MOVE'O Lite

Presentation

The MOVE'O lite sensor is a **LoRaWAN class A** sensor that uses a disposable 3.6V AA-type battery as power supply. It also includes an internal antenna.

MOVE'O lite can sensor **measure following environemental parameters**: Temperature, Hygrometry, Occupancy (Passive infrared move detetction), Illuminance. It can also detect case effraction.

Family code

The family code of MOVE'O lite sensor is: **50-70-225-xxx**

For previous release **50-70-220-xxx**, see **older revision documentation**

LoRaWAN release

v1.0.2 Region Parameter rev B

Installation and operation

Installation

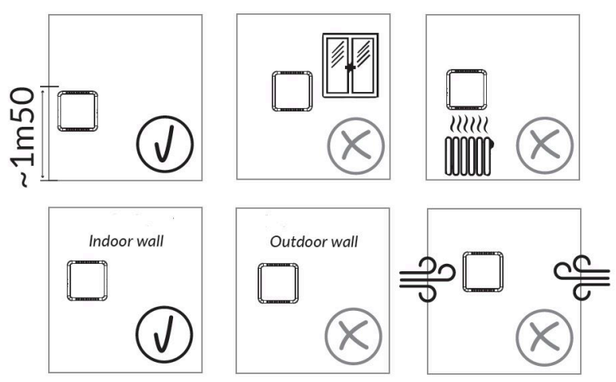
*Manual and QuickStart guide are available in our **download center.***

The housing is intended to be installed inside a building.

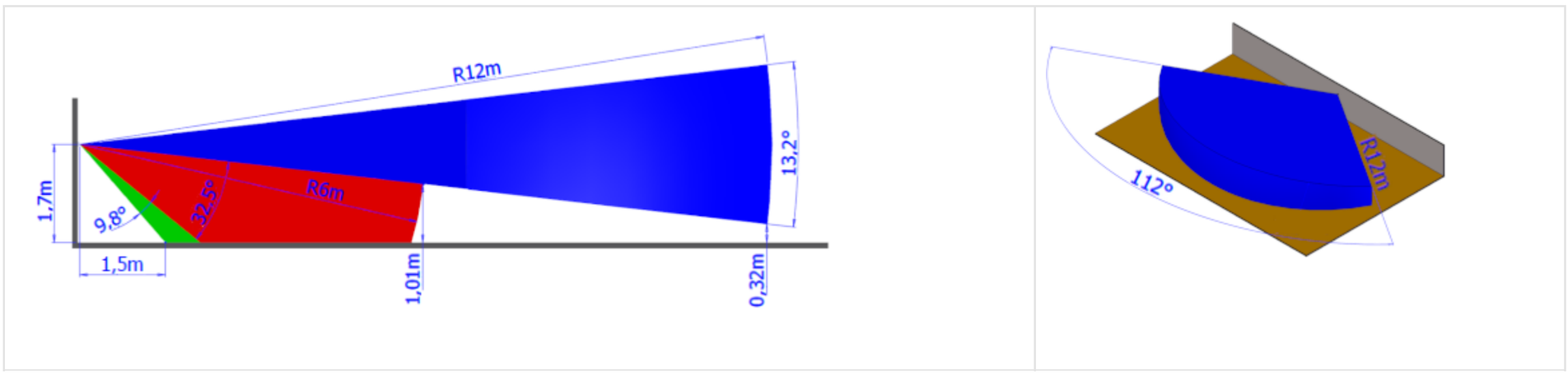
First, fix the lid of the sensor to the wall using screws or double-side tape. Then attach the case that contains the electronic board to the lid.

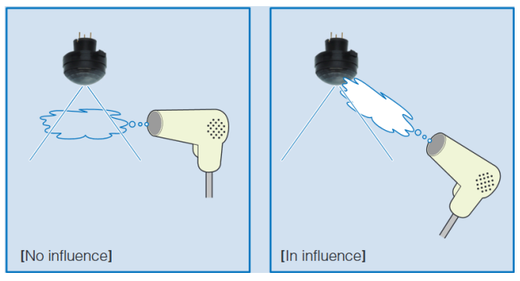
> ***It is important to start the device once fixed to the wall.*** *The tilt box's pull-out alert function is based on the angle with the vertical. This initial angle is taken at startup, and a periodic check of the angle is performed. If the angle varies by more than 4 degrees from the initial position, then the alert is triggered. It is necessary to return to the initial angle ±2 degrees for the alert to be deactivated.*

Move'o lite must be protected from any water spray and must be used in environnement with less than 80% relative humidity. The product should not be installed in direct heat source (Heater, sunlight, ...) to avoid local heating effects that may alter a global estimation of environnemental parameters in the measured room. The product should be installed in a representative position in regard of the required environnemental parameters survey. Usualy it should be installed beetween 1m50 and 2m50 from floor.



