

## Motion sensor iO Engineering Specification

Motion sensor iO is a universal Z-Wave Sensor. It can detect motion and communicate with other associated Z-Wave™ devices, such as Gateway, Siren, Smart Switch, etc.

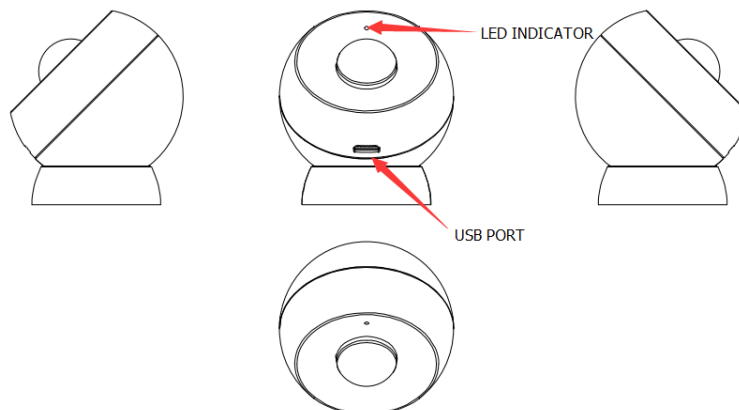
Motion sensor iO can be included and operated in any Z-Wave network with other Z-Wave certified devices.

The features list:

- 1) Z-Wave Plus™ certified for wide compatibility (500 series product).
- 2) Supports security 0 and security 2 protected mode with AES-128 encryption.
- 3) Motion sensor.
- 4) Tamper alarm by shock sensor.
- 5) The battery life is up to 1 year.
- 6) Low battery alarm.
- 7) Support firmware OTA.

### I . GENERAL INFORMATION ABOUT MOTION SENSOR

#### 1. Product layout

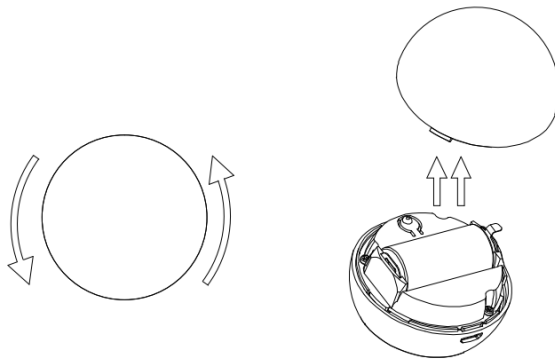


#### 2. Specifications

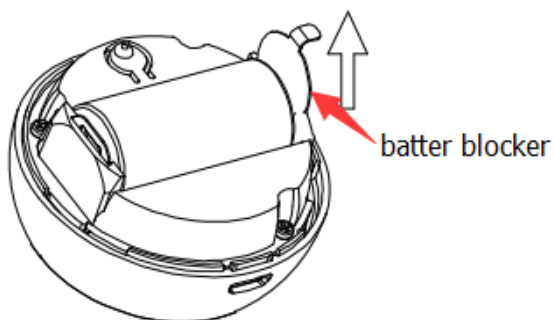
Power Supply:	3V: 1*CR123A or USB
Storage environment:	-40 -70 °C
Operational temperature :	0 - 40 °C
Radio protocol:	Z-Wave Plus
Radio frequency:	868.42MHz (EU)
Range:	More than 100m outdoors About 30m indoors
Dimensions:	50mm(Φ)
Working current:	About 50mA
Standby current:	About 55uA
Recommended installation height:	2m ~ 4m

## II . INSTALLATION

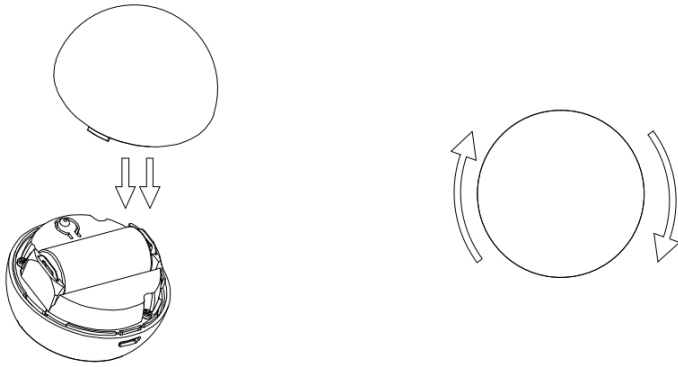
1. Turn the cover counter-clockwise and open it.



