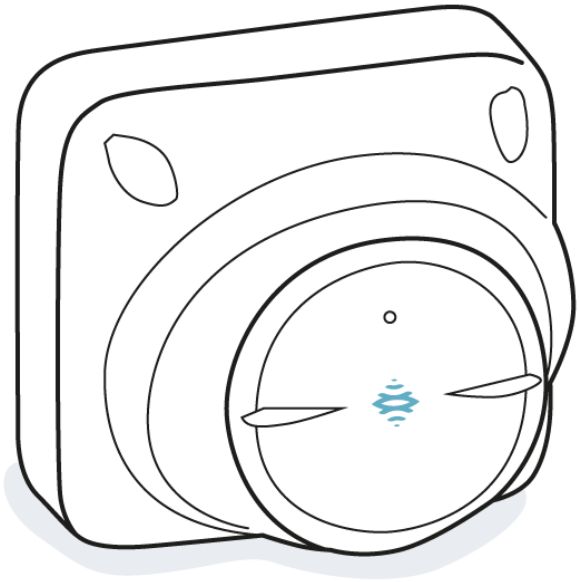
MAGNASPHERE MOTION BY INXPECT

MSK-101-POE-MM

Intelligent motion sensor
Power over Ethernet



Advanced configuration manual
v1.1 - 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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Contents

Manual updates

Publication date	Code	Updates
DEC 2019	msk-101-poe-advanced-config_en_us v1.1	Modified default IP address Modified web address for security products Added password insertion criteria Modified recommended value for manual calibration
AUG 2019	msk-101-poe_advanced-config_en_us v1.0	First publication

Provided documentation

Document	Code	Date	Distribution format
Advanced configuration manual (this manual)	msk-101-poe-advanced-config_en_us v1.1	DEC 2019	online manual PDF online
Installation instructions	msk-101-poe_instructions_en_us v1.1	DEC 2019	PDF online
Inxpect MSK-101-POE Rest API	msk-101-poe-RestApi	-	PDF online

Intended users of this manual

Designers, systems integrator and installers of anti-theft systems, previously trained by Inxpect. Only this training and the information provided in this manual ensures the designing and installing of effective anti-theft systems.

1. Get to know MSK-101-POE-MM

Contents

This section includes the following topics:

1.1 MSK-101-POE-MM

1.1.1 Description

MSK-101-POE-MM is an advanced motion sensor for high security intrusion detection systems. It connects to the local network and is powered via the Ethernet cable.

Thanks to a proprietary motion detection motor based on FMCW radar, it can detect intruders while minimizing false alarms triggered by small animals, moving objects or environmental conditions. A secure rest API system is used to view the status of the sensor and configure all parameters.

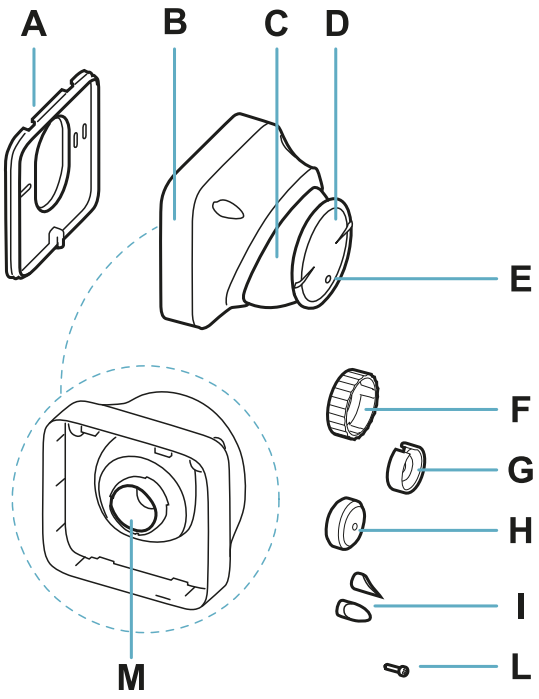
Thanks to IP66 and IP67 protection grade, it is suitable for indoor and outdoor installations.

1.1.2 Special features

The sensor calculates the distance and estimates dimensions of the moving object in real time, permitting advanced configuration possibilities in respect to traditional motion sensors. In particular, it is possible to:

- set a pre-alarm area at the margins of the monitored area for activation of deterrent actions (e.g.: turning on the lights)
- fine set the tolerance level for animals
- exclude any moving objects that would generate continuous false alarms from the monitored area

1.1.3 Main components



Part	Description
A	Perforated back plate for adaptation to the main junction boxes ***IMPORTANT**: the back plate is, together with the two fastening screws (not provided), an integral part of the sensor anti-removal and anti-tear system.*
B	Sensor case
C	Adjustable support for the sensor with integrated fastening screws
D	Sensor
E	LED
F	Ferrule
G	Cable protection ring
H	Cable protector
I	Caps to cover the fastening screws of the adjustable support

Part	Description
L	Fastening screw for case-back plate ***Note**: the case-back plate fastening screw is not a part of the sensor anti-removal and anti-tear system.*
M	Hole for access to the Ethernet port

1.1.4 LED

Status	Meaning
Steady red	Motion detected in alarm area
Flashing red	Motion detected in pre-alarm area
Purple	Sensor tampered with, faulty or masked
Flashing purple	Permanent failure. Contact technical assistance to repair or replace the sensor.
Blue	Motion signal processing in progress.
Flashing blue	Sensor initialization phase in progress. Requires a free area of approximately 1 m around the sensor and lasts 10-15 seconds. ***Note**: during the initialization phase, the masking signal is disabled.*

1.2 Configuration and communication

1.2.1 Introduction

The sensor communicates through a secure HTTPS connection that requires installation of a specific certificate. The certificate can be downloaded from the website www.inxpect.com/security/tools.

Thanks to REST type API, it is possible to read and write the configuration of the sensor and see the status.

Access to most of the operations is password protected.

1.2.2 Available information

The sensor provides the following information:

- the distance and dimension of the last detected object
- alarm signals for:
  - object detected in the alarm area
  - object detected in the pre-alarm area
  - tampering
  - masking
  - malfunction, error or failure

1.2.3 API documentation

For detailed information about the implemented APIs and to integrate them into your system, refer to the document Inxpect MSK-101-POE Rest API, which can be downloaded from the website www.inxpect.com/security/tools.

1.2.4 Web interface for configuration

The sensor can be easily configured through the integrated web interface, accessible via a web browser.

1.2.5 Access to the web interface

By default, the sensor tries to acquire a dynamic IP address through DHCP. If the operation fails, it acquires an IP through Auto IP (first attempt address: 169.254.1.50).

The web interface can be easily reached through the serial number of the sensor using protocols like NetBIOS and/or mDNS (see "Access to the web interface" on page 18). On the web interface it is possible to change the default settings, for example setting a static IP address.

2. Useful information for design

Contents

This section includes the following topics:

2.1 Applications

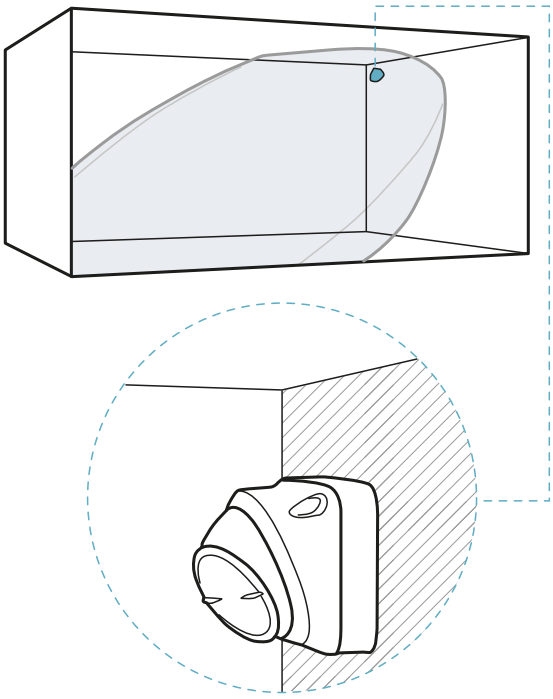
2.1.1 Types of applications

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

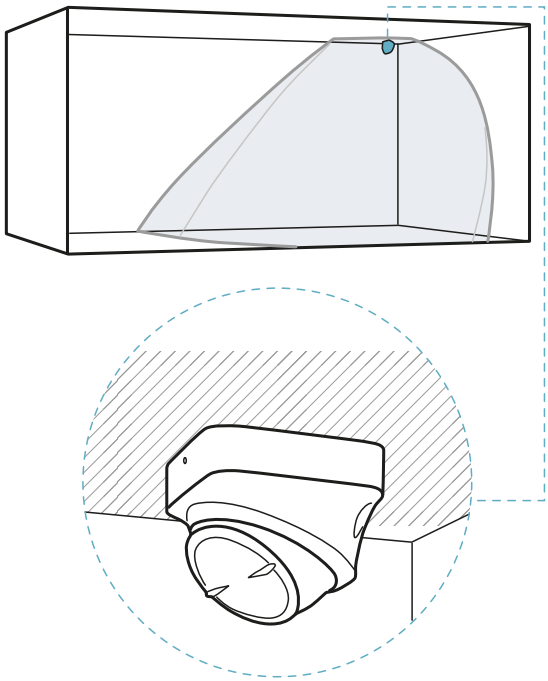
According to the direction, the sensor can be:

- 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).

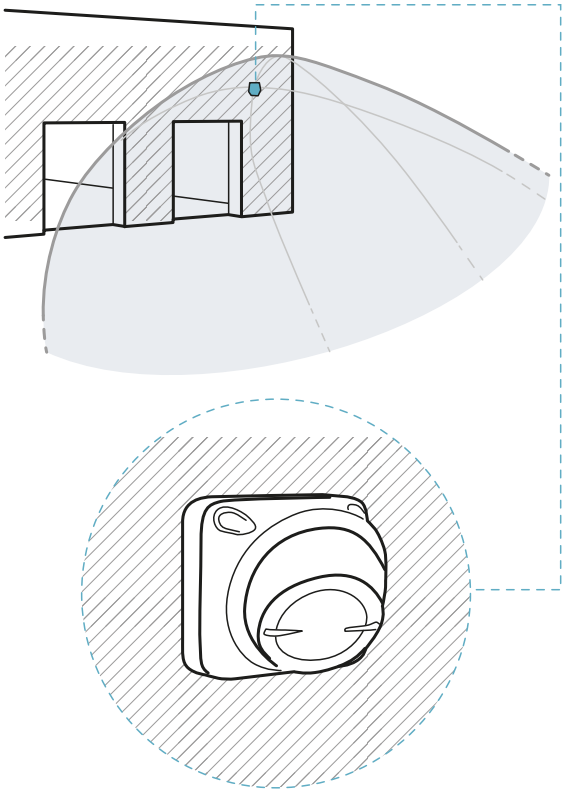
2.1.2 Examples of volumetric sensor installation



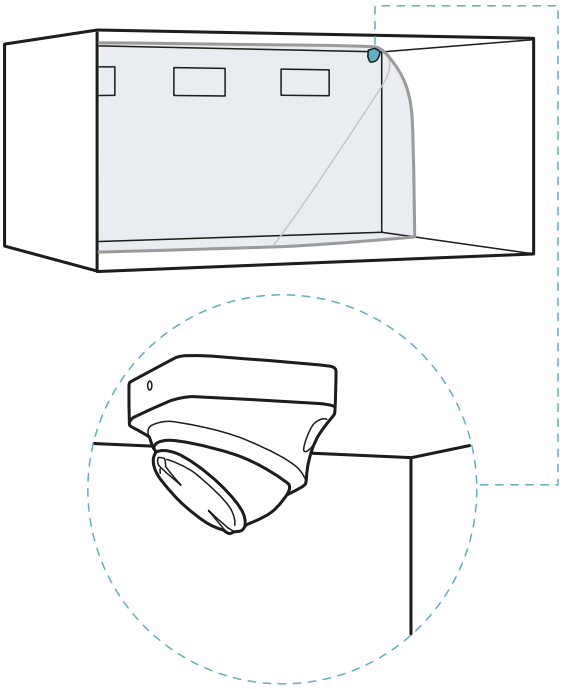
Indoor wall installation.