In the case of room occupancy survey the PIR Lense should face center of the surveyed area. The PIR sensor has a specific area detection which is described below:

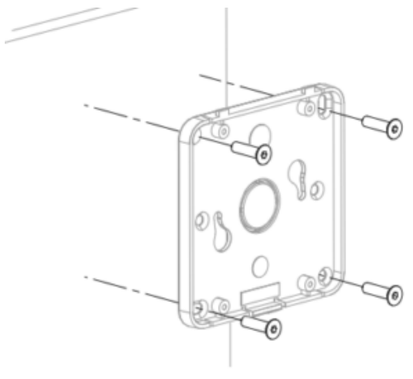


> ***Warning:*** *The PIR sensor should not be exposed directly to hot air flow (such as from a split air conditioning unit) as it may cause false detections.*
>
> 
>

The product has "2 leds" and one "reed switch" as human to machine interface. These elements should placed down when installing the sensor.

To correctly install the sensor:

- Open the product from the two clips at the botom using a small flat screw driver.
- Use the base as a template and obtain horizontality using a level.
- Once done you can clip back the front, containing electronic parts, on the base.

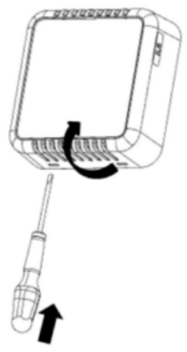


Once installed, the two leds are visible through the bottom left vertical windows and the reed switch can be actuated like a simple button using a magnet.

Replacing battery

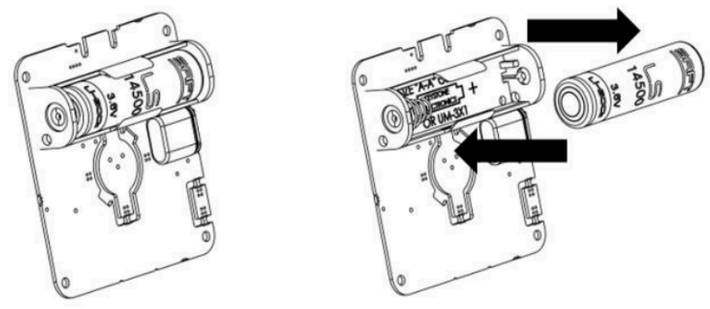
Battery can be replaced with lithium-thionyl-chloride (Li-SOCI2) LR6/AA of 2600mAh each (exemple: SAFT LS14500). They can be replace on the fly.

However operator must carefully avoid any **short circuit** or **electrostatic discharge** during batery replacement.



Steps to replace batteries are :

- Open the product from the two clips at the botom using a small flat screw driver.
- The PCB should now be separated from casing. You can now extract the battery with the spludger and replace it with a new one. **BEWARE** that battery must be placed in the same direction. Notice the "**+**" sign on the PCB.



- Once done you can clip back the front containing electronic parts, on the base starting from upper side.

Autonomy

The information in the table below represents how long the battery can last. It is based on the default configuration at ambient temperature (+25°C) within the optimal operating range of the sensor via a LoRaWAN network (one uplink frame), when the spreading factor used is SF12.

Following estimations are given with default reporting configuration and using three 2.6Ah capacity AA batteries installed, of which 85% is used.
With the default configuration the sensor will record all significative measurements (T, Hr and Lux) up to once each 10 minutes, and occupation detection with 30 minutes W/O move for before "Unoccupied" state, and at least once per hour batch report. Then batch reports will be regularly sent containning all these last measurements. It may contains several sample for any of the measured parameters (T, H, OCC, Lux...). Some specific reports/alarms may also be sent because of default configuration (violation, moves, threshold crossing for T or Rh ...). Due to all these possibly reported informations comsumption estimation is based on a periodic transmissions in range from 20 minutes to two hour with one 2600 mAh batteries.

