

POVS-1-ZBS Series

PIR Occupancy/Vacancy Sensor

Introduction

POVS-1-ZBS is a ZigBee Passive Infrared Motion Sensors with built-in temperature sensor. It is capable of sending wireless signals to the coordinator in the ZigBee network upon movement detection. Optional model with extra temperature sensor and/or ambient light sensor provides temperature/lux reading which will be transmitted via ZigBee network in regular interval.

The PIR can be configured using ZigBee coordinator to function as either a security sensor which activate alarm when triggered, or an occupancy/vacancy sensor which controls home automation or lighting functions via ZigBee coordinator.

The PIR utilizes ZigBee technology for wireless signal transmission. ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission

The PIR serves as an end device in the ZigBee network. It can be included in the ZigBee network to transmit signal upon activation, but cannot permit any other ZigBee device to join the network through the PIR.

The PIR includes following models, with optional ambient light sensor and temperature sensor function.

Model No.	PIR Sensor	Light Sensor	Temperature Sensor
POVS-1 -LT-ZBS	O	O	O
POVS-1 -L-ZBS	O	O	X
POVS-1 -T-ZBS	O	X	O
POVS-1 -ZBS	O	X	X

Parts Identification

1. IR Lens w/ LED Indicator

The LED Indicator is located at the center of the IR lens.

The LED indicator lights up in the following conditions:

- Flashes once after pressing and holding button for 10 seconds:
The PIR has been reset.

- Flashes twice quickly:

The PIR has successfully joined a ZigBee network after factory reset.

- Flashes once every 20 minutes:

The PIR has lost connection to its current ZigBee network.

- Flashes under normal operation

The PIR has detected a movement and it is currently under Low Battery or Tamper open condition.

2. Battery Compartment

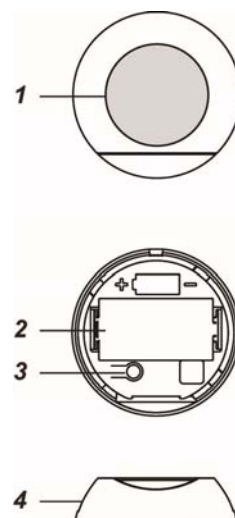
The PIR is powered by one CR123A 3V Lithium battery.

3. Function Button

- Press the button once to send a supervision signal and enter Test Mode.
- Press and hold the button for 10 seconds then release to reset the PIR.

4. Magnetic Base

The PIR is deployed on the magnetic base when installing. The magnet within PIR and the base will ensure the PIR remains attached to the base regardless of PIR location and angle.



Features

● Occupancy/Vacancy Detection

When the PIR detects movement, it will transmit a trigger signal. The PIR then begins counting down the occupancy/vacancy timer. The timer length is adjustable from **30 seconds** to **60 minutes** and must be adjusted from the ZigBee network coordinator/control panel.

During the timer, if the PIR detects movement, the timer will be reset.

When the timer expires without any motion detection, the PIR will transmit a motion detection restore signal and return to normal operation.

● Sensitivity Adjustment

The PIR sensitivity can be adjusted to meet different requirements as either security or occupancy/vacancy sensor. Up to 5 levels of sensitivity may be selected via ZigBee network coordinator/control panel. Follow steps below to adjust the sensitivity:

1. Press the function button on the PIR once, the PIR will wake up for one minute.
2. Within 1 minute, set the new PIR sensitivity from the Control Panel (Please refer to your Control Panel manual for details). The panel will send signal to the PIR to complete setting.
3. If sensitivity setting is not completed within 1 minute, restart from Step 1.

● **Battery and Low Battery Detection**

The PIR uses one CR123A 3V Lithium battery as its power source. The PIR main body must be removed from base to access battery compartment. The battery compartment has a strip which should be pressed under the battery when battery is inserted. When removing battery, simply lift the strip.

The PIR feature Low Battery Detection function. When the battery voltage is low, the PIR will transmit Low Battery signal to the coordinator in ZigBee network. If movement is detected under Low Battery condition, the LED Indicator will flash to indicate. If battery is not changed after Low Battery and is exhausted, the LED will flash every 2 seconds and the PIR will stop all operation.

When changing battery, after removing the old battery, press the Function Button twice to fully discharge before inserting new battery

● **Supervision**

The PIR will transmit a supervision signal to report its condition regularly according to user setting. The factory default interval is 30 minutes. The user can also press the Function Button once to transmit a supervision signal manually.

● **Test Mode**

- Test mode is for you to check the PIR's detection range.
- To enter Test mode, press the Function button once enter the Test mode for 3 minutes.
- During Test Mode, you can trigger PIR sensor to check its detection coverage. If PIR is triggered, the LED will light up to indicate.

● **Temperature Detection**

- PIR models with built-in temperature sensor will transmit temperature signals regularly according to setting. The factory default interval is 10 minutes.
- When the temperature changes by +/- 2°C, the PIR will also transmit a signal.
- You can also press the Function Button once to transmit a temperature signal manually.
- The temperature detection range is about -10°C ~ 50°C.(14°F ~ 122°F)

● **Light Monitoring**

- PIR models with built-in ambient light sensor measures illuminance and transmits measured data to ZigBee network coordinator regularly. The factory default interval is 30 minutes.
- When the current illuminance changes by +/- 10%, the PIR will also transmit a signal.
- You can also press the Function Button once to transmit current lux reading manually.