Indoor ceiling installation.

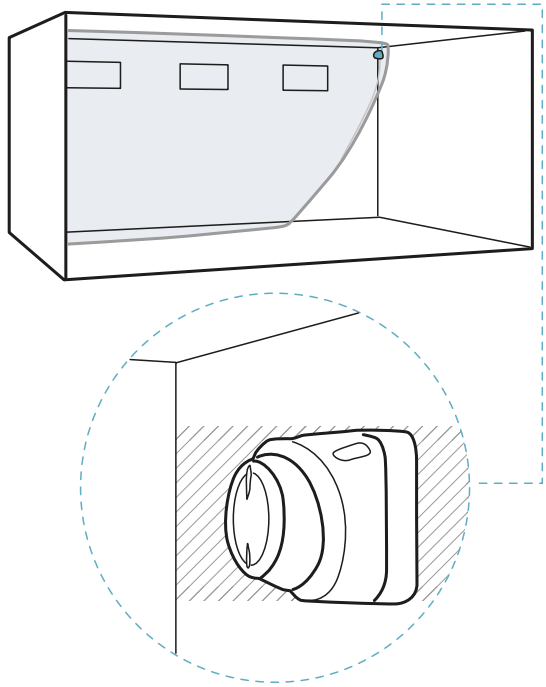


Outdoor installation.

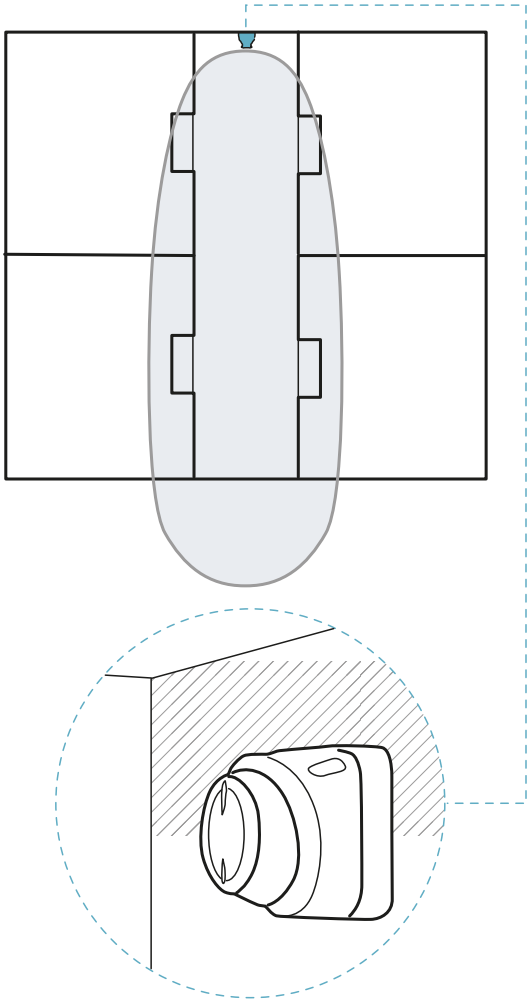


Indoor ceiling installation.

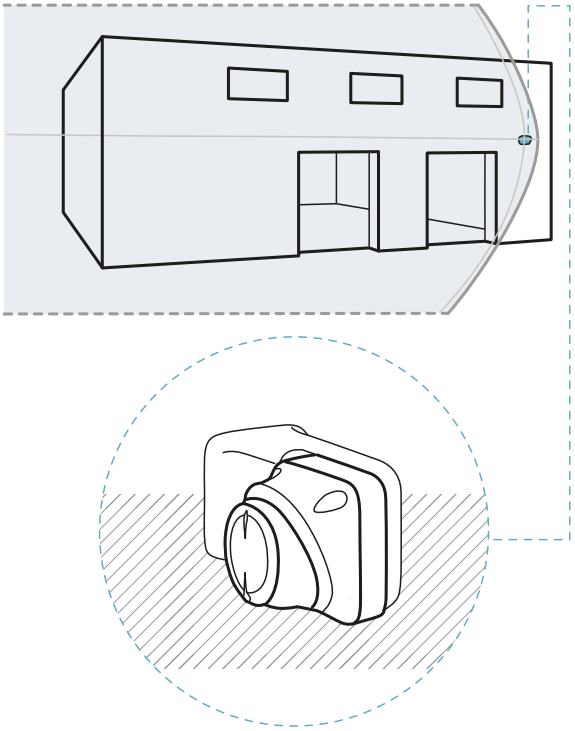
2.1.3 Examples of barrier sensor installation



Indoor wall installation.



Indoor hallway installation.

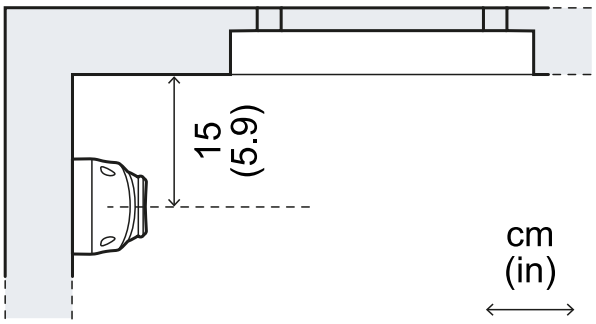


Outdoor installation with bracket.

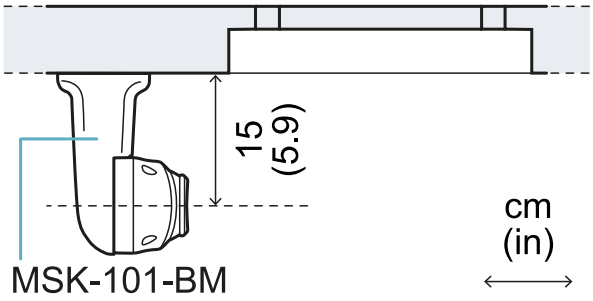
2.2 Barrier configuration

2.2.1 Barrier bracket

Barrier installation for safeguarding 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, use the barrier bracket (product code: MSK-101-BM).



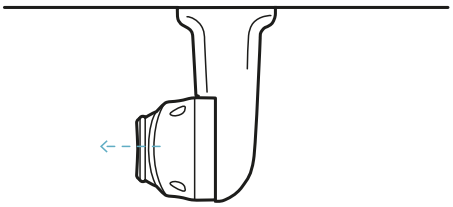
Example of installation with bracket.



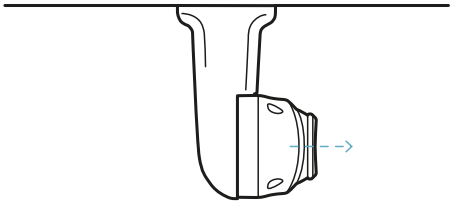
Example of installation with MSK-101-BM bracket.

2.2.2 Sensor direction

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



Sensor directed towards the left.

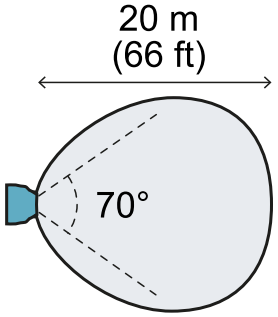


Sensor directed towards the right.

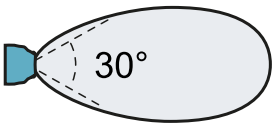
2.3 Field of vision

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

In this installation the visual field of the sensor is approximately 70° along the horizontal plane and 30° on the vertical plane. It extends for a maximum of 20 m, following the radiation pattern of the antenna.



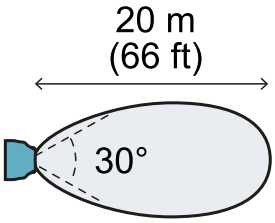
Top view.



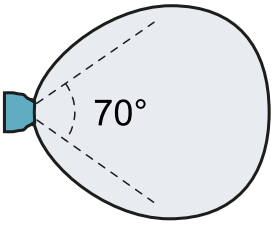
Side view.

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

In this installation the visual field of the sensor is approximately 30° along the horizontal plane and 70° on the vertical plane. It extends for a maximum of 20 m, following the radiation pattern of the antenna.

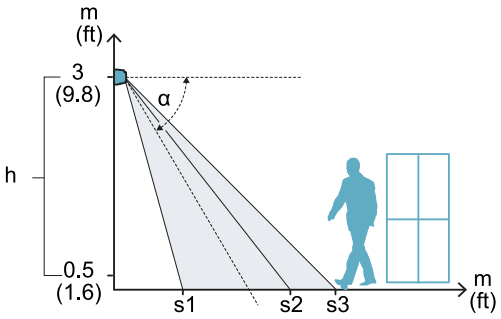


Top view.



Side view.

2.3.3 Calculation of the field of vision



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

- sensor installation height (**h**)
- sensor direction (horizontal or vertical)
- sensor inclination (**α**)

Within the field of vision, discernment of animals is guaranteed up to a certain distance from the sensor (s_2). For details about discerning animals, see "Set the tolerance level for animals" on page 22.

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.

2.3.4 Sensor installation height

The sensor can be installed at any distance from the plane to be monitored, from 0.5 and 3 m (from 1.6 to 10 ft). For example, it can be installed at 2 m from the floor or 0.5 m from the jamb of the window frame.

When installing the sensor, consider the risk of a blind spot: if the sensor is too high, it must be tilted downwards to reduce the undetected area. However, this also reduces the maximum detected distance. If the sensor is too low, the blind spot is minimal, but it increases the risk of masking caused by accidental passage of people.

2.3.5 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_1 (m)	s_2 (m)	s_3 (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_1 (ft)	s_2 (ft)	s_3 (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.*

2.3.6 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.

