Neo

Motion Sensor with temperature sensor

SKU: NEOEMS02Z

Quickstart

This is a **Multilevel Sensor** for **Europe**. To run this device please insert fresh **1 * CR123A** batteries. Please make sure the internal battery is fully charged.

1) Disassemble PIR main body and insert battery into PIR sensor. After making it powered on, please do not operate it within 20s.
2) Make sure PIR sensor is located within the Z-Wave network range of gateway.
3) Set Z-Wave gateway into inclusion mode (Refer to gateway user manual).
4) Press the code button in PIR sensor three times continuously, LED Color Indicator then PIR sensor will enter inclusion mode. Meanwhile, LED light would flash red color five times on and off alternately.
5) PIR will be detected and included in the Z-Wave network.
6) Wait for gateway to configure PIR sensor.

What is Z-Wave?

Z-Wave is the international wireless protocol for communication in the Smart Home. This device is suited for use in the region mentioned in the Quickstart section. (For more information about frequency regulations please refer to the frequency coverage overview at Sigma Designs Website).

Z-Wave ensures a reliable communication by reconfirming every message (**two-way communication**) and every mains powered node can act as a repeater for other nodes (**meshed network**) in case the receiver is not in direct wireless range of the transmitter.

This device and every other certified Z-Wave device can be **used together with any other certified Z-Wave device regardless of brand and origin** as long as both are suited for the same frequency range.

If a device supports **secure communication** it will communicate with other devices secure as long as this device provides the same or a higher level of security. Otherwise it will automatically turn into a lower level of security to maintain backward compatibility.

For more information about Z-Wave technology, devices, white papers etc. please refer to www.z-wave.info.

Product Description

Motion sensor(PIR) is a passive infrared detector or physical sensor. This sensor doesn't emit any energy but only passively receive and detect infrared radiation from outside. Under room temperature, all items have radiation. Human beings are warm-blooded animals with stable infrared radiation, so are most easily to be detected. That's why we also call it body sensor. PIR send messages via Z-Wave network to Z-Wave gateway. In the Z-Wave network communications, PIR can be connected to any Z-Wave gateway. Different countries or areas, the radio frequency is different. In the communication between PIR and Z-Wave gatwway, PIR can only send messages, not be able to receive messages. When PIR is triggered, PIR will send message to Z-Wave gateway, and associate devices to work through ZWave gateway. PIR is battery powered, is small and can be installed easily.

Prepare for Installation / Reset

Please read the user manual before installing the product.

In order to include (add) a Z-Wave device to a network it **must be in factory default state.** Please make sure to reset the device into factory default. You can do this by performing an Exclusion operation as described below in the manual. Every Z-Wave controller is able to perform this operation however it is recommended to use the primary controller of the previous network to make sure the very device is excluded properly from this network.

Reset to factory default

This device also allows to be reset without any involvement of a Z-Wave controller. This procedure should only be used when the primary controller is inoperable.

1. Remove the cover of PIR sensor.
2. Make sure the sensor is powered.
3. Press and hold the reset button for 10-15 seconds, then LED lights would flash red color 1 time first, then 5 times on and off alternately.
4. Release the code button.

Safety Warning for Batteries

The product contains batteries. Please remove the batteries when the device is not used. Do not mix batteries of different charging level or different brands.
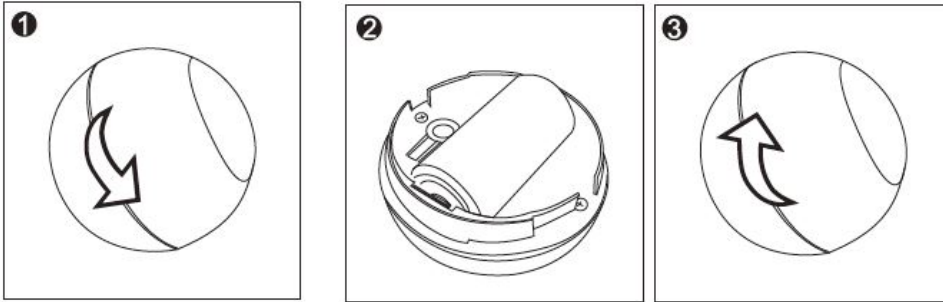
Installation

Holder Installation

Fix the holder with screws and screw stopper or put the sticker on the bottom of motion sensor then fix it on the wall.
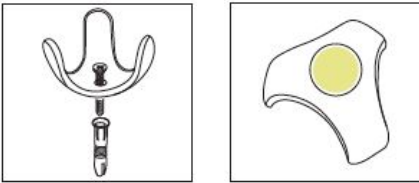
Battery Installation

