

VST-852EX Outdoor PIR Camera

VST-852EX is an Outdoor ZigBee Passive Infrared (PIR) motion sensor camera. It is capable of sending wireless signals and captured images (picture quality of up to 640 x 480 pixels) to send to coordinator in the ZigBee network upon movement detection.

The PIR Camera is designed to give a typical detection range of 12 meters when mounted at 2.3 meters above ground. The camera supports configurable setting which could be adjusted according to installation surrounding to prevent false alarm and provide optimum performance in outdoor environment. The PIR Camera further features multi-level pet-immune function which can be selected according to size of pet in the house. A built-in tamper switch protects the PIR Camera from unauthorized cover opening.

The PIR Camera 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 Camera 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 Camera.

Parts Identification

1. Sunshade

Remove the Sunshade to access battery compartment and open back cover if required.

2. PIR Camera Lens

3. IR Sensor

The sensor is intended to detect moving objects.

4. Red LED /Function Button

LED Indication:

The Red LED lights up in the following conditions:

- The Red LED flash once every 20 minutes
The PIR Camera has lost connection to its current ZigBee network.
- The Red LED lights up for 30 seconds:
The PIR Camera is warming up when fault(s) exists in the PIR Camera.
- The Red LED flashes twice quickly:
The PIR Camera has successfully joined a ZigBee network after factory reset.
- The Red LED lights up for 2 seconds under normal operation:
The PIR Camera has detected a movement when fault(s) exists in the PIR Camera.
- The Red LED flashes rapidly
PIR Camera is transmitting pictures to the coordinator of the ZigBee network when fault(s) exists in the PIR Camera.
- The Red LED and Flash LED flash once
PIR Camera has been reset.

Function Button Usage:

- Press the button once to send a supervision signal.
- To reset the PIR Camera:
Press and hold the button for 10 seconds. Release the button when both the Flash LED and the Red LED flash once

5. LED Flash

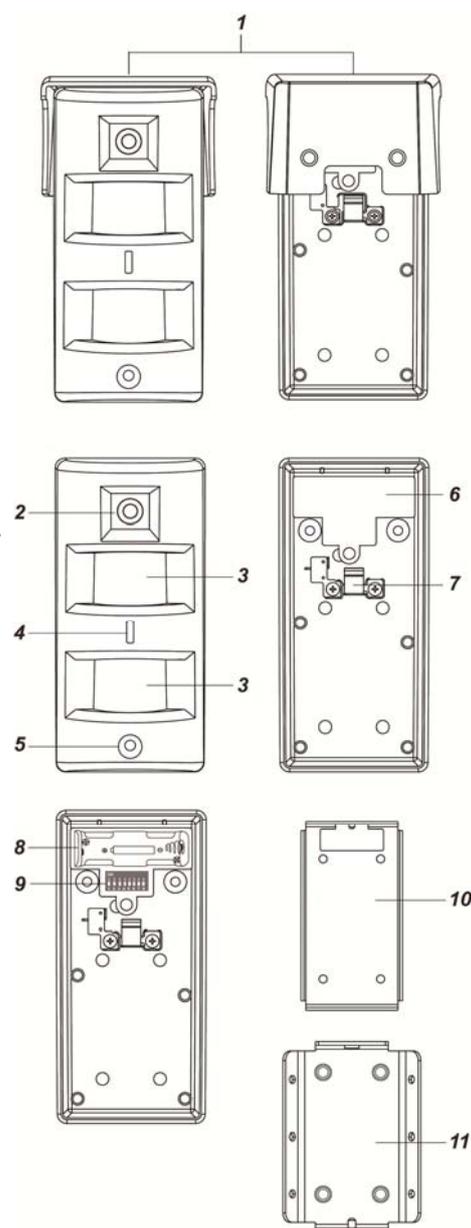
The LED Flash delivers sufficient light for image capture under low lighting condition.

6. Battery Compartment Cover

Remove the battery compartment cover to open battery compartment.

7. Tamper Switch

The Tamper Switch is depressed against the mounting bracket when the PIR camera is mounting on the bracket.



8. Battery Compartment

Pull out the battery compartment to connect two 1.5V Lithium batteries.

9. Dip Switch Block

Contains 8 DIP Switches to set the function & detection sensitivity levels.

10. Bracket Arm

11. Rotation Bracket

Features

● **Image Capture**

When the alarm system is armed, the PIR Camera will capture 3 alarm images upon movement detection. You can also manually request the PIR Camera to take a picture through CIE. The captured images will be transferred to ZigBee coordinator or CIE for user to view.