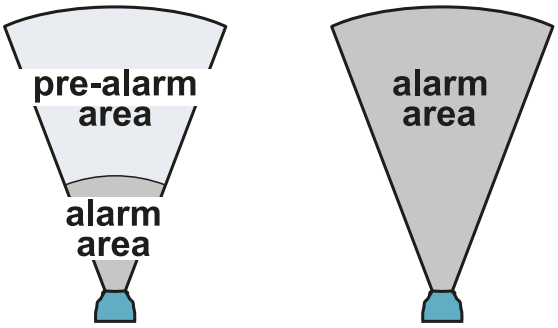
h (m)	α (°)	s_1 (m)	s_2 (m)	s_3 (m)
1	0	0.5	*	20
1.5	0	0.5	20	20
2	-15	2	20	20
2	-30	1	16	16
2.5	-15	2	20	20
2.5	-30	1	20	20
2.5	-45	1	16	18
3	-15	2	20	20
3	-30	1	20	20
3	-45	1	12	15

h (ft)	α (°)	s_1 (ft)	s_2 (ft)	s_3 (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.*

2.3.7 Alarm and pre-alarm areas

Within the sensor field of vision, the alarm and possible pre-alarm areas define the area that is actually monitored by the sensor. If a pre-alarm area is not defined, the alarm area corresponds to the entire monitored area.



Motion in the alarm area triggers an alarm, motion in the pre-alarm area triggers a pre-alarm.

***Note**: not all motions occurring in the pre-alarm or alarm area are signaled. It depends on the level of tolerance set for animals and possible semi-static objects.*

For outdoor installations, the pre-alarm area is especially useful for implemented security operations (e.g.: turning on the lights, activating a surveillance video camera) in the presence of motion in the marginal areas of the monitored area.

The configuration of the pre-alarm area in barrier installations is usually not very useful, except for safeguarding in hallways, where the pre-alarm area could be useful for detecting the presence of an intruder in the area that is farthest from the sensor.

2.4 Interferences

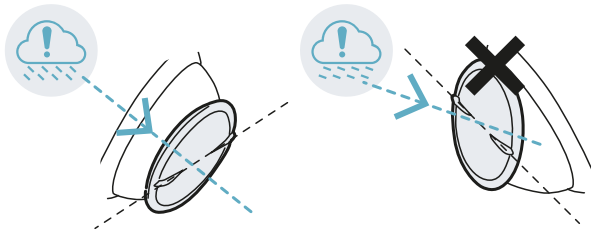
2.4.1 Introduction

The MSK-101-POE-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.

2.4.2 Warnings relative to precipitation

- Unusually intense rain (heavy storms with intensities exceeding 20 mm/h (0.80 in/h)) can reduce the field of vision by up to 50%.
- Hail may cause false alarms.

- If exposed to precipitation, install the sensor parallel to the usual direction of the precipitation.



2.4.3 Precautions

- The sensor has been designed for installations on the wall or ceiling: do not install it on moving or vibrating objects, like poles or fences.
- Hiding the sensor behind objects may impact the sensor performance, even significantly. To learn about the most interfering materials, see "Interfering materials" below.
  ***NOTICE**: hiding the sensor is not a foreseen use. Checking correct functioning is the responsibility of the installer.*
- Do not install it in the presence of large reflective objects (e.g.: metallic objects) that could influence correct detection.
- In the presence of fluorescent tubes, tilt down the sensor by 15°/30°, or install it at a minimum distance of 20 m from the tube.
- In the presence of other MSK-101-POE-MM sensors, maintain the minimum indicated distances, see "How to install several sensors" below.
- In the presence of other MSK-101-POE-MM sensors, assign each sensor to a different channel, see "How to configure several sensors" on the facing page.
- The sensors that use the same frequency (e.g. *Blind Spot Detection* devices on automobiles, with radar at 24 GHz) interfere with proper functioning and may cause false alarms. Do not point the sensor directly towards a parking area.
- The sensor can detect motion beyond glass, walls, and thin floors, for example in drywall. Limit the monitored area to only the specific area of interest, and perform inspections to prevent false alarms.
- 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)" on page 10 and "Examples of the field of vision with vertical sensor direction (barrier)" on the previous page.*

2.4.4 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)

2.4.5 Factors that do NOT interfere

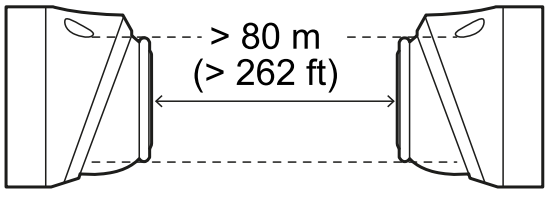
A list of factors that in contrast to traditional motion sensors do NOT interfere with the normal functioning of the sensor is presented as follows:

- direct exposure to the sun or windows that face the exterior
- thin plasterboard walls or polystyrene or stiferite panels
  ***NOTICE**: the composition of materials used for walls and panels is not sufficiently known to ensure the foreseen performance of the sensor. Checking correct functioning is the responsibility of the installer.*
- rapid temperature fluctuations
- smoke, dust, or strong air currents (e.g.: air conditioners, fans)
- water sprays, vaporized water or mist
- electrical fields (e.g.: electrical motors, high voltage devices)
- moving objects (e.g.: fans, pulleys, conveyor belts, trees and shrubs). See "Manage semi-static objects" on page 23.
- small animals or pets. See "Set the tolerance level for animals" on page 22.

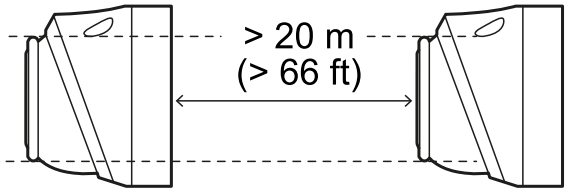
2.4.6 How to install several sensors

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 9.

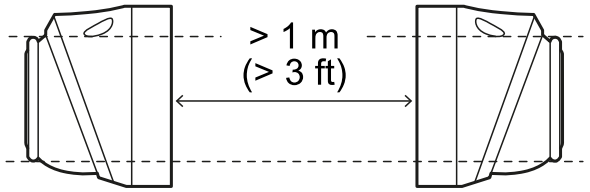
***NOTICE**: other combinations are possible, but their performance must be validated in the field.*



Front-front combination



Front-back combination



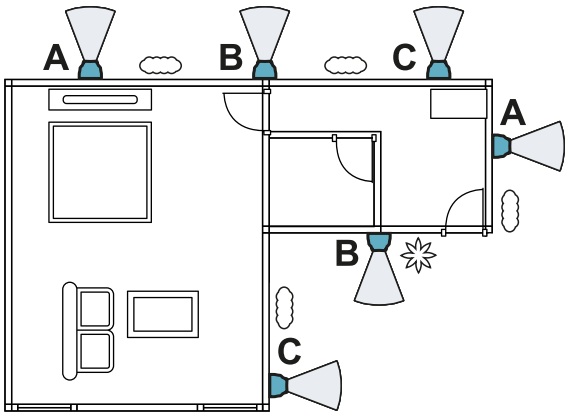
Back-back combination

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

2.4.7 How to configure several sensors

To reduce interference between the sensors present in the same area, assign a different channel to each one. Up to three channels are available (channel A, B, C).

An example of an installation with nine sensors and relative channel assignments is presented as follows.



3. Installation and use

Contents

This section includes the following topics:

3.1 Before installation

3.1.1 Necessary components and tools

- A computer connected to the same network as the sensor.
- Only for barrier applications and if necessary, bracket for assembly (product code: MSK-101-BM), see "Barrier configuration" on page 9.
- Two screws up to M4 (No. 6) 30 mm long (1.9 in) for fastening to the wall or to the junction box.
- Screwdriver and fastening tools not provided.

3.1.2 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 7).
2. Define the installation position, considering possible interferences (see "Interferences" on page 11).
3. Define the height of installation for the sensor to obtain the desired field of vision (see "Field of vision" on page 9).
4. Run a cable without terminal from the Ethernet network in question.
   ***NOTICE**: installation with cable that already has a terminal is possible but not recommended.*
5. Download the security certificate from the www.inxpect.com/security/tools website to access the configuration web interface and install it.
6. Only for installations with MSK-101-BM bracket, define the direction of the sensor (see "Barrier configuration" on page 9).

3.1.3 Warnings

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

3.1.4 Install MSK-101-POE-MM

1. Assemble the sensor:

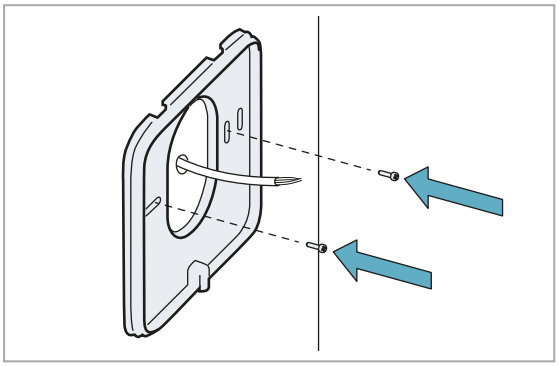
For...	See...
barrier applications with MSK-101-BM bracket and sensor directed to the right	"Assemble the sensor with the MSK-101-BM bracket (sensor directed to the right)" on page 16
barrier applications with MSK-101-BM bracket and sensor directed to the left	"Assemble the sensor with the MSK-101-BM bracket (sensor directed to the left)" on page 17
all other cases	"Assemble the sensor" on the next page

2. "Direct the sensor" on page 18.
3. "Access to the web interface" on page 18.
4. "Configure the sensor" on page 18.
5. "Fasten the sensor" on page 19.

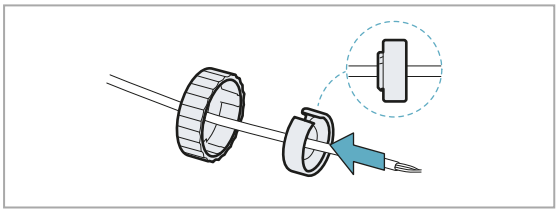
3.2 Install and configure the sensor

3.2.1 Assemble the sensor

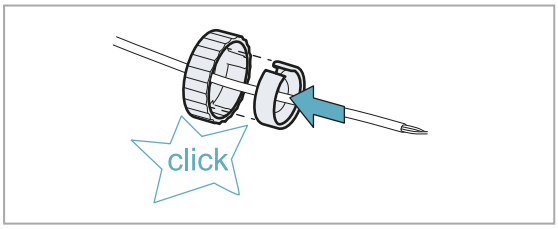
1. Using the prepared holes, fasten the plate to the wall or to the junction box with two screws (not provided). See "Back plate dimensions" on page 31.



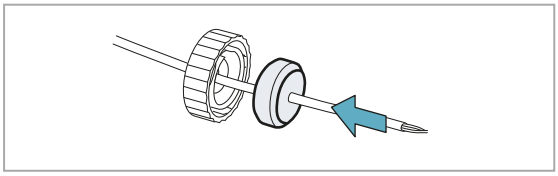
2. Insert the ferrule in the cable and then the cable protection ring.