ZigBee Network Setup

● **ZigBee Device Guideline**

ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

Due to the fundamental structure of ZigBee network, ZigBee device will actively seek and join network after powering on. Since performing a task in connecting network may consume some power, it is required to follow the instructions to avoid draining battery of a ZigBee device

- Ensure your ZigBee network router or coordinator is powered on before inserting battery into the ZigBee device.
- Ensure the ZigBee network router or coordinator is powered on and within range while a ZigBee device is in use.
- Do not remove a ZigBee device from the ZigBee network router or coordinator without removing the battery from a ZigBee device.

● **Joining the ZigBee Network**

As a ZigBee device, the PIR needs to join a ZigBee network to transmit signal when a movement is detected. Please follow the steps below to join the PIR into the ZigBee network.

PIR models with light and/or temperature sensor have 2 ZigBee Endpoints. One for PIR and the other for Light/Temperature Sensor function. It will be recognized as **2 separate ZigBee devices** and will occupy **2 zones** in your ZigBee network coordinator.

PIR sensor without light/temperature sensor has only 1 ZigBee endpoint and will be recognized as a single device as usual.

1. Insert the battery to power on the PIR.
2. Press and hold the Function button for 10 seconds then release when the LED flashes once to join the network. Please make sure the permit-join feature on the router or coordinator of your ZigBee network is enabled.
3. After joining the ZigBee network, the PIR will be registered in the security system in the network automatically. Please check the security system control panel or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
4. After joining the ZigBee network, if the PIR loses connection to current ZigBee network, the LED indicator will flash every 20 minutes. Please check the ZigBee network condition and PIR signal range to correct the situation.

● **Removing Device from ZigBee Network (Factory Reset)**

To remove the PIR from current ZigBee network, the PIR must be put to Factory Reset to complete device removal. Factory Reset function will clear the PIR of its stored setting and information and prompt the PIR to search for new ZigBee network.

Before removing device, make sure the PIR is within current ZigBee network signal range

1. Press and hold the function button for 10 seconds, then release the button to reset PIR.

- Upon reset, the PIR will clear current ZigBee network setting and transmit signal to ZigBee coordinator to remove itself from current ZigBee network. It will then actively search for available ZigBee network again and join the network automatically.

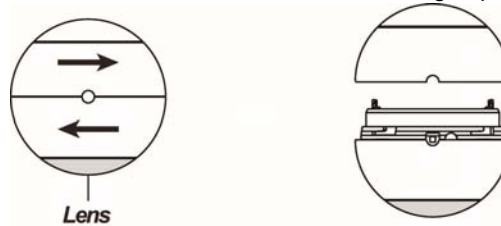
Installation

● Mounting Height and PIR Detection Coverage

- The PIR has detection coverage of a 120° cone to the front. When mounted at 1.2m to 2.1m height and facing forward, the PIR has maximum range of 10 meters.
- The PIR direction can be changed by simply rotating the PIR on the base. After changing direction, make sure to test the detection function to confirm the new detection coverage.

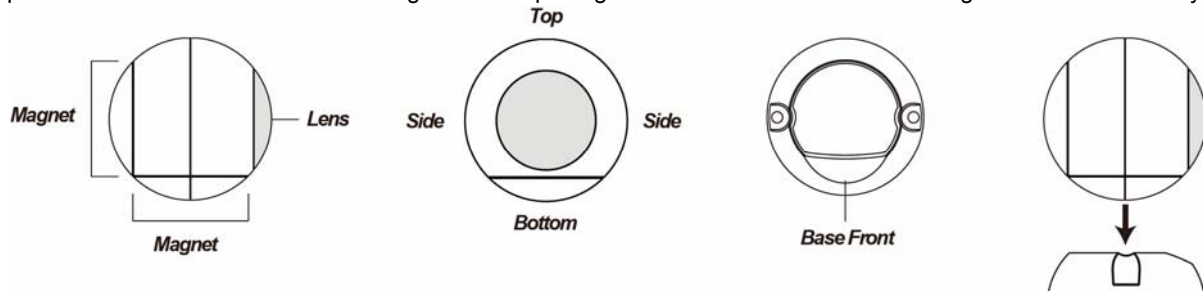
● Assembly

- The PIR is comprised of a front cover and a back cover. The back cover must be separated for battery installation and ZigBee network setup.
- To separate the back cover, hold the PIR in both hands and turn according to picture below to open the PIR.



● Installation

- The PIR main body has internal magnet at bottom and back, which attaches the main body to PIR magnet base when placed on the base. The magnet locations are identified by the circle mark on the casing.
- The PIR's movement detection function is directional. It is more sensitive to movement from side, and less sensitive to vertical movement from top to bottom. Use the location of the bottom magnet as a reference to determine the horizontal and vertical direction of the PIR.
- The PIR base has 2 mounting holes used for installation on surface with fixing screws and plugs provided. The base also has magnet within. One side of the base has an opening to mark the front side of the base. The main body should be placed on the base with the lens facing the front opening to ensure PIR's detection coverage is not obstructed by the base.