● **Warm Up Period**

When the ZigBee network coordinator or system control panel enters arm mode, or when PIR Camera is put into Test Mode, the PIR Camera will warm up for 60 seconds. Do not trigger the PIR Camera during the 60-second warm up period. The Red LED will light up upon entering the warm up period for 70 seconds. (10 seconds more than actual warm up time)

● **Sleep Timer**

When **Dip Switch 1** is set to Off, the PIR Camera has a “**sleep time**” of approximately 1 minute to conserve power. After transmitting for a detected movement, the PIR Camera will not retransmit for 1 minute. Any detected movement during this period will reset the sleep time to 1 minute. Continuous movement in front of the PIR Camera will therefore not exhaust the battery.

● **Battery and Low Battery Detection**

The PIR Camera uses two **1.5V “AA” Lithium batteries** in serial connection as its power source.

The PIR Camera features Low Battery Detection function. When the battery voltage is low, the PIR Camera will transmit Low Battery signal to the coordinator in ZigBee network. If movement is detected under Low Battery condition, the Red LED will light up for 2 seconds.

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

● **Tamper Protection**

The PIR Camera is protected by a metal tamper switch which is compressed against the back by the metal bracket when the PIR Camera is mounted on the bracket. When the PIR Camera cover is removed from the bracket, the tamper switch will be activated and the PIR Camera will send a tamper open signal to the ZigBee network coordinator or system control panel to remind the user of the condition. If movement is detected when the tamper switch is open, the Red LED will light up for 2 seconds.

- PIR Camera will not detect the status of the tamper switch within 5 minutes of inserting battery.
- If the Tamper Switch is triggered during this 5-minute non-detection period, the PIR Camera will transmit a tamper status signal to the ZigBee network coordinator or system control panel immediately after the 5-minute non-detection period.
- **When the tamper switch is compressed, Factory Reset of the PIR Camera is disabled.**

● **Supervision**

The PIR Camera 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 camera's detection range (not shooting coverage).
- To enter Test mode, press and hold the Function button over 3 seconds and release the button to enter the Test mode for 3 minutes.
- The PIR camera will warm up for 30 seconds. Please do not trigger the Camera during this warming-up period.
- After the warm-up period, you can trigger PIR camera to check IR detection range. If PIR camera is triggered, the Red LED will light up for 2 seconds.

● **Double Knock Function**

The PIR Camera has a double knock function which is controlled by **Dip Switch 7**. If the double knock function is

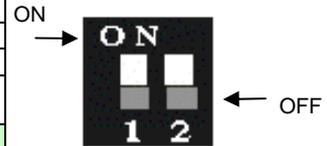
enabled, (Factory Default) the PIR CAMERA will report an alarm to the control panel only if two movements are detected within 10 seconds. If the double knock function is disabled, the PIR CAMERA will report an alarm to the control panel whenever a movement is detected.

● **DIP Switch Position Table**

- Use a sharp object to adjust the DIP Switch according to your PIR Camera's installation location and pet-immune requirement.
- The function of each DIP Switch is listed as the table below. The DIP Switch is either ON or OFF. Top position indicates ON and bottom position indicates OFF.

DIP	Position	Function
Switch1	ON	Sleep Timer Disable
	OFF	Sleep Timer Enable (default)
Switch2	ON	Reserved
	OFF	
Switch3	ON	PIR CAMERA facing a wall within 10 m
	OFF	PIR CAMERA facing an open space (no wall within 10 m)(default)
Switch4	ON	PIR CAMERA facing a lawn (default)
	OFF	PIR CAMERA facing a concrete/stone ground

DIP		Sensitivity Level
Switch5	Switch6	
ON	ON	Low; for 75 cm / 60 kg pet
ON	OFF	Medium; for 60 cm / 40 kg pet
OFF	ON	High; for 45 cm / 30 kg pet
OFF	OFF	Superior; for 30 cm / 20 kg pet (default)
DIP	Position	Function
Switch7	ON	Double Knock Enable (default)
	OFF	Double Knock Disable
Switch8	ON	Reserved
	OFF	



ZigBee Network Setup

● **ZigBee Device Guideline**

ZigBee is a wireless communication protocol that is reliable, has low power consumption and has 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

