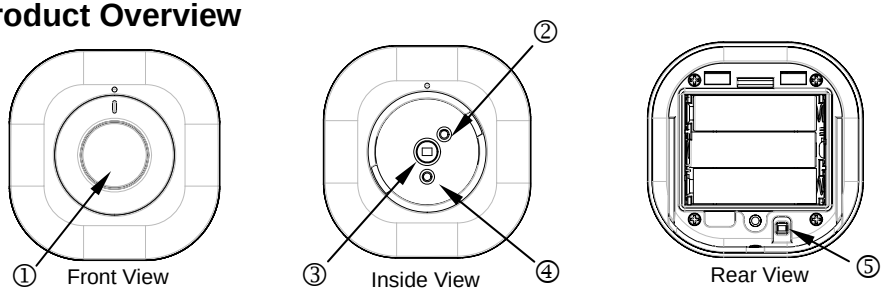
SP814 MOTION DETECTOR

The Motion Detector is a Z-Wave™ enabled device which is fully compatible with any Z-Wave™ enabled network. Z-Wave™ enabled devices displaying the Z-Wave™ logo can also be used with it regardless of the manufacturer, and ours can also be used in other manufacturer's Z-Wave™ enabled networks. This Motion Detector can control our modules via controller setting. Inclusion of this Motion Detector on other manufacturer's Wireless Controller menu allows remote turn-on of connected modules and their connected lighting when the detector is triggered. Z-Wave™ nodes in the system also act as repeaters if they support that function.

The Motion Detector is designed with two detecting sensors, Passive Infra-Red (PIR) sensor and light sensor, in order to fulfill the purpose of security and home automation. When the detector is cooperated with security appliances, it is acting as a security device by detecting changes in infra-red radiation levels. If a person moves within or across the device field of vision, a trigger radio signal will be transmitted to cause full alarm condition in order to frighten intruders away. Alternatively, when the detector is worked with home automation appliances, the detector can be set to perform the role of home automation device by detecting both changes in infra-red radiation levels and percentage of lux levels. Once night falls, the percentage of ambient illumination is lower than preset value. If a person moves within or across the device field of vision, a trigger radio signal will be transmitted so as to turn on the connected lightings for better illumination.

Two mounting methods are provided for varying detection range. The detector can be mounted on a wall for farther detecting distance but narrower coverage; while for ceiling mounting, shorter detecting distance can be made but desired coverage can be expected at user's disposal.

Product Overview



① Lens Cover (wall-lens cover and ceiling-lens cover)	
② Photocell Sensor	④ Two-Color Indication LED (red & green)
③ PIR Sensor	⑤ Learning Key

Adding to Z-Wave™ Network

In the rear casing, there is a learning key which is used to carry out inclusion, exclusion or association. Put a Z-Wave™ Wireless Controller into inclusion/exclusion/association mode, and press the learning key on the detector 3 times within 1.5 seconds, the detector beeps whenever you press the learning key.

Auto Inclusion

Besides carrying out the inclusion procedure by pressing the learning key, the detector executes the function of auto inclusion when…

1. The power is first supplied where no ID code has been stored in the detector. The orange LED flashes on and off alternatively and repeatedly at 2-second intervals.

2. The execution of exclusion/reset is successful where the stored ID code(s) is (are) cleared.

Note: The node information of explorer frame will be emitted once every 5 seconds during 4 minutes auto inclusion until the inclusion process is complete. The detector cannot execute detecting function if no ID code has been stored in it.

Refer to the following table for functions indication and operation:

Function	Description	Indication
No node ID	The Z-Wave Controller does not allocate a node ID to the unit.	2-second on, 2-second off
Inclusion	1. Have Z-Wave Controller entered inclusion mode.	One short beep when learning key is pressed
	2. Pressing learning key 3 times within 1.5 seconds will enter inclusion mode.	
Exclusion	1. Have Z-Wave Controller entered exclusion mode.	One short beep when learning key is pressed
	2. Pressing learning key 3 times within 1.5 seconds will enter exclusion mode.	
Reset	1. Press learning key 3 times within 1.5 seconds.	One short beep when learning key is pressed
	2. Within 1 second, press and hold learning key for 5 seconds until LED is OFF.	One long beep for 5 seconds
	3. IDs are cleared and all settings will be reset to factory default.	2-second on, 2-second off (for 4 minutes)