1. Make sure PIR placed within the Z-Wave network range of gateway.
2. PIR is recommended to be fixed at the height of 2- 4 meters off the ground.
3. When install PIR, please keep it far away from places where air temperature changes sensitively, e.g., around air conditioners, refrigerators, stoves and so on.
4. Furniture, large bonsai or other spacers shouldn't be placed within PIR's detection area.
5. When installing PIR, please keep it away from stairs, elevators and other obstructions. Make sure these obstructions are outside of PIR's detection area.
6. After instaling PIR, please test whether PIR works properly or not, if there is false alarm from PIR, please install PIR in another place.
7. Direct association can be allowed between PIR and other ZWave network devices if preset association functionality. Z-Wave gateway will not take part in such communication. Using this mechanism, PIR can communicate with other devices even when gateway is damaged.

Detection Range

PIR has to be installed in a corner of room or perpendicularly to door. Actual detection range of this sensor can be influenced by environment conditions. If there are false alarms reported, check if there are any moving objects within sensor's detection
area, such as trees blowing in the wind, cars passing by, windmills. False motion alarms may be caused by masses of moving air and heat as well. If sensor keeps on reporting false alarms, despite eliminating all of above-mentioned factors, then install sensor in another place.
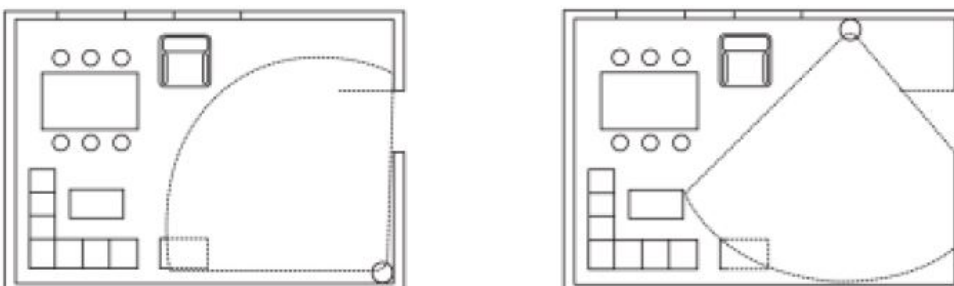
Detection range of PIR shown in the following picture
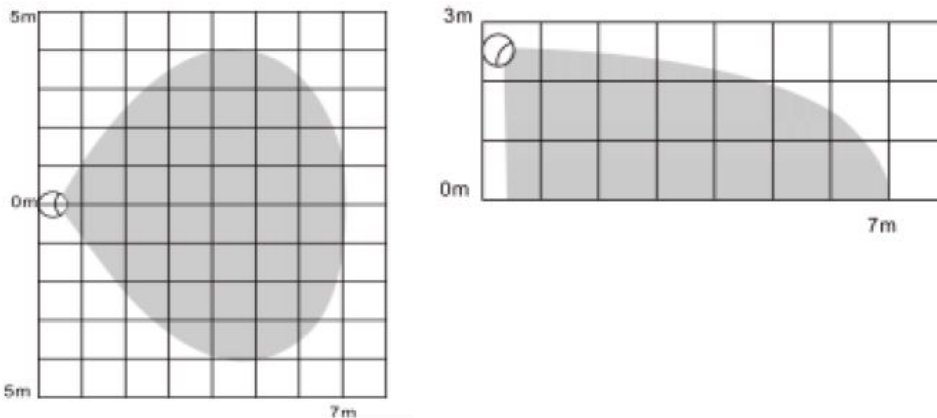
Working Conditions
If there is someone moving within the detection area, then alarm would be triggered, and LED lights would flash in the inductive area at the same time.
Work schematic diagram of PIR is shown in the following picture

Inclusion/Exclusion

On factory default the device does not belong to any Z-Wave network. The device needs to be **added to an existing wireless network** to communicate with the devices of this network. This process is called **Inclusion**.

Devices can also be removed from a network. This process is called **Exclusion**. Both processes are initiated by the primary controller of the Z-Wave network. This controller is turned into exclusion respective inclusion mode. Inclusion and Exclusion is then performed doing a special manual action right on the device.

Inclusion
Press the code button in PIR sensor three times continuously

Exclusion
Press the code button in PIR sensor three times continuously

Product Usage

Battery Usage Tips

Battery life of motion sensor is approximately 1 year. The power level of battery would be displayed in the gateway. Red icon means the battery needs replacing, and then mobile app would receive a message "power level is low, please remember to replace battery" from gateway. In order to avoid false alarm, before replacing battery, please disconnect association of motion sensor with other devices.