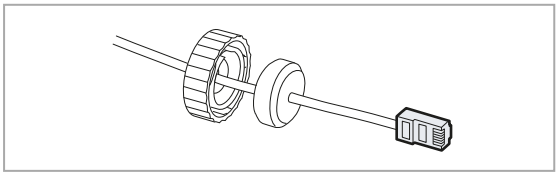
3. Insert the cable protection ring into the ferrule until it clicks.



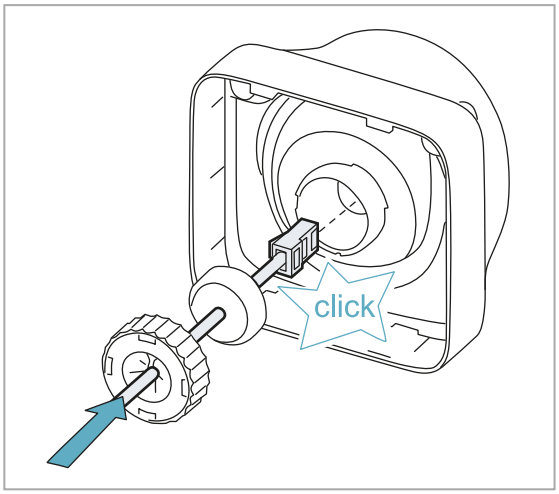
4. Insert the cable protector in the cable. If the cable already has a terminal, see "Procedure with cable already with terminal" on the next page.



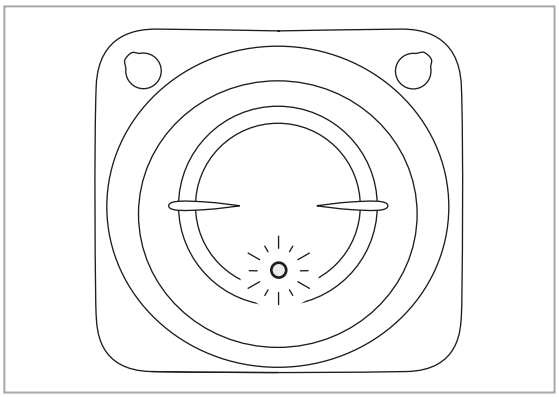
5. Terminate the cable using an RJ45 connector.



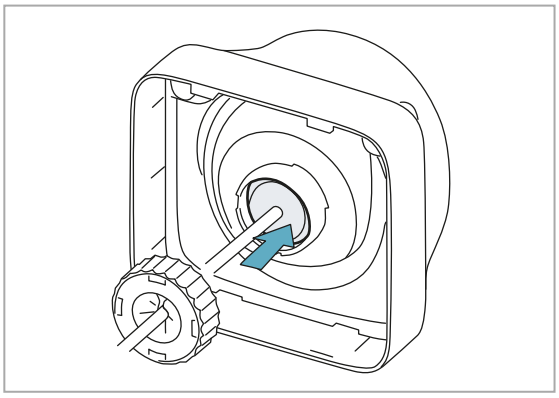
6. Insert the RJ45 connector into the Ethernet port through the hole on the back of the sensor until it clicks.



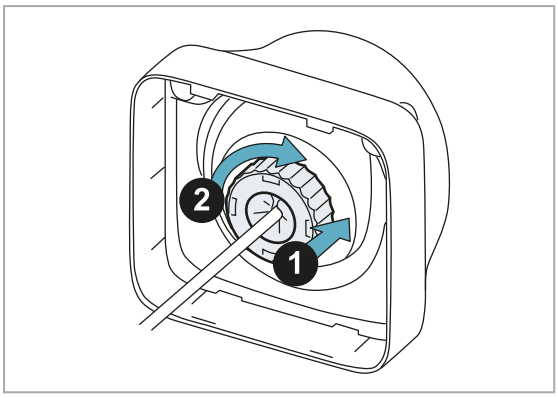
7. If the sensor is already supplied with power, check that the LED on the sensor is flashing blue.



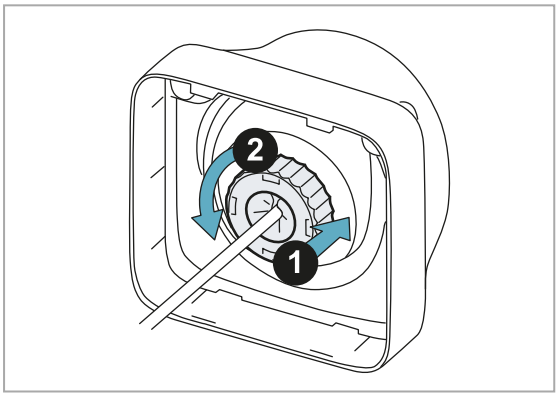
8. Insert the cable protector into the hole on the back of the sensor and press it until it is entirely housed in the housing.



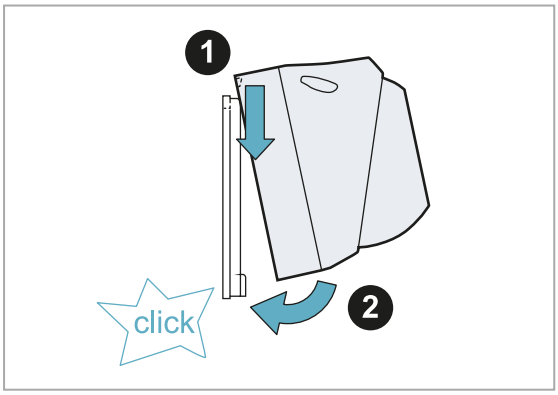
9. Push the ferrule all the way in and then screw it in.



***NOTICE**: if it is necessary to unscrew the ferrule, to prevent damaging the closure mechanism, press and then turn the ferrule in a counter-clockwise direction.*

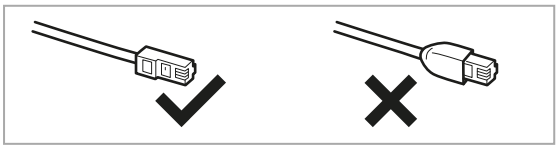


10. Fasten the sensor case to the plate.

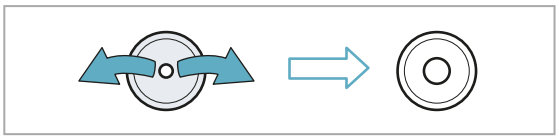


3.2.2 Procedure with cable already with terminal

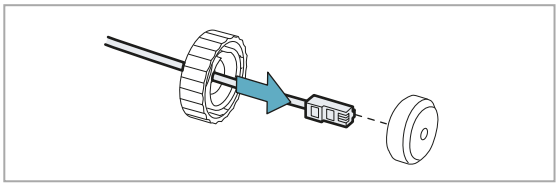
***Note**: this procedure is possible only if the cable already has a terminal with a non-industrial RJ45 connector.*



1. Expand the cable protector using your hands, pulling it right and left to enlarge the hole.

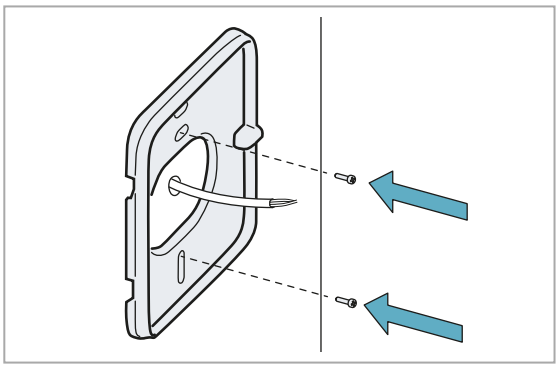


2. Insert the cable in the cable protector by pressing firmly.

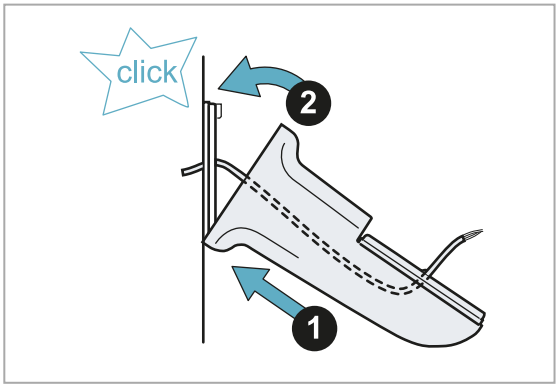


3.2.3 Assemble the sensor with the MSK-101-BM bracket (sensor directed to the right)

1. Using the prepared holes, direct the sensor plate as shown in the figure and fasten it to the wall or to the junction box with two screws (not provided). See "Back plate dimensions" on page 31.

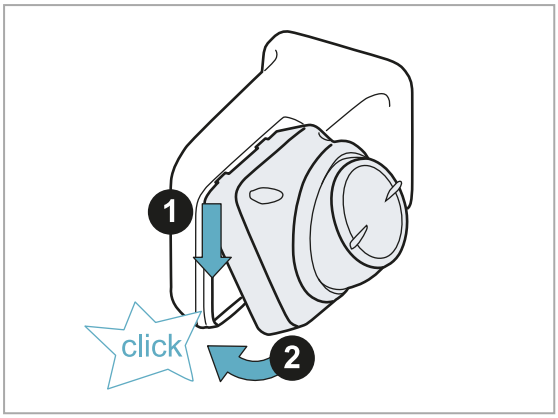


2. Fasten the bracket to the plate, passing the Ethernet cable into the bracket.



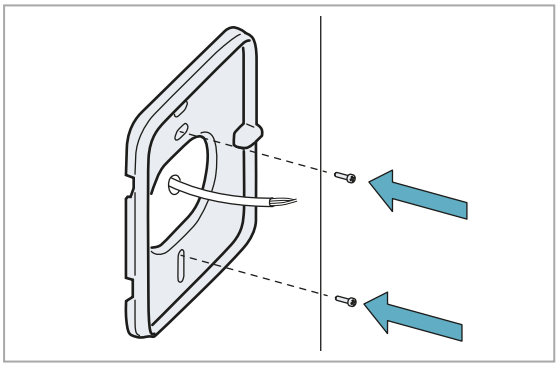
3. Insert the ferrule, the cable protection ring and the cable protector in the cable and insert the RJ45 connector into the Ethernet port, see steps 2–9 of the "Assemble the sensor" on the previous page procedure.