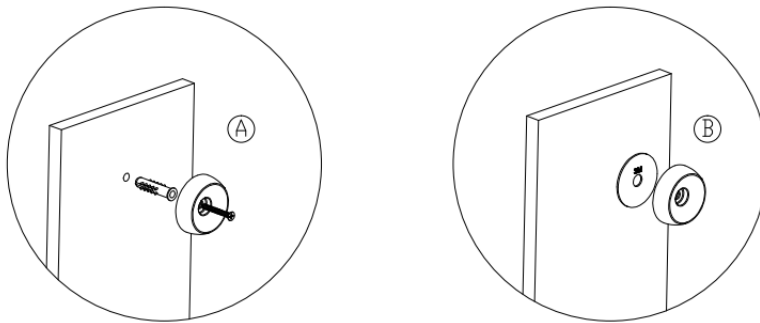
2. Remove the battery blocker.



3. Add the device (see “Adding/removing the device” on page 4).
4. Close the cover and turn it clockwise.



5. Place the sensor to anywhere you want.



### III. Functions of each trigger

**Function of Action Button:**

**Motion sensor iO is not in the Z-Wave network:**

Trigger	Description
Short press 1 time (within 1 second)	<ol style="list-style-type: none"> <li>1. Led will blink fast.</li> <li>2. <b>Add for inclusion (non-security):</b> <ol style="list-style-type: none"> <li>1) Insert one CR123A batteries.</li> <li>2) Set the Z-Wave network main controller into learning mode (see Z-Wave network controller operating manual).</li> <li>3) Trigger this button action.</li> <li>4) If the inclusion is successful, the LED will blink fast and then keep on, otherwise the LED will blink fast and then turn off, in which you need to repeat the process from step 2.</li> </ol> </li> </ol>
Short press 3 time (within 1 second)	The same as "Short press 1 time"
Press and hold for 1-3 seconds	Led keeps on when holding the Z-Button, turn off when Z-Button is released.
Press and hold for more than 3 seconds	<ol style="list-style-type: none"> <li>1. Led blink fast then turn off;</li> <li>2. <b>Add for inclusion (security):</b> <ol style="list-style-type: none"> <li>1) Insert two CR123A battery.</li> <li>2) Set the Z-Wave network main controller into learning mode (see Z-Wave network controller operating manual).</li> </ol> </li> </ol>

	<p>3) Trigger this button action.</p> <p>4) If the inclusion is successful, the LED will blink fast and then keep on, otherwise the LED will blink fast and then turn off, in which you need to repeat the process from step 2.</p>
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**Motion sensor iO is in the Z-Wave network:**

Trigger	Description
Short press one time (within 1 second)	Led will keep on for 1 seconds
Short press 3 time (within 1 second)	<p>1. Led will blink fast;</p> <p>2. <b>Remove for exclusion;</b></p> <p>    1. Insert one CR123A battery.</p> <p>    2. Set the Z-Wave network main controller into removing mode (see Z-Wave controller operating manual).</p> <p>    3. Trigger this button action.</p> <p>    4. If the removing is successful, the LED will blink slowly and then turn off, otherwise you need to repeat the process from step 2.</p>
Press and hold for 1-3 seconds	Led keeps on when holding the Z-Button, turn off when Z-Button is released.
Press and hold for 3-20 seconds	<p>1. LED will blink fast.</p> <p>2. <b>Motion Sensor</b> will send “wake up notification command” to the nodes which is assigned by “Wake Up Command”.</p> <p>3. <b>Motion Sensor</b> will enable/disable “awaking for 5 minutes function”.</p>
Press and hold more than 20 seconds	<p><b>Reset Motion Sensor</b></p> <p>Triggering this action, led will keep on until the Z-Button is released; <b>Motion Sensor</b> will send “Device_Reset_Locally” to the main controller and exclude from the Z-Wave network when the Z-Button is released, this procedure will reset the Sensor to factory default.</p>

**IV. features of Motion sensor iO in Z-Wave network**

Motion sensor iO can be included into a Z-Wave network as a non-security or security device.

**1.Add for inclusion (security):**

See the section of “functions of each trigger” above.

**2. Node info frame**

**The node info frame supports:**

**2.2. Security device**

**The node info frame supports:**

COMMAND_CLASS_ZWAVEPLUS_INFO	V2
COMMAND_CLASS_TRANSPORT_SERVICE	V1
COMMAND_CLASS_SECURITY	V1
COMMAND_CLASS_SECURITY_2	V2

**Security Command Supported Report Frame:**

COMMAND_CLASS_VERSION	V2
COMMAND_CLASS_MANUFACTURER_SPECIFIC	V2
COMMAND_CLASS_NOTIFICATION	V5
COMMAND_CLASS_ASSOCIATION_GRP_INFO	V1
COMMAND_CLASS_ASSOCIATION	V2
COMMAND_CLASS_BATTERY	V1
COMMAND_CLASS_WAKE_UP	V2

## V. Note for special command

### 1.1 Association Command

**Motion Sensor** supports two association groups.

Association allows Motion sensor to control another Z-Wave device such as Smart Switch, Smart Dimmer, etc.