Note: PIR motion sensor is powered by battery, and please use battery in a correct way to avoid exploding. When handling the battery, refer to environmental law please.

LED Indicator

- Blink 5 Times (1s Interval): Motion Sensor(PIR) is powered on, and has not added to Z-Wave network yet
- Blink 5 Times (500ms Interval) Enter includsion mode, excluison mode or send Node Info
- Blink 5 Times (300msInterval) Motion Sensor(PIR) has already added to Z-Wave network, and make it powered on again
- Blink 1 Time first, then 5 times on and off alternately. Press and hold the reset button for 10 - 15 seconds to restore PIR sensor to factory settings
- Blink 1 Time 1: Detect a Movement
            2:Press the Button shortly to Send Wake up information to gateway

Communication to a Sleeping device (Wakeup)

This device is battery operated and turned into deep sleep state most of the time to save battery life time. Communication with the device is limited. In order to communicate with the device, a static controller **C** is needed in the network. This controller will maintain a mailbox for the battery operated devices and store commands that can not be received during deep sleep state. Without such a controller, communication may become impossible and/or the battery life time is significantly decreased.

This device will wakeup regularly and announce the wakeup state by sending out a so called Wakeup Notification. The controller can then empty the mailbox. Therefore, the device needs to be configured with the desired wakeup interval and the node ID of the controller. If the device was included by a static controller this controller will usually perform all necessary configurations. The wakeup interval is a tradeoff between maximal battery life time and the desired responses of the device. To wakeup the device please perform the following action: You can press the button once to wake up the sensor and send wakeup notification to gateway. If press successfully, LED light will blink one time.

Quick trouble shooting

Here are a few hints for network installation if things dont work as expected.

1. Make sure a device is in factory reset state before including. In doubt exclude before include.
2. If inclusion still fails, check if both devices use the same frequency.
3. Remove all dead devices from associations. Otherwise you will see severe delays.
4. Never use sleeping battery devices without a central controller.
5. Dont poll FLIRS devices.
6. Make sure to have enough mains powered device to benefit from the meshing

Association - one device controls an other device

Z-Wave devices control other Z-Wave devices. The relationship between one device controlling another device is called association. In order to control a different device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called association groups and they are always related to certain events (e.g. button pressed, sensor triggers, ...). In case the event happens all devices stored in the respective association group will receive the same wireless command wireless command, typically a 'Basic Set' Command.

Association Groups:

Group Number	Maximum Nodes	Description
1	4	Lifeline
2	4	Send control commands to associated devices such as relay module, lighting, etc.
3	4	Send Notification to associated devices in this group.
4	4	Sending Sensor Binary Report to associated devices in this group.

Configuration Parameters

Z-Wave products are supposed to work out of the box after inclusion, however certain configuration can adapt the function better to user needs or unlock further enhanced features.

IMPORTANT: Controllers may only allow configuring signed values. In order to set values in the range 128 ... 255 the value sent in the application shall be the desired value minus 256. For example: To set a parameter to 200 it may be needed to set a value of 200 minus 256 = minus 56. In case of a two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

Parameter 1: Sensitivity Level Setting

This parameter defines the sensitivity of PIR sensor. At the first time of test, it is recommended to test the sensor with movements from a farthest end of the coverage area . If movements cannot be detected sensitively, simply adjust the sensitivity level by changing this parameter.
Size: 1 Byte, Default Value: 12

Setting	Description
8 - 255	Sensitivity Level Setting.

Parameter 2: On/Off Duration
This parameter can determine how long the associated devices should stay ON status. For instance, this parameter is set to 30(second), PIR sensor will send a BASIC SET Command to an associated device with value basic set level if PIR sensor is triggered, and the associated devices will be turned on, and stay in this status for 30(second) before it is turned off automatically.
Size: 2 Byte, Default Value: 30

Setting	Description
5 - 600	On/Off Duration Setting

Parameter 3: Basic Set Level
Basic Set Command will be sent where contains a value when motion sensor is triggered, Z-Wave gateway will take it for consideration; for instance, if a lamp module is received the Basic Set Command of which value is decisive as to how bright of dim level of lamp module shall be.
Size: 1 Byte, Default Value: 99

Setting	Description
0	OFF
1 - 99	Alarm cancelling or turning a device off
255	ON

Parameter 4: PIR Detecting Function Enabled/Disabled
This parameter can enable or disable PIR detector detecting function.
Size: 1 Byte, Default Value: 255