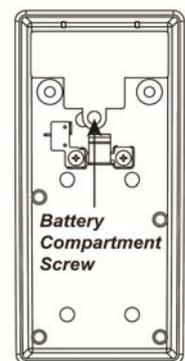
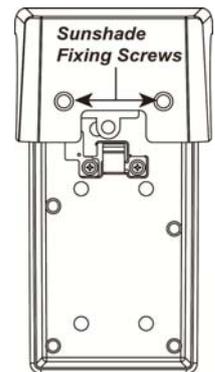
- Ensure your ZigBee network router or coordinator is powered on before inserting battery into the ZigBee device.
- Ensure the ZigBee network router or coordinator is powered on and within range while a ZigBee device is in use.
- Do not remove a ZigBee device from the ZigBee network router or coordinator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

● **Joining the ZigBee Network**

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

The PIR Camera can only join ZigBee network within 3 minutes after power on.

1. Remove the sunshade fixing screws to take off the sunshade.
2. Remove the battery compartment cover to access battery compartment and Dip Switches.
3. Adjusting the Dip Switches with a sharp object if required, refer to table above for setting detail.
4. Insert the two "AA" lithium L91 batteries into the battery compartment taking care to connect the polarity correctly.
5. **Make sure the tamper switch is opened (released) before proceeding to next step.**
6. **Within 3 minutes after power on**, Press and hold the function button for 10 seconds, release the button when both the Red LED and flash LED flash once. Please make sure to enable the permit-join feature on the router or coordinator of your ZigBee network.
7. After joining the ZigBee network, the PIR Camera will be registered in the security system in the network automatically. Please check the ZigBee network coordinator, system control panel, or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
8. After joining the ZigBee network, if the PIR Camera loses connection with the ZigBee network, the LED will flash 20 minutes to indicate. Please check your ZigBee network condition and PIR Camera signal range to correct the situation.



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

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

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

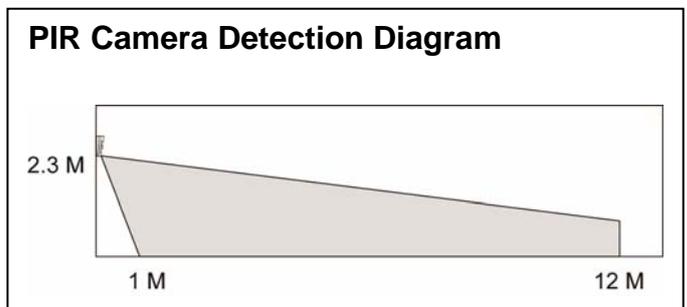
1. Delete the PIR Camera from current control panel / CIE.
2. The PIR Camera can only be reset **within 3 minutes** after power up. If the PIR Camera has been powered up for more than 3 minutes, remove and reinsert the battery.
3. **Make sure the tamper switch is open (released)**, press and hold the function button for 10 seconds, then release the button to reset PIR Camera.
4. Upon reset, the PIR Camera 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

● **Installation Guideline**

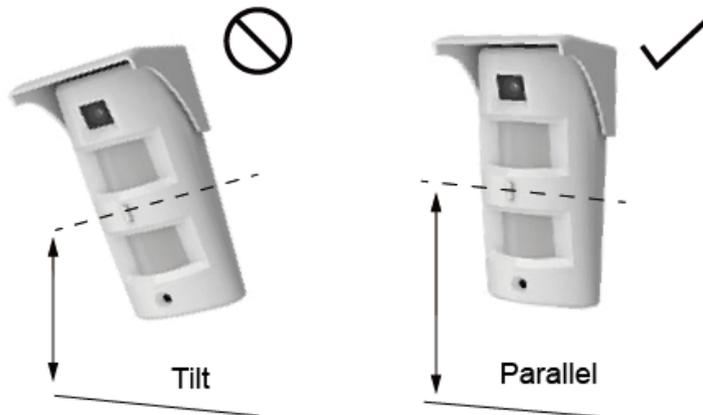
It is recommended to install the PIR Camera the following locations:

- 2.3 m (measured from bottom of the camera) above ground level for best performance.
- In a corner for the widest view.
- Where an intruder would normally move across the PIR CAMERA's field of view.
- The PIR Camera has a detection range of 12M when mounted 2.3m above ground.