Motion sensor iO can max associate 5 nodes in each group.

Association Group 1 is the lifeline group

Group 1 reports the motion detection and battery level.

Group 2 is assigned to send BASIC SET command.

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Grouping Identifier	Max Nodes	Send Commands
Group 1	0x05	1. Notification Report. Sensor will send Notification Report to the associated nodes when <b>Motion sensor iO</b> is removed or/and PIR is triggered. 2. Battery Report. <b>Motion sensor iO</b> will send Battery Report when the battery level is low and the battery report's value is 0xFF. 3. Device Reset Locally Notification.
Group 2	0x05	1. Basic Set. <b>Motion sensor iO</b> will send Basic Set to associated nodes when the PIR is triggered.

### 1.2 Basic Command

**Motion sensor iO** will send Basic Set to associated nodes when the PIR is triggered.

### 1.3 Notification command parameters

parameters	Value
Supported Notification Type	Home Security (07)
Supported Event	Motion Detection Unknown Location (08) Tampering Product covering removed (03)

a. When the PIR is triggered, send Motion Detection Unknown Location (08);

- b. When PIR is released, send Previous Events cleared (00), Parameter 1 for Motion Detection Unknown Location (08)
- c. When there is vibration / movement, send Tampering Product covering removed (03);
- d. When there is vibration / movement, send Tampering Product covering removed (03);**
- e. Notification has a switch to Notification Status, and when it is 0xFF, there will be a Notification Report. When it is 0, there will be no Notification Report.**

## **VI. ADVANCED CONFIGURATION**

Motion sensor iO offers a wide variety of advanced configuration settings. Below parameters can be accessed from main controllers configuration interface.

### **Parameter NO. 12 MOTION SENSOR'S SENSITIVITY**

The higher the value, the more sensitive the PIR sensor.

**0** – Disabled motion detection

Available settings: **1-8**

Default setting: **8**

Parameter size: **1 [byte]**

### **Parameter No.14 ENABLE/DISABLE BASIC SET COMMAND**

Motion sensor iO can send BASIC SET command to nodes associated with group 2 when motion is triggered.

**0** – Disable.

**1** – Enable.

Default setting: **0**

Parameter size: **1 [byte]**

### **Parameter No.15 VALUE OF THE BASIC SET**

Motion sensor iO can reverse its value of BASIC SET when motion is triggered.

**0** –Send BASIC SET VALUE = 255 to nodes associated with group 2 when motion alarm is triggered.

Send BASIC SET VALUE = 0 to nodes associated with group 2 when motion alarm is canceled.

**1** –Send BASIC SET VALUE = 0 to nodes associated with group 2 when motion alarm is triggered.

Send BASIC SET VALUE = 255 to nodes associated with group 2 when motion alarm is canceled.

Default setting: **0**

Parameter size: **1[byte]**

### **Parameter No.17 ENABLE/DISABLE SHOCK ALARM**

**0** –Disable.

**1** –Enable.

Default setting: **0**

Parameter size: **1[byte]**

#### **Parameter No.18 MOTION ALARM CANCELLATION DELAY**

Motion alarm will be cancelled in the main controller after 3 seconds, the alarm cancellation can be delay by this parameter. Any motion detected during the cancellation delay time countdown will result in the countdown being restarted.

Available settings: **0-65535 (seconds)**

Default setting: **0 (seconds)**

Parameter size: **2[byte]**

#### **Parameter No.32 LEVEL OF LOW BATTERY**

Define a battery level as the “low battery”.