4. Fasten the sensor case to the bracket.

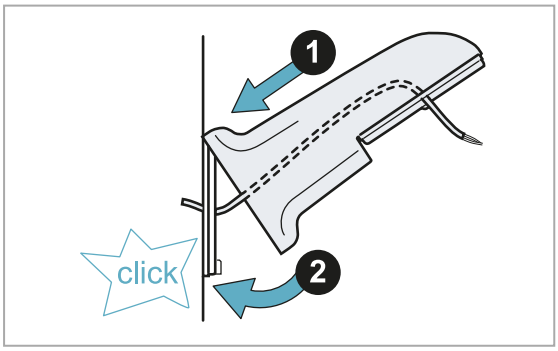


3.2.4 Assemble the sensor with the MSK-101-BM bracket (sensor directed to the left)

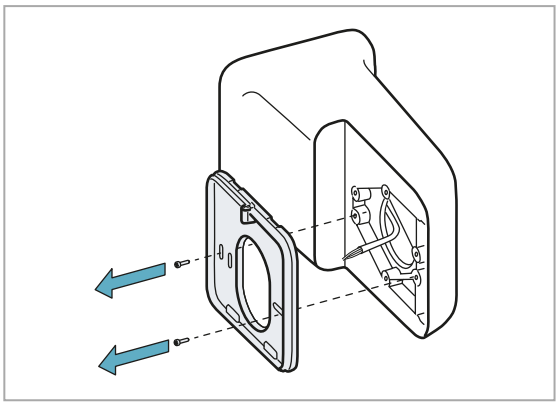
1. Using the prepared holes, direct the sensor plate as shown in the figure and fasten it to the wall or to the junction box with two screws (not provided). See "Back plate dimensions" on page 31.



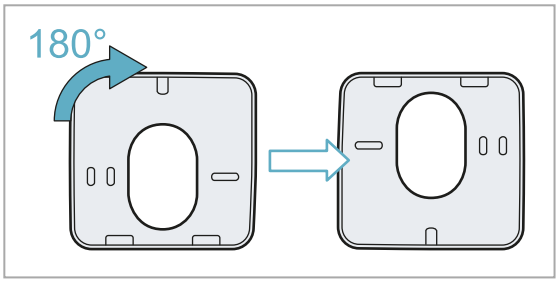
2. Fasten the bracket to the plate, passing the Ethernet cable into the bracket.



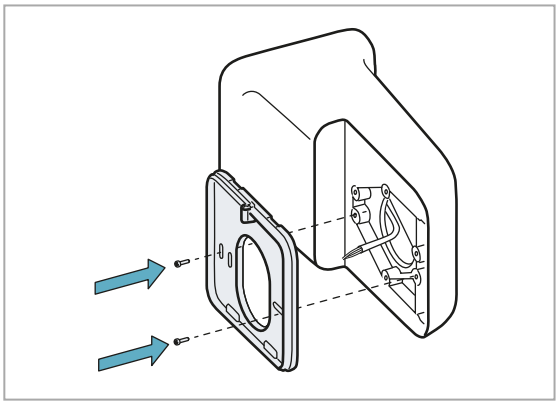
3. Unscrew the fastening screws on the pre-assembled plate of the bracket.



4. Turn the plate 180°.

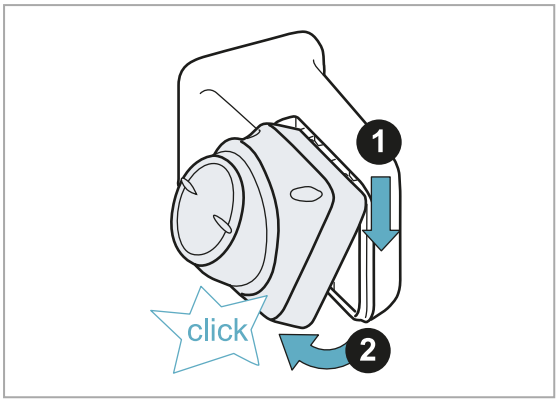


5. Tighten the screws.



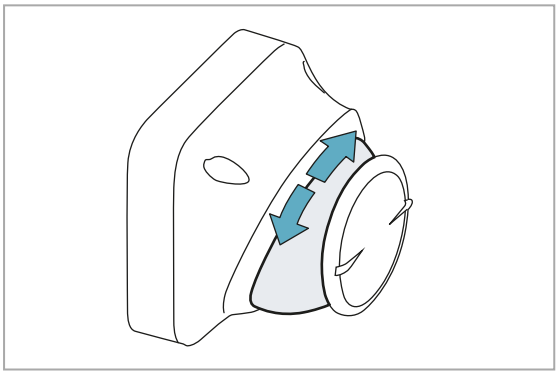
6. Pass the cable into the sensor case.
7. Insert the ferrule, the cable protection ring and the cable protector in the cable and insert the RJ45 connector into the Ethernet port, see steps 2–9 of the "Assemble the sensor" on page 15 procedure.

8. Fasten the sensor case to the bracket.

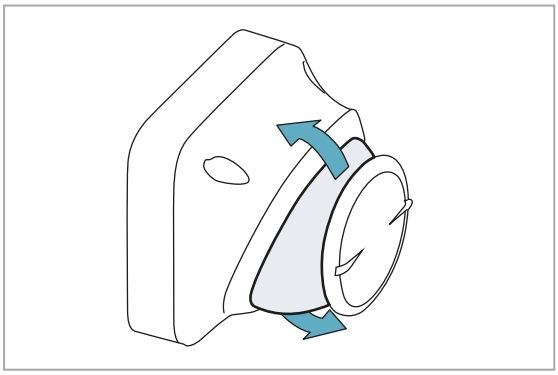


3.2.5 Direct the sensor

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



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



3.2.6 Access to the web interface

1. Check that the computer being used is connected to the network where the sensor is located.
2. Open a web browser.
   ***Note**: to check the compatibility of the browser with the web interface, visit the www.inxpect.com/security/tools website.*
3. Insert the following address into the address bar:

If using...	Then type...
Windows via NetBIOS	https://msk101poe-xxxxx
OSX/Windows via mDNS/Bonjour	https://msk101poe-xxxxx.local

   where "xxxxx" stands for the network (**NID**) reported on the label on the case of the sensor.

   ***Note**: if a security warning appears or the sensor cannot be reached, see "Web interface troubleshooting" on page 25.*
4. On the authentication page, insert the password (default "admin") and then select **ENTER**: the first step of the first start-up procedure appears.
5. If required, set a new password.
   ***Note**: the password must contain at least 8 characters, of which at least one number, one capital letter and one special character.*
6. "Configure the sensor" below.

3.2.7 Configure the sensor

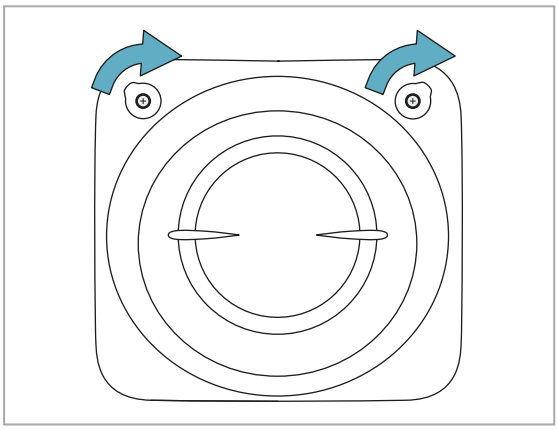
1. On the **Step 1: Sensor settings** page, if necessary, change the country of installation.
   ***Note**: correctly setting the country avoids violating national restrictions on radio frequency allocation, see "National restrictions" on page 29.*
2. If other sensors are present in the area, assign a specific channel to the sensor, or select **None**.
3. Set the other parameters as desired.
4. Select **Save & Proceed**.
5. On the **Step 2: Installation** page, insert the installation height. If the installation height exceeds 3 m (11 ft), insert the height as 1 m (3 ft) (e.g. safeguarding for skylights or windows in a warehouse).
6. Check that the detected direction corresponds with the set direction and compare the detected inclination with the optimum recommended value. If necessary, adjust the position of the adjustable support accordingly.
7. Select **Save & Proceed**.
8. To guarantee the maximum detection performance, on the **Step 3: Calibration** page, perform the calibration procedure (see "Calibrate the sensor" on page 20).
9. On the **Step 4: Configuration** page, set the alarm area and possible pre-alarm area.

Physically move near the area limit and move in place. Based on the displayed motion indicator, adjust the area dimensions.

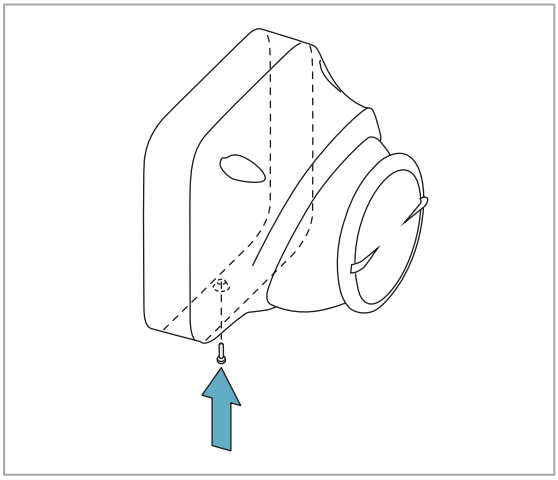
10. To check correct functioning, move around the set areas and check that the alarm and pre-alarm LEDs turn on properly.
    ***Note**: to disable the pre-alarm area, coincide the alarm and pre-alarm thresholds.*
11. Set the tolerance level for animals.
12. Select **Save & Proceed**: the **Configuration** page appears.
13. Proceed with the procedure described in section "Fasten the sensor" below.

3.2.8 Fasten the sensor

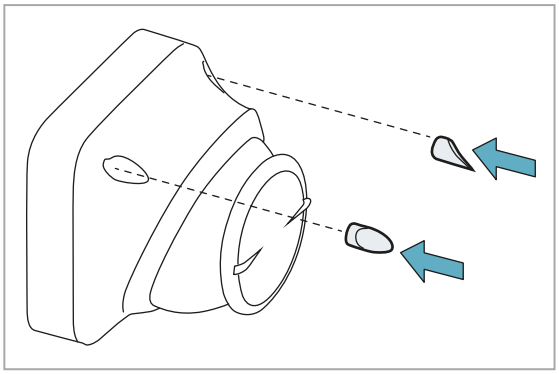
1. Tighten the screws to fasten the adjustable support. Check in the web interface that the adjustable support has not moved.



2. Fasten the case of the sensor to the plate using the provided screw.



3. Insert the provided caps.



3.3 Change the configuration

3.3.1 Change the set configuration

Procedures for changing the sensor configuration after the first installation are provided as follows:

Change	Procedure
Network settings	1. "Access to the web interface" on the previous page. 2. On the main menu select **Network settings**.
Alarm and pre-alarm thresholds	1. "Access to the web interface" on the previous page. 2. On the main menu select **Configuration**. 3. Change the dimensions of the areas as desired, see "Define the alarm and pre-alarm areas" on the next page.
Installation parameters after moving the sensor	1. "Access to the web interface" on the previous page. 2. If the installation parameters have changed in respect to the previous installation, the interface displays the **Installation** page, otherwise on the main menu select **Installation**. See "Define the inclination of the sensor" on the next page.
Calibration after moving the sensor	1. "Access to the web interface" on the previous page. 2. On the main menu select **Calibration**. See "Calibrate the sensor" on the next page.
Channel after adding new sensors to the area	1. "Access to the web interface" on the previous page. 2. On the main menu select **Sensor settings**.