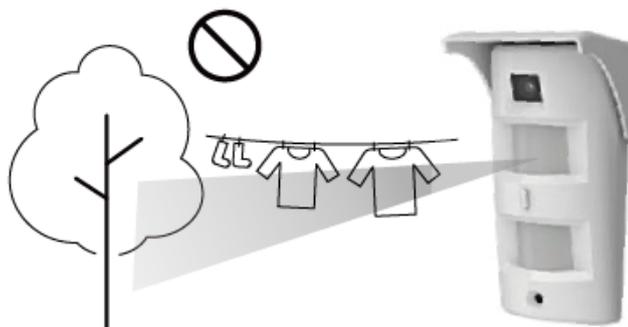


Limitation:

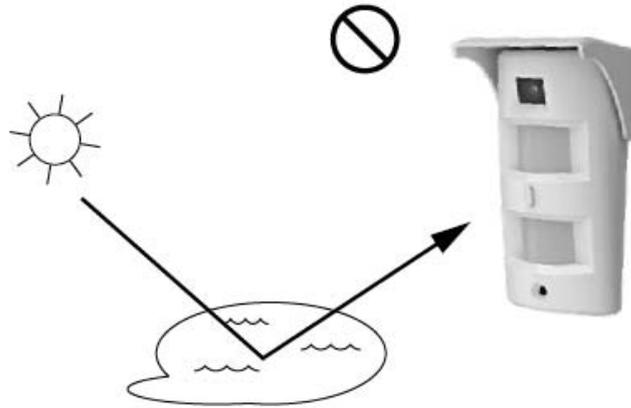
- The operating temperature of PIR Camera ranges between -10° to 45°C.
- Do not expose the PIR Camera to direct sunlight.
- Avoid large obstacles in the detection area.
- Do not point directly at sources of heat, such as fires and boilers, or install above radiators.
- Please install the PIR Camera straight up. Do not tilt it.



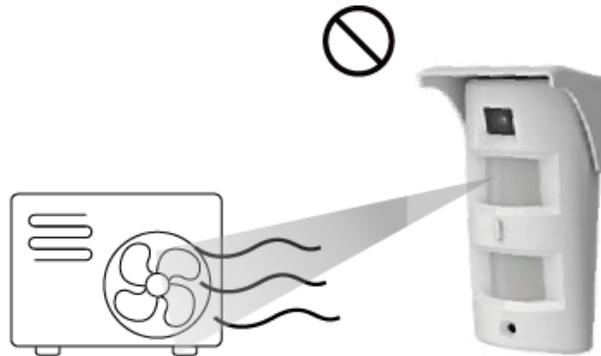
- Do not install the motion sensor camera where objects moved by wind such as trees and laundry, which may block the motion sensor camera's field of view.



- Clear all light reflecting surfaces from the detection area, as well as water puddles.



- Avoid looking directly at the path of outdoor unit's intake or exhaust airflow.



IMPORTANT NOTE

- ☞ Adjust the Dip Switches according to the installation location of the PIR Camera, for ideal performance. If Dip Switch settings does not match with intallation environment, the PIR Camer's performance will be hindered and may cause either false alarm or inability to detect movement.
- ☞ The PIR Camera detects differences between the moving object and the background. If the object is idle (i.e. not moving), the PIR Camera will not be triggered.
- ☞ The PIR Camera has a directional characteristic and is most effective at detecting intruder moving across field of detection. It is less sensitive for detecting motion directly towards the PIR Camera.
- ☞ For best performance, remember to adjust the mounting height of PIR Camera with respect to the height of the tallest pet in the house. Taller dogs require the PIR Camera to be mounted higher for pet friendliness.
- ☞ The PIR Camera has about 1M of blind sport under the camera when mounted at 2.3M height, the blind spot area will enlarge if you mount the PIR Camera higher than 2.3M, and reduce if lower than 2.3M.
- ☞ Unless required, we suggest to keep to PIR Camera mounting location at suggested 2.3M for optimum performance. If you change the mounting height, please conduct detection test to make sure the PIR Camera can detect intruder normally and chosen height.
- ☞ **Be sure to always remain the RSSI signal strength steady at "4".**