- Use the 2 mounting holes on PIR base as template, drill holes in the surface.
- Insert the wall plugs if fixing it into plaster or brick.
- Screw the base into the wall plugs.
- Place the PIR on the base. The magnet within PIR and base will ensure the PIR stays attached to base.
- Rotate the PIR to adjust detection coverage according to expected intruder movement path. Make sure the intruder would move across the PIR detection coverage from side to side.

● Installation Guideline

- It is recommended to install the PIR in the following locations.**
 - In a position such that an intruder would normally move across the PIR's field of view from side to side, avoid installing where intruder moves across the detection coverage from PIR top to bottom.
 - Between 1.9 and 2m above ground for best performance when facing forward.
 - Where its field of view will not be obstructed e.g. by curtains, ornaments etc.
- Limitations**
 - Do not install the PIR at location exposed direct sunlight, or close to heating/cooling appliance and vent
 - Do not point the PIR at heat source such as heater, radiator and window.
 - Do not point the PIR at window.
 - Avoid large obstacles in the detection area, and avoid moving objects such as curtain.
 - Avoid locations where pet may climb on and compromise pet immunity, such as stairway.

● Using PIR with ZigBee Router

IMPORTANT NOTE

If PIR installation location is away from your system control panel and requires ZigBee routers to improve signal strength. **DO NOT** use a ZigBee Router without backup battery. A ZigBee router without battery will be powered down during AC power failure and the PIR connected to the router will lose connection with ZigBee network. You should plan your PIR installation location using only ZigBee router with backup battery.

Appendix (For developers only)

• **POVS Cluster ID**

Device ID: Occupancy Sensor 0x107 Endpoint: 0x01	
Server Side	Client Side
Mandatory	
Basic (0x0000)	None
Identify(0x0003)	
Occupancy Sensing (0x0406)	
Optional	
Power Configuration(0x0001)	None
Device ID: Light Sensor 0x106 Endpoint: 0x02	
Server Side	Client Side
Mandatory	
Basic (0x0000)	None
Illuminance Measurement (0x0400)	
Temperature Measurement(0x0402)	
Optional	
None	None

• **Attribute of Basic Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x01	M
0x0001	<i>ApplicationVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x00	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0	O
0x0004	<i>ManufacturerName</i>	Character String	0 – 32 bytes	Read only	Climax Technology	O
0x0005	<i>ModelIdentifier</i>	Character String	0 – 32 bytes	Read only	(Model Version)	O
0x0006	<i>DateCode</i>	Character String	0 – 16 bytes	Read only		O
0x0007	<i>PowerSource</i>	8-bit	0x00 – 0xff	Read only		M
0x0010	<i>LocationDescription</i>	Character String	0 – 32 bytes	Read / Write		O
0x0011	<i>PhysicalEnvironment</i>	8-bit	0x00 – 0xff	Read / Write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 – 0x01	Read / Write	0x01	M

• **Attribute of Identify Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>IdentifyTime</i>	Unsigned 16-bit integer	0x00 – 0xffff	Read / Write	0x0000	M

• **Attribute of Occupancy Sensing Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	Occupancy	map8	0b0000 000x	Read only	-	M
0x0001	OccupancySensorType	enum8	0x00 – 0xfe	Read only	-	M
0x0010	PIROccupiedToUnoccupiedDelay	uint16	0x00 – 0xffff	Read / Write	0x00	O
0x00F0	OccupancySensingSensitivityLevelsSupported	uint8	0x05	Read only	5	O
0x00F1	OccupancySensingSensitivityLevel	uint8	0x01 – 0x05	Read / Write	4	O

• **Attribute of Power Configuration Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0035	BatteryAlarmMask	map8	0b0000 000x	Read / Write	0	O

• **Attribute of Illuminance Measurement Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>MeasuredValue</i>	Signed 16-bit Integer	MinMeasuredValue to MaxMeasuredValue	Read only	0x00	M
0x0001	<i>MinMeasuredValue</i>	Signed 16-bit Integer	0x0002 – 0xffffd	Read only	-	M
0x0002	<i>MaxMeasuredValue</i>	Signed 16-bit Integer	0x0001 – 0xffffe	Read only	-	M

• **Attribute of Temperature Measurement Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	MeasuredValue	Signed 16-bit Integer	MinMeasuredValue to MaxMeasuredValue	Read only	0x00	M
0x0001	MinMeasuredValue	Signed 16-bit Integer	0x954d – 0x7ffe	Read only	-1000(-10°C)	M
0x0002	MaxMeasuredValue	Signed 16-bit Integer	0x954e – 0x7fff	Read only	5000(50°C)	M
0x0003	Tolerance	Unsigned 16-bit Integer	0x0000 – 0x0800	Read only	100(1°C)	O

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- . Reorient or relocate the receiving antenna.
- . Increase the separation between the equipment and receiver.
- . Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- . Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 0.5 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 0.5 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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.