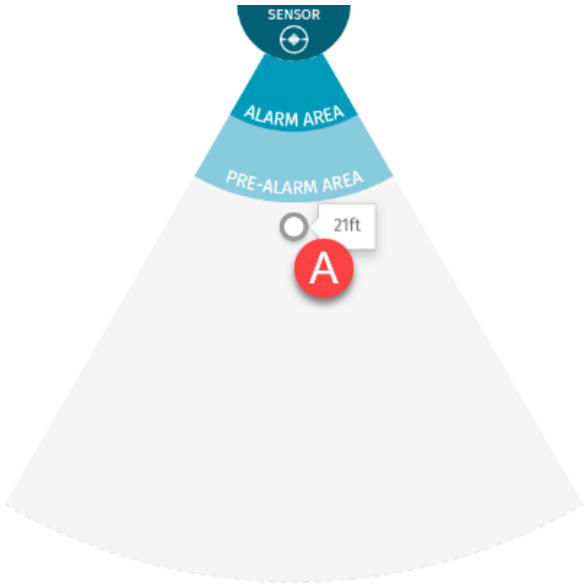
3.3.2 Define the alarm and pre-alarm areas

main menu > ***Configuration***

The web interface allows setting the alarm and pre-alarm areas through parameters.

***Note**: to disable the pre-alarm area, coincide the alarm and pre-alarm thresholds.*

The first moving object is detected **[A]**. By moving within the monitored area it is possible to use your own position to facilitate definition of the area distances.

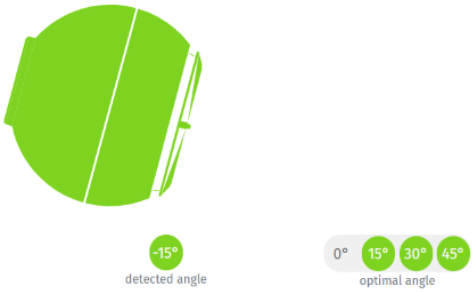


3.3.3 Define the inclination of the sensor

main menu > ***Installation***

The inclination of the sensor is essential for determining the visible area of the sensor and reducing the blind spot.

To facilitate this operation, the application helps to identify the optimum inclination for the set height and direction. An example where the optimum recommended values are 15° and 30° and the current value is 15° is presented as follows.



For more information, see "Field of vision" on page 9.

3.3.4 Set the tampering signal level

main menu > ***Sensor settings***

The tampering signal level can be: aggressive, standard, disabled.

The signal is based on the deviation perceived by the anti-removal system devices (accelerometer or magnetometer). The aggressive level guarantees the maximum security level: if the detected deviation of both devices is significant, tampering is always signaled. With the standard level, tampering is signaled only if detected simultaneously with the presence of motions in proximity of the sensor.

***Note**: with the tampering signal level set to **Disabled**, the sensor does not comply with standard EN 50131.*

3.3.5 Set the tampering signal reset

main menu > ***Sensor settings***

Reset of the tampering signal can be automatic or manual. With manual reset, the signal is deactivated and the system can detect new tampering events only after having reset the installation parameters (web interface > main menu > **Installation**).

3.3.6 Set the masking signal level

main menu > ***Sensor settings***

The tampering signal level can be: aggressive, standard, disabled.

The aggressive level guarantees the maximum security level. Nevertheless, in outdoor installations with the sensor exposed to weather conditions, the aggressive level generates false alarms when it rains. Therefore, the aggressive level is recommended for indoors or if the sensor is protected from rain.

***Note**: with the masking signal level set to **Disabled**, the sensor does not comply with standard EN 50131. The masking signal is automatically disabled during the sensor initialization phase (flashing blue LED).*

3.4 Calibrate the sensor

3.4.1 Calibration

The calibration procedure calibrates the sensor according to the environment where it is installed and defines the reference for the maximum tolerance level for animals (see "Set the tolerance level for animals" on page 22). Calibration must be performed during the first configuration of the sensor or at each new installation.

3.4.2 Calibration types

The available calibration types and when they are performed are presented as follows.

Type	Performing conditions
Standard automatic	Always
Automatic by area	If following standard automatic calibration areas are detected within the monitored area with inhomogeneous sensitivities. For examples of inhomogeneous environments, see "Examples of inhomogeneous environments" below
Manual	If it is not possible to perform automatic calibration, for example in areas in front of the sensor: • less than 6 m (20 ft) • with stairs • with ramps or sloping ground

3.4.3 Examples of inhomogeneous environments

Some examples of inhomogeneous environments that could cause inhomogeneous sensitivities with standard automatic calibration are presented as follows.

For barrier application:

- wall to protect with "holes" (e.g. wall only at the start or at the end, central area missing)
- floor not always parallel to the sensor direction

For volumetric application:

- monitored area with medium/large size metallic object
- floor not always parallel to the sensor direction

3.4.4 Perform standard automatic calibration

main menu > ***Calibration***

NOTICE*: for complete and efficient calibration, set the alarm area to at least 5-6 m (16.5-19.7 m) and walk slowly up to the limit of the alarm zone.*

1. Select **Start calibration**.
2. Follow the instructions provided by the web interface.
   Note*: for an illustrative explanation of the main direction of the sensor, see "Examples of main direction" on page 28.*
3. On the main menu, select **Configuration** and check that a motion generates an alarm in the entire monitored area (see "Check the calibration" below).

3.4.5 Perform automatic calibration by areas

main menu > ***Calibration***

NOTICE*: for complete and efficient calibration, set the alarm area to at least 5-6 m (16.5-19.7 m) and walk slowly up to the limit of the alarm zone.*

1. Select **Start calibration**.
2. Select **Areas calibration**.
3. Follow the instructions provided by the web interface.
   Note*: for an illustrative explanation of the main direction of the sensor, see "Examples of main direction" on page 28.*
4. On the main menu, select **Configuration** and check that a motion generates an alarm in the entire monitored area (see "Check the calibration" below).

3.4.6 Perform manual calibration

1. On the main menu select **Configuration**.
2. Set the maximum tolerance value.
3. On the main menu, select **Configuration** and select **MANUAL CALIBRATION**.
4. Set a high calibration value (recommended value: 3500) and select **Save & Proceed**.
5. On the main menu, select **Configuration** and check that a motion generates an alarm in the entire monitored area (see "Check the calibration" below).
6. To avoid excessively sensitizing the sensor, set and check the calibration value until identifying the highest value that ensures correct detection. Save the value.

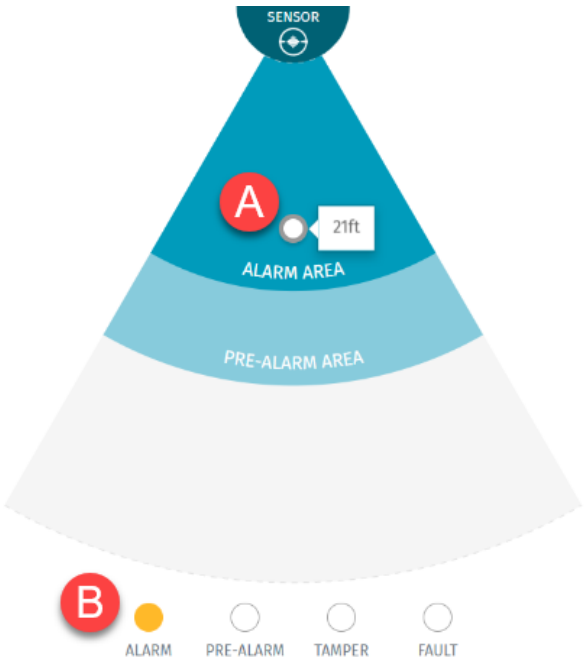
3.4.7 Check the calibration

At the end of the calibration check that:

- the sensor has the same detection sensitivity level in the entire monitored area
- the sensor has the correct sensitivity level to detect all and only those motions that must be detected

On the **Configuration** page it is possible to check correct calibration considering the detection of a motion **[A]** and the alarm signal **[B]**.

Wrong calibration. Calibration value too high.



Correct calibration.

3.4.8 Troubleshooting calibration

Problem	Solution
The sensitivity is inhomogeneous within the monitored area	Perform automatic calibration by areas (see "Perform automatic calibration by areas" on the previous page)
The sensitivity level is homogeneous but too high/low	Refine the calibration value (see "Perform manual calibration" on the previous page)

3.5 Set the tolerance level for animals

3.5.1 Tolerance for animals

The sensor can discriminate between motion by people and pets or small animals (e.g.: mice, birds).

The ability to discern is greater in proximity of the sensor and less at the margins of the field of vision, see "Examples of the field of vision with horizontal sensor direction (volumetric)" on page 10 and "Examples of the field of vision with vertical sensor direction (barrier)" on page 11. Furthermore, if the objects to be discerned have similar dimensions, the capability to discern them is reduced.

3.5.2 Tolerance level

The tolerance level of the sensor can be configured. A low tolerance level guarantees a higher level of security, but simultaneously increases the risk of false alarms. It is suitable for scenarios where no motion is allowed in the monitored area (e.g.: in a museum).

A high tolerance level is suitable for outdoor installations where the probability of false alarms caused by animals or other moving objects is very high.

An intermediate tolerance level ignores motion of a pet, for example, but correctly signals motion of people walking.

***NOTICE**: a person crawling or kneeling is comparable to the dimensions of an animal for the sensor. The tolerance level must be lowered to detect people who are not standing up.*

3.5.3 Set the level

main menu > ***Configuration*** > ***Pet tolerance level***

The tolerance for animals can be set to a value from 0 to 100.

The maximum tolerance level is the recommended level to minimize outdoor false alarms.

3.6 Manage semi-static objects

3.6.1 Immunity to semi-static objects

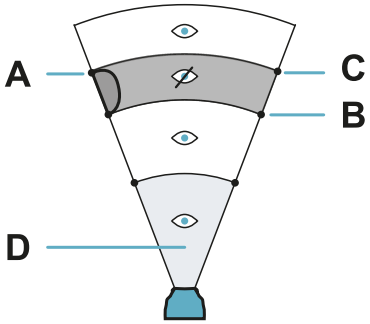
Objects moving within the monitored area may generate false alarms. If the objects oscillate or move within a limited space (semi-static objects), they can be recognized by the sensor and ignored.

3.6.2 Identification of semi-static objects

A semi-static object **[A]** is identified through the distance between the sensor and the start of the object **[B]** and the distance between the sensor and the end of the object **[C]**.

It is possible to define a maximum security area near the sensor **[D]**, in which semi-static objects cannot be configured.