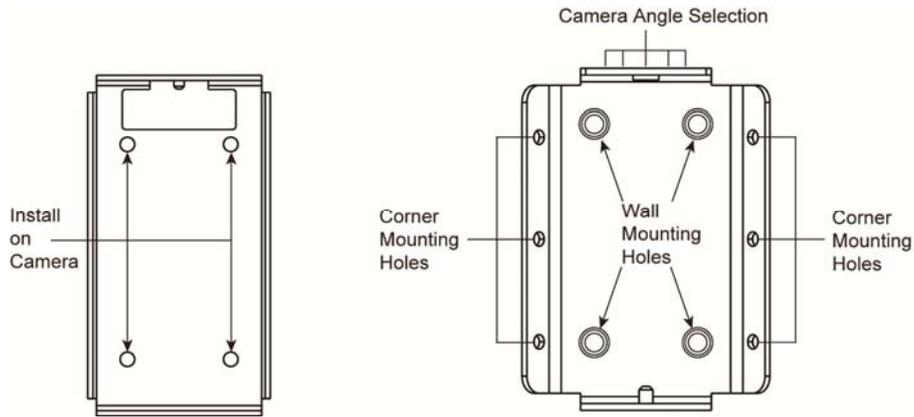
● **Using PIR Camera with ZigBee Router**

IMPORTANT NOTE

If PIR Camera 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 Camera connected to the router will lose connection with ZigBee network. You should plan your PIR Camera installation location using only ZigBee router with backup battery.

● **Mounting the PIR Camera**

- The PIR camera is designed to be mounted on either a flat surface or in a corner situation with fixing screws and plugs provided.
- A metal rotation bracket is included in the package to provide adjustable camera/sensor angle and coverage. The bracket has holes for fixing into wall or corner

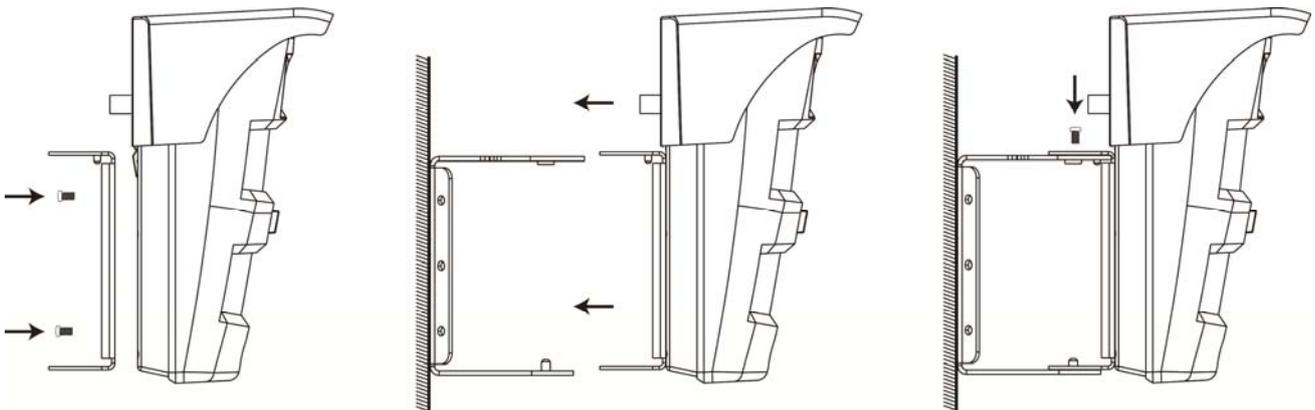


1. Use the mounting holes on the rotation bracket, mark location on wall or corner, insert wall plug if required.
2. Screw the rotation bracket onto the marked mounting location.
3. Screw the bracket arm on to the PIR Camera. **(Figure 1)**
4. Hook the PIR Camera onto the rotation bracket; adjust the PIR Camera's angle with the top holes on the bracket. **(Figure 2)**
5. Secure the PIR Camera on the bracket by fastening the top screw. **(Figure 3)**

Figure 1

Figure 2

Figure 3



Appendix (For developers only)

- **PIR Camera Cluster ID**

Device ID: <code>_852_DEVICEID: 0x404</code> (proprietary)	
Endpoint: <code>0x01</code>	
Server Side	Client Side
Mandatory	
Basic (<code>0x0000</code>)	<i>None</i>
IAS Zone(<code>0x0500</code>)	
Optional	
<code>_852_Cluster(0x0503)</code> (proprietary)	<i>None</i>

• **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	Vesta 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 IAS Zone Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZoneState</i>	8-bit Enumeration	All	Read only	0x00	M
0x0001	<i>ZoneType</i>	16-bit Enumeration	All	Read only		M
0x0002	<i>ZoneStatus</i>	16-bit bitmap	All	Read only	0x00	M
0x0010	<i>IAS_CIE_ADDRESS</i>	IEEE ADDRESS	Valid 64bit IEEE address	Read / Write		M
0x0011	<i>ZONE_ID</i>	Unsigned 8-bit integer	All	Read only	0xFF	M