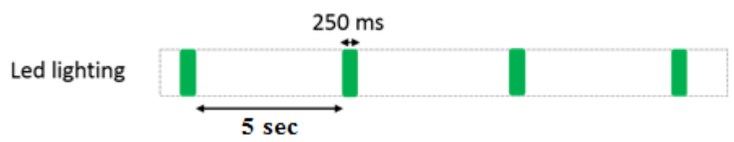
Transmission / Measure periodicity	SF9 Battery life expectancy	SF12 Battery life expectancy
12 hours / 1 hour	> 10 years	> 10 years
2 hours / 30 min	> 10 years	> 10 years
1 hour / 10 min	> 10 years	8,5 years
30 min / 10 min	> 10 years	5 years
20 min / 10 min	> 10 years	4 years

Human Machine Interface

Video Tutorials - WATTECO

There are two LEDs on the device:

Green: blinking until the association with a network is done. Since release v3.5.2.5530, after 6 hours in association searching the led blinks all 1 minute.



Red: blinking in configuration mode.

A magnet can be used to activate it and perform specific actions on the sensor (switch off, switch on, reassociation…). When the reed switch is activated, the red LED blinks quickly.

To **start up the device**, a magnet must be placed next to the sensor for one second to the configuration sticker (the "gears"). The red LED blinks quickly during this step. After **one second**, the red LED stops blinking and the green LED blinks slowly until the association is done.

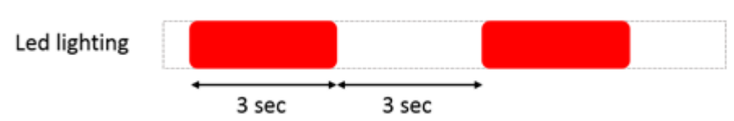
To **switch off the device**, repeat the same operation by placing the magnet next to the sensor for **5 seconds**. After those 5 seconds, the red LED blinks 5 times slowly.

Other specific actions can be carried out:

- During regular working mode, a **configuration mode** can be activated through one "user button" press (same as one pass of magnet on reed switch (ILS)), to enter the configuration mode.
  Consequently, "Void" frames are then sent every minute for 10 minutes allowing to probe uplink communication and send quickly downlink frames (configurations, requests, ...) to the class A sensor.

  Standard reports are disabled during this configuration mode.

Configuration mode	
Way to trigger it	One press on the USER button or specific ZCL command
Way to stop it	Another press on the USER button or specific ZCL command
Effects on the sensor	The CONF led (red) blinks (3 sec. OFF, 3 sec. ON) and the sensor sends an uplink frame every minute. The blinking is illustrated below this table.
Duration	The configuration mode lasts 10 minutes when it is triggered by pressing the USER button



- A **reassociation procedure** can be fired either manually (see table below) or automatically if no downlink frame is received by the sensor during a given periodicity (4 days by default) or if a given number (100 by default) is reached or in case of failure (no acknowledgement received) by sending an applicative frame to the sensor.

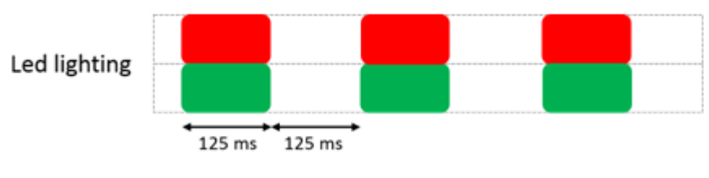
The sensor keeps the AppEUi and DevAddr configured, Confirmed/Unconfirmed configuration and all applicative configurations. However, LoRaWAN configurations (channel, data rate…) are lost.

ReAssociation Mode	
Way to trigger it	Three short presses on the USER button or ZCL command from LoRaWAN cluster.
Effects on the sensor	The ASSO LED (green) blinks as the “no commissioned sensor” LED is lit.

- A **factory reset**, available on Watteco’s sensors, can be fired manually (see table below). It deletes all the applicative settings saved in the flash memory (i.e.: newly configured batches and reports will be replaced by the factory reporting configuration).

The sensor keeps the AppEUi and DevAddr configured. However, LoRaWAN configurations (channel, data rate…) and applicative configurations are lost.

Factory reset	
Way to trigger it	Two short presses and one long press for approximately 7 seconds on the USER button.
Effects on the sensor	The CONF LED (red) and ASSO LED (green) blink at the same time briefly. All the applicative settings (for batches and reports) are deleted. The blinking is illustrated below this table.