***NOTICE**: configuration of semi-static objects reduces the security level: in the area impacted by the semi-static object, no motion is detected while the semi-static object moves.*



***Note**: for indoor installations, consider that the motion of the semi-static object may create projections on walls and/or reflective objects. If necessary, set two semi-static objects: one for the object and one for its projection on the wall.*

3.6.3 Examples of semi-static objects

- Wet fabrics or plastic films, for example patio umbrellas or awnings exposed to rain
- Air conditioner motors or fans
- Fans
- Plants in the wind

3.6.4 Define the semi-static objects

main menu > ***Semi static objects***

Semi-static objects can be configured as follows:

Mode	Description	Settings
Automatic (aggressive)	Automatic detection of the position of the semi-static objects for a maximum security level.	Maximum security area distance
Automatic (standard)	Automatic detection of the position of the semi-static objects for a standard security level.	
Semiautomatic	Automatic detection of the position of the semi-static objects	Maximum security area distance Number Maximum size of semi-static objects
Manual	Manual insertion of a maximum of four objects	Number Distance from the start and end

3.6.5 Set the distance for semi-static objects

The distance can be set in two ways:

- manually.
- moving the object and selecting the button : the field is automatically filled with the distance measured by the sensor.

3.6.6 Check the setting of semi-static objects

1. On the main menu select **Configuration**.
2. Move near the semi-static object or move the semi-static object.
3. Check that the detected moving object appears on the screen, and that the alarm/pre-alarm LED stays off.

3.7 Other operations

3.7.1 Operations on the sensor

On the main menu > **Sensor settings** it is possible to:

- assign a name to the sensor name
- set the Country of installation (default: Country automatically detected by the device in use)
- enable/disable the LED
- to set the masking signal level, see "Set the masking signal level" on page 20
- set the tampering signal level, see "Set the tampering signal level" on page 20 and type of

reset, see "Set the tampering signal reset" on page 20
- reset factory default settings

3.7.2 Operations on web interface

On the main menu > **Sensor settings** it is possible to:

- set the measurement system (Imperial or Metric)
- set the language
- update the firmware
- change the access password
- restore factory default settings

4. Maintenance and diagnostics

Contents

This section includes the following topics:

4.1 Diagnostics and troubleshooting

4.1.1 Web interface troubleshooting

Problem	Cause	Remedy
Impossible to access the web interface	No sensor connection.	Access the web interface through a web browser at the address: https://169.254.1.50. Check the status of the Ethernet cable. Check the status of the network.
	Network settings changed.	Contact the network administrator.
	Forgotten password	Reset the password to default value: 1. Turn the sensor off and on again. 2. Check that the computer being used is connected to the network where the sensor is located. 3. Open a web browser. ***Note**: to check the compatibility of the browser with the web interface, visit the www.inxpect.com/security/tools website.* 4. Insert the following address into the address bar: **If using...** / **Then type...** Windows via NetBIOS / https://msk101poe-xxxxx OSX/Windows via mDNS/Bonjour / https://msk101poe-xxxxx.local where "xxxxx" stands for the network (**NID**) reported on the label on the case of the sensor. 5. Within 30 seconds from restarting the sensor, on the authentication page select **RESET**: the password is reset to the default value ("admin").
Security warning (e.g. "Connection is not private" or "Problem with the security certificate")	Invalid security certificate.	Add the address to the list of secure addresses in the browser settings. The security certificate is saved on the computer where the access occurred and is valid for all MSK-101-POE sensors.

***Note**: if the problem persists, contact technical assistance, see "Service and warranty" on page 29.*

4.1.2 Troubleshooting

Problem	Cause	Remedy
The sensor does not turn on The blue LED does not turn on at start	Incorrect Ethernet cable connection or faulty Ethernet cable Wrong power supply voltage	Check the connection, condition and functioning of the Ethernet cable. Check that it is sufficiently supplied with power (2 W)
The purple LED turns on unexpectedly	Tampering, failure or masking detected	Check that there are no objects in the first 50 cm (20 in) of the sensor field of vision.
False alarms	There are moving objects in the monitored area	Reduce the alarm and/or pre-alarm areas until the moving objects are eliminated (web interface > main menu > **Configuration** page). Define the semi-static objects present in the monitored area (web interface > main menu > **Semi static objects**).
	Animals have entered the monitored area	Adjust the pet tolerance level (web interface > main menu > **Configuration**)

***Note**: if the problem persists, contact technical assistance, see "Service and warranty" on page 29.*

4.2 Event log

4.2.1 Introduction

The event log recorded by the system can be displayed and downloaded in JSON format. An event starts at activation of an alarm (for motion detection, failure...) and concludes after five minutes. At this point a new event can be recorded.

4.2.2 Manage logs

1. "Access to the web interface" on page 18.
2. On the main menu select **Event log**.
3. To export the logs, select **EXPORT LOG**.

4.3 Updates

4.3.1 Download updates

Download updates from the website www.inxpect.com/security/tools.

4.3.2 Install downloaded updates

On the main menu > **Sensor settings**, select **UPDATE FIRMWARE**.

***Note**: updating the sensor requires approximately 2 minutes. Upon conclusion of updating, the sensor is restarted.*

4.4 Maintenance

4.4.1 Cleaning

Remove any dust or dirt from the outside of the sensor and case using a slightly damp cloth. Do not use abrasives or solvents.

Check correct functioning after cleaning.

5. Appendix

Contents

This section includes the following topics:

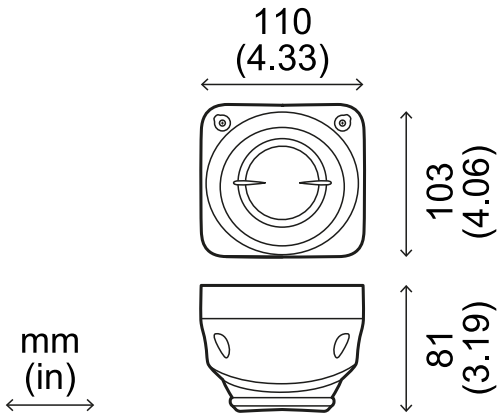
5.1 Technical data

5.1.1 General specifications

Detection method	Inxpect motion detection motor based on FMCW radar
Frequency	Working band: 24–24.25 GHz Transmission power: ≤ 13 dBm Modulation: FMCW
Detection interval	0.5–20 m (2–66 ft), depending on the installation conditions. Configurable in 30 cm (1 ft) increments.
Field of vision	Sensor horizontal plane: 90° Sensor vertical plane: 30° Height: 0.5–3 m (1.6–10 ft)
Detection speed	> 0.05 ms (2 in/s)
Power supply	Power over Ethernet, standard IEEE 802.3at, with 48 V dc (37-57 V dc) at powered device
Absorption	50 mA @48 V dc
Cable	Ethernet CAT5
Dimensions	103 x 110 x 81 mm (4.06 x 4.33 x 3.19 in)
Material	Technopolymer
Operating temperature	From -40 to +70 °C (from -40 to +158 °F)
Degree of protection	IP66 and IP67
Cable diameter	4–7 mm (0.16–0.27 in)
Approvals	CE Contains FCC ID: UXS-SMR-3X4

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.*

5.1.2 MSK-101-POE-MM dimensions

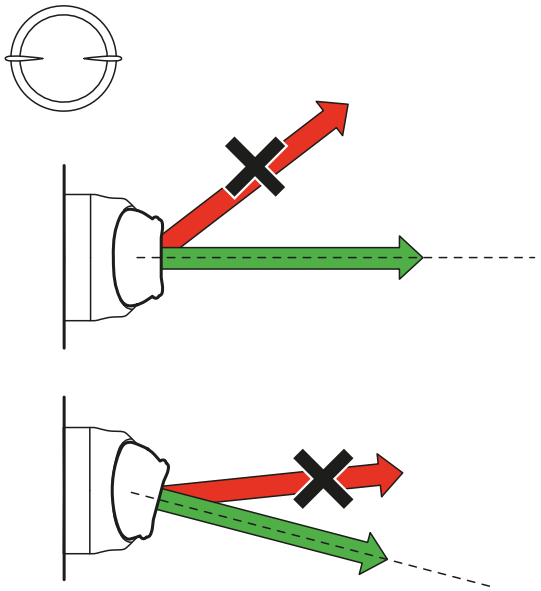


5.1.3 Back plate dimensions

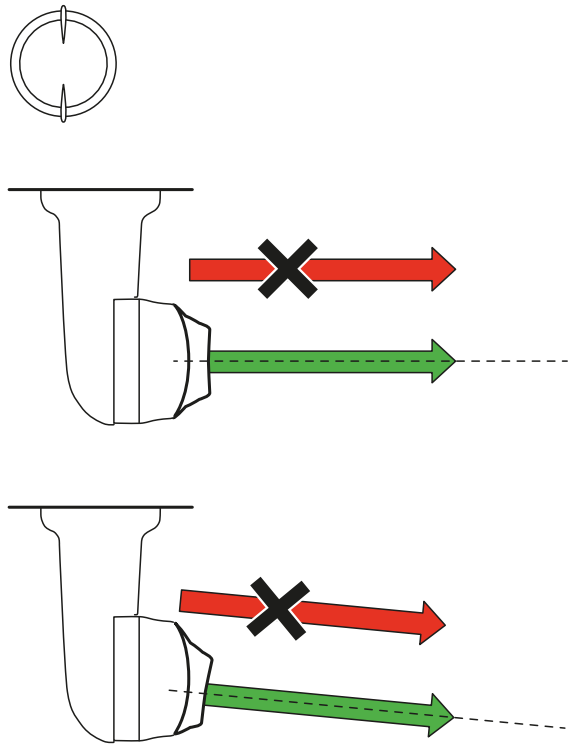
See "Back plate dimensions" on page 31.

5.2 Examples of main direction

5.2.1 Main direction for sensor with horizontal direction (volumetric).



5.2.2 Main direction for sensor with vertical direction (barrier).



5.3 Disposal

MSK-101-POE-MM contains electrical parts. As set forth in European Directive 2012/19/EU, do not dispose of the product with unsorted urban waste materials.

It is the responsibility of the owner to dispose of these products, as well as other electrical and electronic equipment, through specific waste collection facilities indicated by the government or local public authorities.

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

To receive more detailed information about disposal, contact the relevant public authorities, waste disposal services or the representative from whom you purchased the product.

5.4 Conformity and restrictions

5.4.1 Declaration of conformity and certifications

The manufacturer, Inxpect SpA, declares that the type of radio equipment MSK-101-POE-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/security/tools.

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

5.4.2 FCC Certification

MSK-101-POE-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.*

5.4.3 National restrictions

MSK-101-POE-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:

	FR	UK

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.

***IMPORTANT**: the sensor firmware must be version 21xx or later. Update the firmware if necessary. See "Updates" on page 26.*

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

***IMPORTANT** : la version du firmware du détecteur doit être 21xx ou supérieure.*

5.5 Service and warranty

5.5.1 Customer service

MAGNASPHERE Corp.
N22 W22931 Nancys Ct., Ste 3
Waukesha, WI 53186USA
Tel: (262) 347-0711
Fax: 262.347.0710
e-mail: info@magnasphere.com
website: www.magnasphere.com

5.5.2 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
Note distributor information here:	MAGNASPHERE Corp. N22 W22931 Nancys Ct., Ste 3 Waukesha, WI 53186USA T. (262) 347-0711 F. 262.347.0710 info@magnasphere.com www.magnasphere.com

5.5.3 Warranty

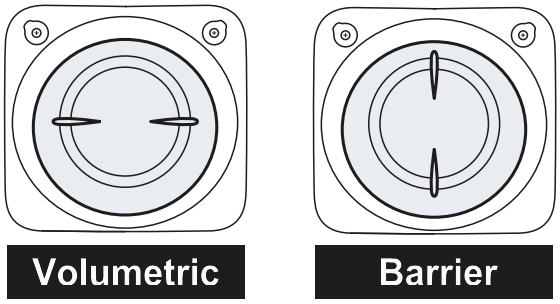
To find out about the terms of the warranty, exclusions and cancellation of the warranty, refer to the website www.tsec.it.