Setting	Description
0	Disable PIR Detector
255	Enable PIR Detector

Parameter 5: Ambient illumination Lux Level
This parameter can be set a lux level value which determines when light sensor is activated. If the ambient illumination level falls below this value, and a person moves across or stands within the detected area , PIR detector will send a Z-Wave ON command(i.e. BASIC_SET value = parameter 3#) to an associated device and activate it.
Size: 2 Byte, Default Value: 100

Setting	Description
0 - 1000	LUX

Parameter 6: Re-trigger Interval Setting
This Parameter can be used to adjust the interval of being retriggered after PIR sensor has been triggered. This Parameter value must be less than Parameter 2#.If user set this parameter to default by Configure CC, the parameter #2 will be set to default value
Size: 1 Byte, Default Value: 8

Setting	Description
1 - 8	Re-trigger Interval Setting.

Parameter 7: Light Sensor Polling Interval
This Parameter can be set as interval time for light sensor measuring ambient illumination level.
Size: 2 Byte, Default Value: 180

Setting	Description
60 - 36000	Light Sensor Polling Interval

Parameter 8: Lux Level Function Enable
If this parameter is set to '1', and when Lux level is less than the value defined by parameter #5, PIR sensor will send a BASIC_SET command frame(i.e. BASIC_SET (value = parameter 3) to an associated device and activate it. If Lux Level is greater than the value defined by parameter #5, PIR sensor will not send a BASIC_SET command frame.
Size: 1 Byte, Default Value: 0

Setting	Description
0	Disable
1	Enable

Parameter 9: Ambient illumination Lux Level Report

This parameter defines how much Lux must be changed first, then PIR sensor will report to z wave gateway.

Size: 1 Byte, Default Value: 100

Setting	Description
0 - 255	Lux Level Report

Parameter 10: Ambient Temperature Differential Report

This parameter is configured the value that differential between current measured and previous report value. If the differential value larger than the settings, device will report this measured temperature value to nodes associated in lifeline.

Size: 1 Byte, Default Value: 5

Setting	Description
0 - 127	Differential Value in step 0,1°C

Parameter 11: Led Blink Enable

This parameter defines the Led on/off enable. If this parameter is set to '1', led blink will be enabled, the led will blink once when motion sensor detect a movement. Otherwise, the led will be turned off always.

Size: 1 Byte, Default Value: 1

Setting	Description
0	Disable
1	Enable

Parameter 12: Motion Event Report One Time Enable

Size: 1 Byte, Default Value: 1

Setting	Description
0	The motion detected event will be sent to controller when device detects a movement event
1	he motion detected event will be sent to controller only once until device report motion cleared event.

Parameter 99: Ambient light intensity calibration

This parameter defines the calibrated scale for ambient light intensity. Because the method and position that the sensor is mounted , and the cover of sensor will bring measurement error,user can get more real light intensity by this parameter setting. User should run the steps as blows for calibrating.

Size: 2 Byte, Default Value: 10

Setting	Description
1 - 65536	Ambient light intensity calibration

Technical Data

Dimensions	45 x 45 x 48 mm
Weight	25.14 gr
Hardware Platform	ZM5101
EAN	6924715906508
IP Class	IP 20
Voltage	3V
Battery Type	1 * CR123A
Device Type	Multilevel Sensor
Firmware Version	03.50
Z-Wave Version	04.26
Z-Wave Product Id	0x0258.0x0003.0x108d

Supported Command Classes

- Basic
- Sensor Binary
- Sensor Multilevel

- Association Grp Info
- Device Reset Locally
- Zwaveplus Info
- Configuration
- Alarm
- Manufacturer Specific
- Powerlevel
- Battery
- Wake Up
- Association
- Version

Explanation of Z-Wave specific terms

- **Controller** — is a Z-Wave device with capabilities to manage the network. Controllers are typically Gateways,Remote Controls or battery operated wall controllers.
- **Slave** — is a Z-Wave device without capabilities to manage the network. Slaves can be sensors, actuators and even remote controls.
- **Primary Controller** — is the central organizer of the network. It must be a controller. There can be only one primary controller in a Z-Wave network.
- **Inclusion** — is the process of adding new Z-Wave devices into a network.
- **Exclusion** — is the process of removing Z-Wave devices from the network.
- **Association** — is a control relationship between a controlling device and a controlled device.
- **Wakeup Notification** — is a special wireless message issued by a Z-Wave device to announces that is able to communicate.
- **Node Information Frame** — is a special wireless message issued by a Z-Wave device to announce its capabilities and functions.