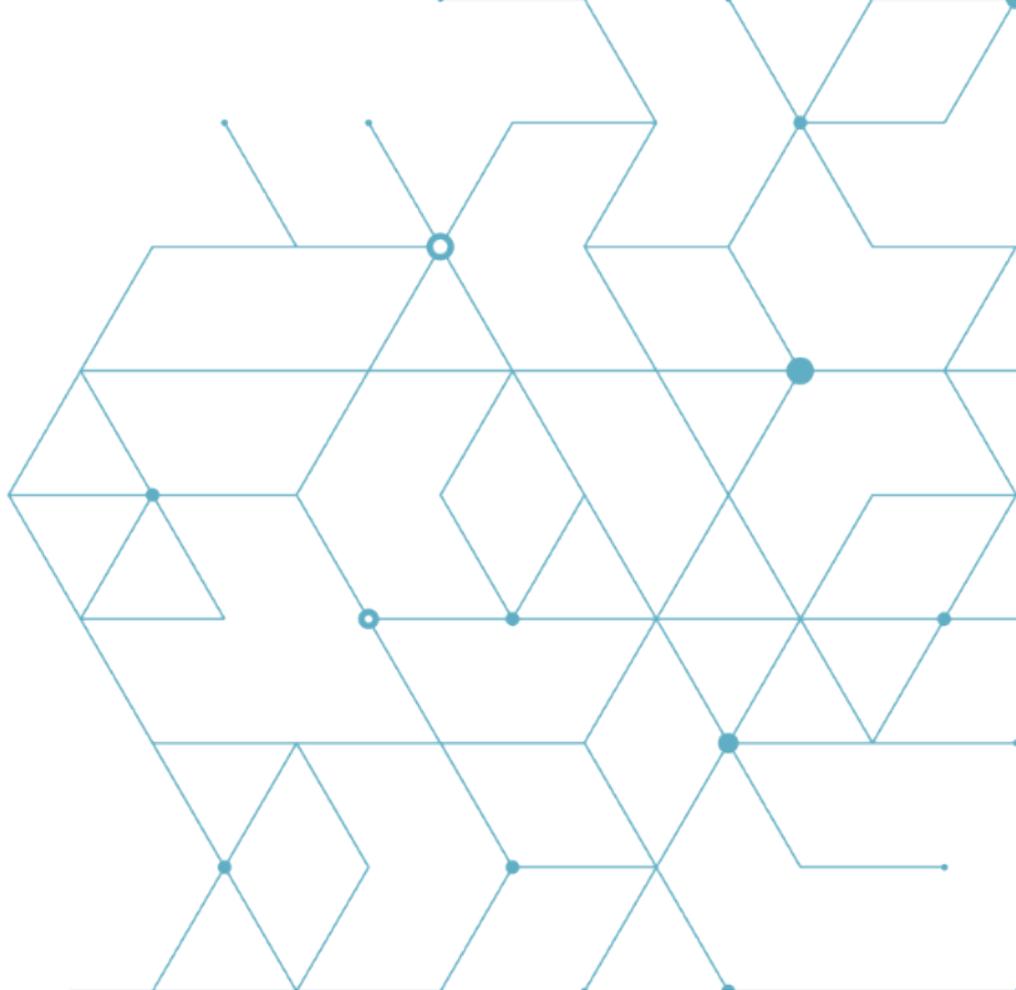
Legend

Icon	Description
	Wall installation
	Ceiling installation



# Perforated base dimensions





Exclusive distributor for North America:

**MAGNASPHERE Corp.**

N14 W23777 Stone Ridge Dr., Suite 160,

Waukesha, WI 53188

[www.magnasphere.com](http://www.magnasphere.com)

[info@magnasphere.com](mailto:info@magnasphere.com)

(262) 347-0711

Manufacturer:

**Inxpect SpA**

Via del Serpente, 91

25131 Brescia (BS)

Italy

[www.inxpect.com](http://www.inxpect.com)

[security@inxpect.com](mailto:security@inxpect.com)

+39 030 5785105

MSK-101-MM

Installation instructions v1.7

OCT 2018

[msk-101-mm\\_instructions\\_en\\_us v1.7](#)

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