5.6 Useful conventions for requesting assistance

5.6.1 Conventions

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

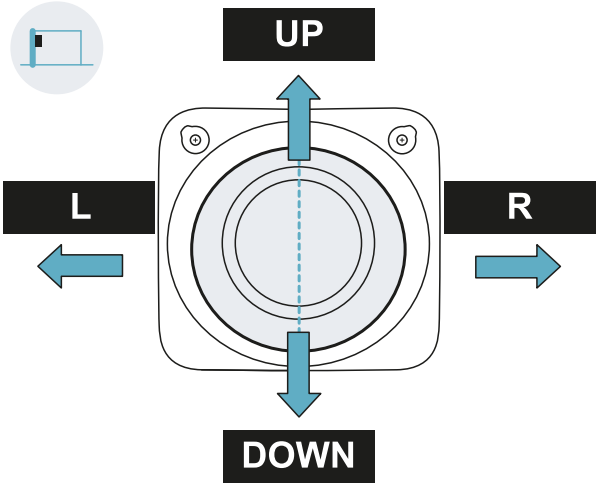
5.6.2 Type of application

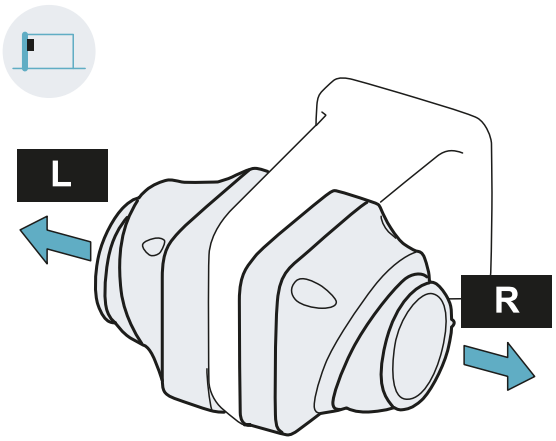


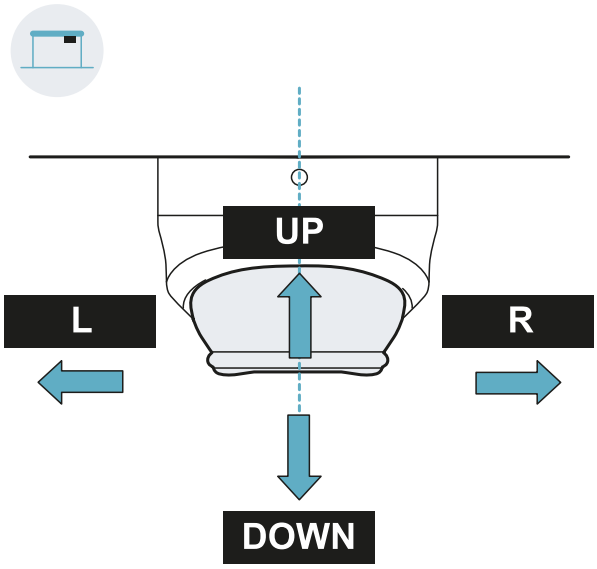
5.6.3 Spatial direction

Legend

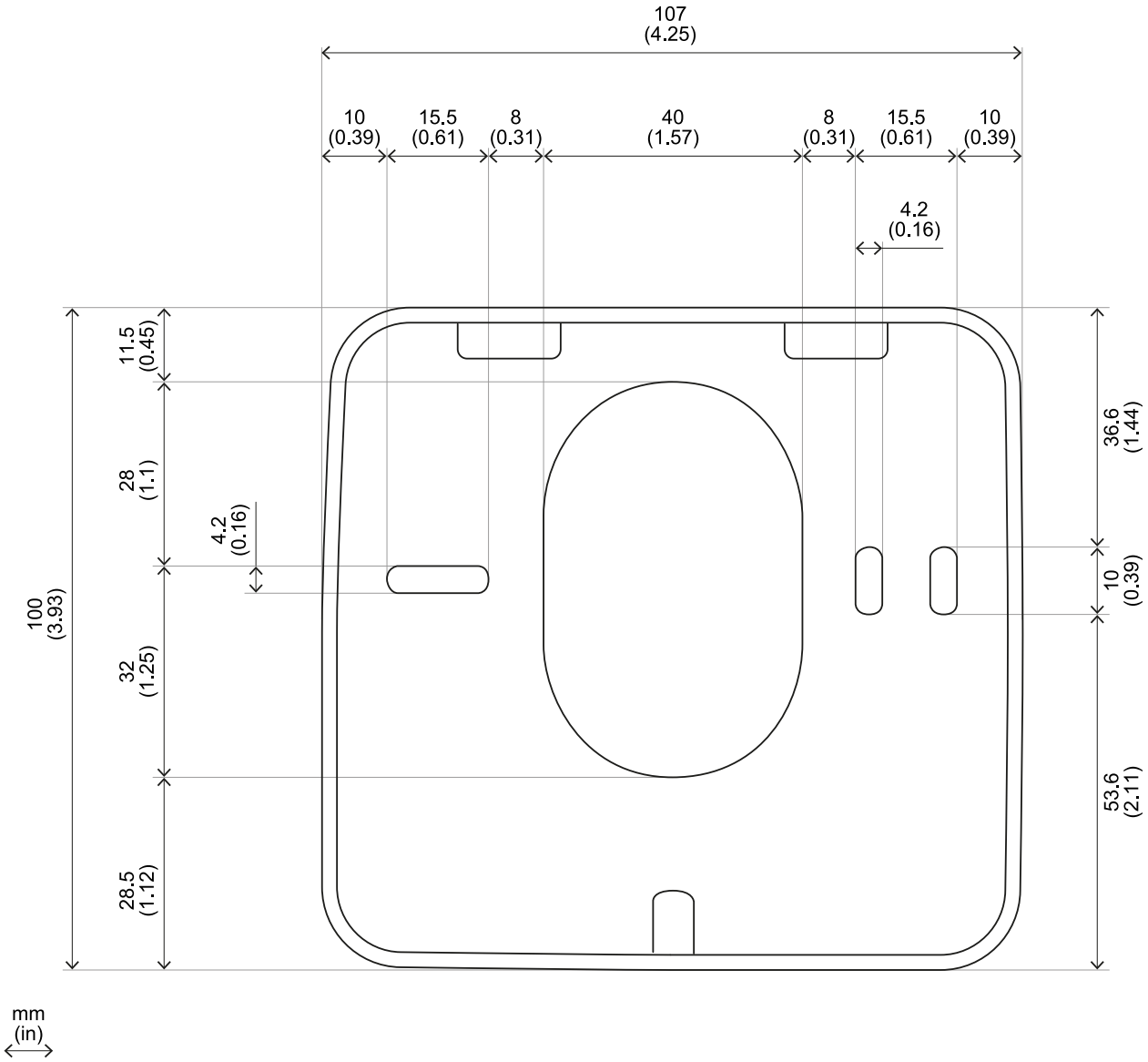
Icon	Description
	Wall installation
	Ceiling installation

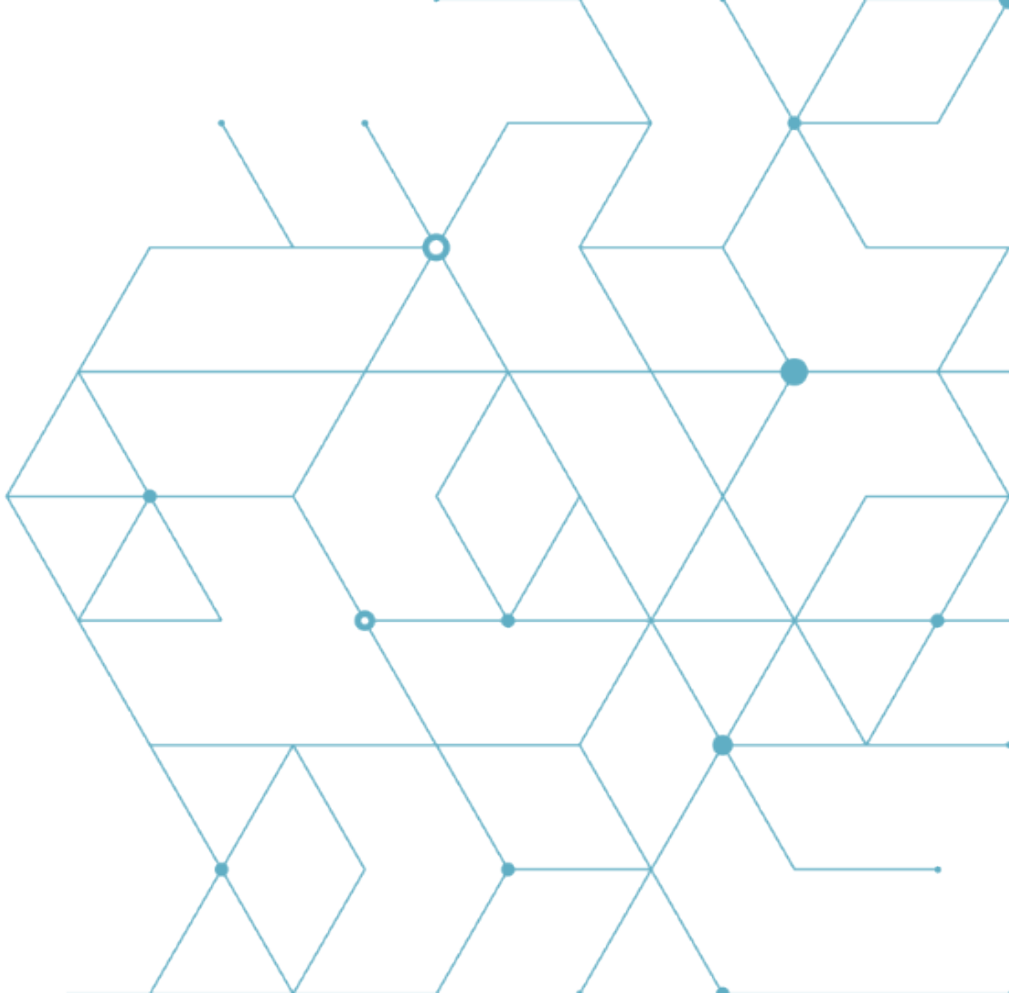






5.7 Back plate dimensions





Distributor:
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Advanced configuration manual v1.1
DEC 2019
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