Applicative layer

> ***Codecs are available to decode frames:*** ***Downloads***
> ***All downlink frames have to be sent on port 125***
> *Please, try and see also Watteco* ***Online codecs***

The MOVE’O lite device implements many applicative clusters associated to different sensors entries. The associations beetween measurment functionnalities and EndPoints/Clusters are shown below:

Cluster	Cluster name	EndPoint: Rôle	Product	Managed attributes
0x0402	Temperature	EP0 (0x11): Accuracy +/-0,2°C [1/100 °C]	All	All
0x405	Humidity	EP0 (0x11): Accuracy +/-2% [1/100 %RH]	All	All
0x000F	Binary input	EP0 (0x11): Violation status [Sensor removed 1:Yes, 0: No]	All	All
0x0406	Occupancy	EP0 (0x11): Current PIR sensor status [1: Occupied, 0: Not occupied]	All	All
0x0400	Illuminance	EP0 (0x11): Illuminance measurement [Lux]	All	All
0x0000	Basic	EP0 (0x11): Sensor firmware and hardware informations	All	All
0x0050	Configuration	EP0 (0x11): Sensor global configuration parameters and commands	All	All
0x8004	LoRaWAN	EP0 (0x11): Sensor LoRaWAN parameters management	All	All

Default configuration

MOVE'O lite sensors have got a default, Batch and Standard, configuration, that manages all embeded measurements through a periodic reporting of up to 2 frames per hour. This default configuration can be summerized as follow :

The "Batch" configuration

It records environnemental parameters with a 10 minutes max time sampling and sends them once or twice per hour:

- Temperature with a resolution of 0.1°C
- Humidity with a resolution of 1%
- Occupancy state
- Illuminance with a resolution of 10 Lux

The configuration of batch is :

Features	Label (size= 3)	Measure periodicity	Transmission periodicity	resolution
Temperature	1	10 minutes	1 hour	0.1°C
Relative Humidity	2	10 minutes	1 hour	1%
Illuminance	5	10 minutes	1 hour	10 lux
Occupancy	0	30 minutes	1 hour	/

Every change made to the default configuration must comply with the legal duty cycle (for example, the most restrictive in the EU is 0.1%, which corresponds to approximately 1 frame per hour with SF12)

To decode the default "batch" is necessary to use this argument: `3 0,1,4,OCC 1,10,7,T 2,100,6,H 5,10,6,LUX.`

The "Standard" configuration

It monitors critical events on environnemental parameters

- An report on violation (device removing)
- An alarm/report on power supply lowring down to 2,9v and once each 5 days
- A report each time Occupancy changes from Occupied to Unoccupied and vice versa

Any of these configurations can be removed or modified, and some different ones can be set. However, **every change made to the default configuration must comply with the legal duty cycle. For example, the most restrictive in the EU is 0.1%, corresponds to approximately 2 frames per hour with the most constrained Spreading Factor : SF12.**

Detailed default configurations

MOVE'O

Alternate 'No Batch' configuration

MOVE'O lite sensors has got an alternate default configuration that can be activated instead of default one. With this alternate configuration Batch is not used. Beware that this configuration is more verbose on radio, and will drain battery faster.

Following configuration commands can be used to swap beetween default configuration and alternate one:

- Set 'No Batch' default configuration: **11500050F101**
- Set Back default configuration : **11500050F100**

Detailed alternate 'No batch' configurations

MOVE'O Alternate 'No batch' configuration

Received frame examples

> ***Codecs are available to decode frames:*** *Downloads*
> *Please, try and see also Watteco* ***Online codecs***

Batch report

Typical MOVE'O batch report

Input uplink frame to decode:

```
4610000000860444ed3390bb00a8c2082800
```

Batch attributes :

```
3 0,1,4,OCC 1,10,7,T 2,100,6,H 5,10,6,LUX
```

Decoding results:


```
{
"batch_counter": 0,
"batch_relative_timestamp": 52,
"batch_absolute_timestamp": "2024-10-14T18:21:13.674",
"dataset": [
{
"data_relative_timestamp": 20,
"data": {
"value": 1,
"label": 0,
"label_name": "OCC"
},
"data_absolute_timestamp": "2024-10-14T18:20:41.674Z"
},
{
"data_relative_timestamp": 12,
"data": {
"value": 2440,
"label": 1,
"label_name": "T"
},
"data_absolute_timestamp": "2024-10-14T18:20:33.674Z"
},
{
"data_relative_timestamp": 12,
"data": {
"value": 6600,
"label": 2,
"label_name": "H"
},
"data_absolute_timestamp": "2024-10-14T18:20:33.674Z"
},
{
"data_relative_timestamp": 13,
"data": {
"value": 170,
"label": 5,
"label_name": "LUX"
},
"data_absolute_timestamp": "2024-10-14T18:20:34.674Z"
}
]}
```


Standard report

Report on violation (sensor moved)

Alarm on Humidity level getting lower than specified threshold

Known Issues