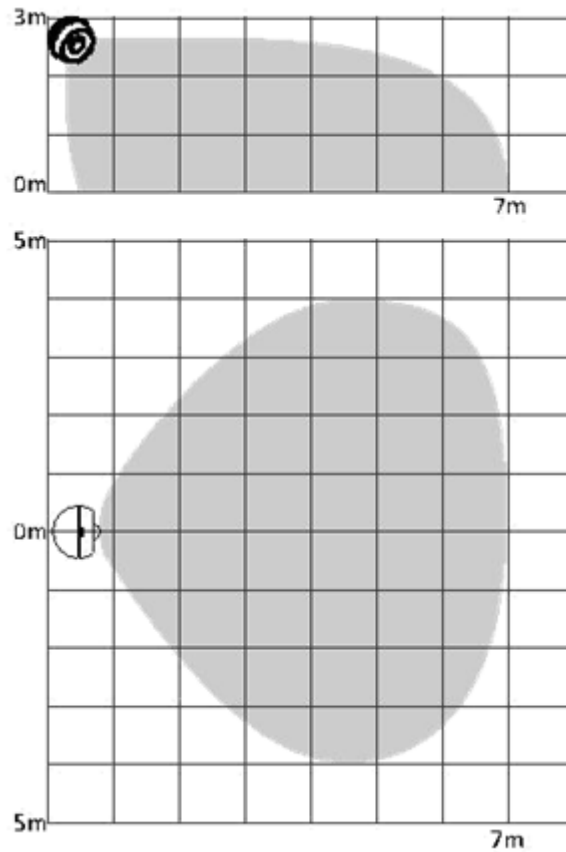
Available settings: **10-50 (10- 50%)**

Default setting: **20 (20%)**

Parameter size: **1[byte]**

### **VII.DETECTION AREA**

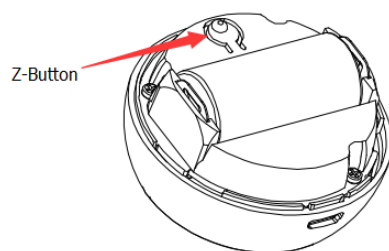
Motion Sensor’s motion detection area is shown below. Actual range of the sensor can be influenced by environment conditions. Should false motion alarms be reported, check for any moving objects within the sensor’s detection area, such as trees blowing in the wind, cars passing by, windmills. False motion alarms may be caused by moving masses of air and heat as well. If the device keeps on reporting false alarms, despite eliminating all of the above-mentioned factors, install the device in another place.



## VIII. ADDING/REMOVING THE DEVICE

### Included as a non-secure device:

- 1) Open the cover.
- 2) Place the device within the direct range of your Z-Wave controller.
- 3) Set the main controller in add mode (see the controller's manual).
- 4) Click the Z-button once or triple click the Z-button quickly, the LED indicator should blink fast.

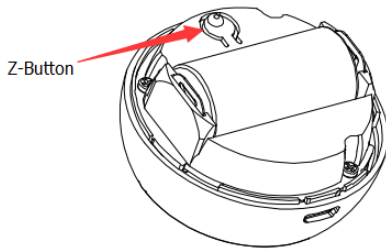


- 5) Wait for the adding process to end.
- 6) Successful adding will be confirmed by the Z-Wave controller's message.

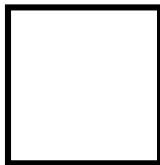
### Included as a secure device (S0 or S2)

- 1) Open the cover.
- 2) Place the device within the direct range of your Z-Wave controller.
- 3) Set the main controller in security add mode (see the controller's manual).
- 4) Press the Z-button for more the 3 seconds and then release, the LED indicator should blink fast.





- 5) Wait for the adding process to end.
- 6) Successful adding will be confirmed by the Z-Wave controller's message.



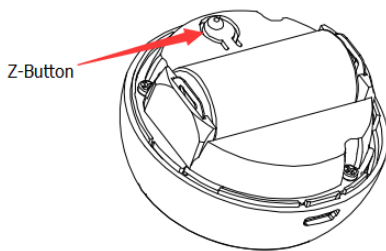
**NOTE**

If you want your motion sensor to be a security device that use secure/ encrypted message to communicate in a Z-Wave network, then a security enabled Z-Wave controller is needed.

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**Removing**

- 1) Open the cover.
- 2) Place the device within the direct range of your Z-Wave controller.
- 3) Set the main controller remove mode (see the controller's manual).
- 4) Triple click the Z-button quickly, the LED indicator should blink fast.



- 5) Wait for the removing process to end.
- 6) Successful adding will be confirmed by the Z-Wave controller's message.

**IX. RESETTING**

Reset procedure clears the motion sensor's memory, including Z-Wave network controller information. To reset Motion sensor:

- 1) Power on the device,
- 2) Press and hold the Z button for more than 20 seconds,
- 3) If holding time more than 20seconds, the LED indicator will keep on for 2 seconds, which means resetting is complete.
- 4) The reset feature works only when the device has been included into a Z-Wave network.



**NOTE**

Use this procedure only in the event that the network primary controller is missing or otherwise inoperable.

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**X.FCC NOTICE**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.