PIR Motion Sensor

Introduction

IR models are ZigBee passive infrared motion sensors (PIR) with optional pet-immune function. It is capable of sending wireless signals to the coordinator in the ZigBee network upon movement detection.

The PIR is designed to give a typical detection range of 12 meters when mounted at 2 meters above ground. The pet immune model (IRP-9ZBSSL) has a pet-immune range of 7 meters and will not trigger false alarm from you household pets within this distance. The PIR also has tamper protections switch which will be activate upon any attempt of unauthorized cover opening or removal from mounted surface.

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.

Parts Identification

1. Function Button aka LED indicator

The Function Button also doubles as the LED Indicator. The function button is used to control the PIR. The LED indicator is used to indicate PIR status.

LED Indication:

The LED indicator lights up in the following conditions:

- 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.

Function Button Usage:

- 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.
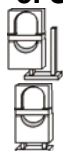
2. Battery Insulator

3. Battery Compartment

The PIR is powered by one 3V Lithium battery.

4. Tamper Switch

The Tamper switch will be activated when the PIR cover is opened.

5. Sensitivity Increaser Jumper Switch (JP2)

- If the jumper is OFF (jumper link is removed or "parked" on one pin), the PIR detection sensitivity is in normal level **(Factory Default)**
- If the jumper is ON (jumper link parked on 2 pins), the PIR's detection sensitivity is high.
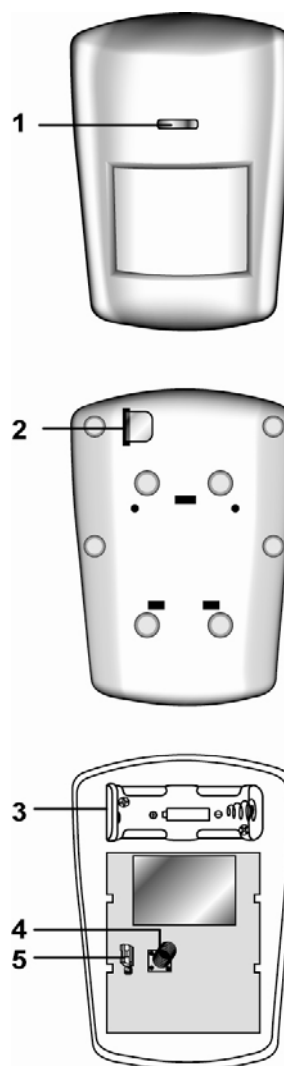
Features

- ### *Sleep Timer*

   The PIR has a "**sleep time**" of approximately 30 seconds to conserve power. After transmitting a detected movement, the PIR will not retransmit detection signal for the next 30 seconds. After 30 seconds, the PIR will return to normal operation and begin transmitting detection signal again. This way continuous movement in front of a PIR will not unduly exhaust the battery.

- ### *Motion Stop Signalling*

   After each movement detection, if 30 second passes without another detection, the PIR will transmit a "motion stop" signal to ZigBee network coordinator.

- ### *Sensitivity Adjustment*

  You can use the sensitivity increaser function to increase the PIR's detection sensitivity. To increase detection sensitivity, please enable the Jumper to **OFF** position. To maintain the normal detection sensitivity, enable the Jumper to **ON** position (**Factory** D**efault**).

- ### *Battery and Low Battery Detection*

  The PIR uses one 3V Lithium battery as its power source. The battery is installed in the battery compartment with a battery insulator inserted. To activate the battery, simply pull out the battery insulator.

  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 Tamper Switch twice to fully discharge before inserting new battery

- ### *Tamper Protection*

  The PIR is protected by a tamper switch which is compressed against the back cover when the cover is closed. Whenever the PIR back cover is opened, the tamper switch will be activated and the PIR will send a tamper open signal to remind the user of the condition. If movement is detected when the tamper switch is open, the PIR will flash to indicate.

- ### *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.

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 bellow to join the PIR into the ZigBee network.

  1. Pull out the battery insulator; this will connect the battery to power on the PIR.
  2. Press and hold the Function button for 10 seconds then release 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.

- ### *Factory Reset*

  If the PIR did not successfully join a ZigBee network upon power up, or if you want to remove the PIR from current network and join a new network, you need to use the Factory Reset function to clear the PIR for its stored setting and information first before it can join another network. To perform Factory Reset:

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

2. The PIR has been reset to factory default setting with all its previous network information removed. It will now actively search for available ZigBee network again and join the network automatically.
3. If the PIR successfully joins a ZigBee network, the LED Indicator will flash twice to indicate.
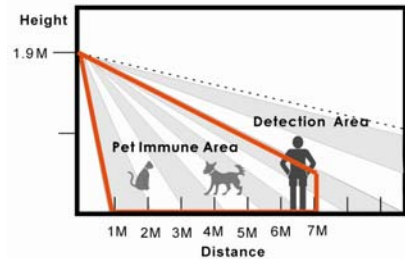
Installation

- ## *Installation Guideline*
  - The PIR is designed to be mounted on either a flat surface or in a corner situation with fixing screws and plugs provided.
  - **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.
    - Between 1.9 and 2m above ground for best performance.
    - In a corner to give the widest view.
    - Where its field of view will not be obstructed e.g. by curtains, ornaments etc.
  - **Pet Immunity (IRP-9ZBSSL Only):**
    - Refer to diagram to the right for PIR pet immunity coverage.
    - If required, you can adjust the height of the PIR according to the size of your pet for optimal pet immune performance. Higher installation location will provide large pet-immune space, but also increases the blind spot under the PIR.
  - **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*
  <u>IMPORTANT NOTE</u>
  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.

- ## *Mounting the PIR*
  - **Surface mounting:**
    1. Remove the fixing screw and cover assembly.
    2. Break through the 4 wall mounting knockouts on the base.
    3. Using the holes as a template, drill holes in the surface.
    4. Insert the wall plugs if fixing it into plaster or brick.
    5. Screw the base into the wall plugs.
    6. Replace the front cover on the back cover.
  - **Corner mounting:**
    1. Remove the fixing screw and cover assembly.
    2. Break through the 4 corner fixing knockouts on the edge of back cover.
    3. Using the corner fixing knockouts as a template, drill holes into in the corner.
    4. Insert the wall plugs if fixing it into plaster or brick.
    5. Screw the back cover onto the wall plugs
    6. Replace the front cover on the back cover.
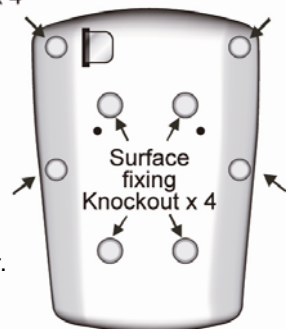
Appendix (For developers only)

● *PIR Cluster ID*

Device ID: IAS Zone 0x402	
Endpoint: 0x01	
Server Side	**Client Side**
Mandatory	
Basic (0x0000)	*None*
Identify(0x0003)	
IAS Zone(0x0500)	
Optional	
None	*None*

● *Attribute of Basic Cluster Information*

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

● *Attribute of Identify Cluster Information*

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

● *Attribute of IAS Zone Cluster Information*

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0001	*ZoneState*	8-bit Enumeration	All	Read only	0x00	M
0x0002	*ZoneType*	8-bit Enumeration	All	Read only		M
0x0003	*ZoneStatus*	16-bit bitmap	All	Read only	0x00	M
0x0010	*IAS_CIE_ADDRESS*	IEEE ADDRESS	Valid 64bit IEEE address	Read / Write		M
0x0011	*ZONE_ID*	Unsigned 8-bit integer	All	Read only	0xFF	M

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.