Association	1. Have Z-Wave Controller entered association mode.	One short beep when learning key is pressed
	2. Pressing learning key 3 times within 1.5 seconds will enter association operation.	
	3. There are two groupings – 1 and 2. See the following section for more info.	
※Including a node ID allocated by Z-Wave Controller means inclusion. Excluding a node ID allocated by Z-Wave Controller means exclusion. ※Failed or successful results in including/excluding the node ID can be viewed from the Z-Wave Controller. ※When "Exclusion" is completed, the parameter 1 of configuration will be restored to default value, while other parameters will retain their settings before exclusion.		

Note: The Motion Detector will stay "awake" for ten minutes when power is first supplied to allow time for configuration.

(I) Grouping 1 (max. 1 node)

If the device (e.g. Z-Wave controller) is associated into detector's Grouping 1, the associated device will receive report commands from the detector when event occurs. Three types of reports can be emitted by the detector, they are:

Event Type		Report Type
Power Up		ALARM_REPORT (Alarm Type = 02, Alarm Level = 0x01)
PIR Status	PIR Trigger On	BINARY SENSOR REPORT (Sensor Value = 0xFF)
	PIR Trigger Off	BINARY SENSOR REPORT (Sensor Value = 0x00)
Low Battery Status		ALARM_REPORT (Alarm Type = 01, Alarm Level = 0xFF)

(II) Grouping 2 (max. 3 nodes)

If a device (e.g. On/Off Module) is associated into the detector's Grouping 2, the device will receive Basic Set Command from the detector if PIR sensor/light sensor of the detector has been triggered.

BASIC_SET (Value = 0 or 1-99), where

Value = 0 (indicates "Off")
Value = 1-99, 0xFF (indicates "On" for binary switch, e.g. On/Off Module or "Dim Level" for multilevel switch device, e.g. Lamp Module)

Note: For more information on how to configure the Basic Set Command, please refer to the section of Basic Set Level on page 4.

Reset

To reset the device, simply press the learning key on the detector 3 times within 1.5 seconds, and then press and hold the learning key within 4 seconds until beep sound stops. Home ID and node ID stored in the detector will be cleared and the detector will be restored to factory default.

Choosing a Mounting Location

The Motion Detector can be mounted either on a wall or under a ceiling. Before selecting a position for Motion Detector, the following points should be noted:

1. Do not position the detector facing a window/fan/air-conditioner or direct sunlight.

2. Do not position the detector directly above or facing any source of heat, e.g. fires, radiators, boiler etc.

3. Ensure the detector is positioned in place where the light source detected by the detector is consistent with actual ambient illumination. Do not locate the detector in a shadowy place.

4. Where possible, mount the detector so that the logical path of an intruder would cut across the fan pattern rather than directly towards the detector (FIGURE 1).

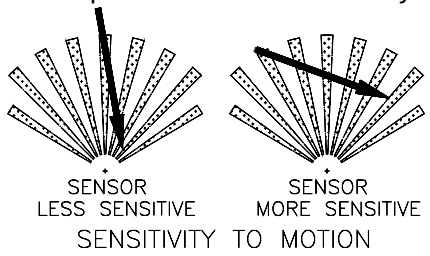


FIGURE 1

5. For best results, locate the detector directly facing an entrance.

Installation

1. Undo and remove the screw from the bottom edge of the detector to detach the rear cover (FIGURE 2).

2. Unscrew the screw from the battery cover and remove the battery cover.

3. Insert 3 AA-size 1.5V alkaline batteries to the battery compartment, ensuring correct polarity is put (FIGURE 3).

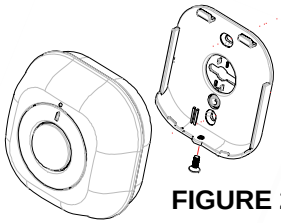


FIGURE 2

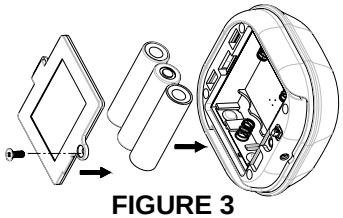


FIGURE 3

4. Two ways of mounting are applicable to the detector. Decide the detector is to be wall-mounted (FIGURE 4a) or ceiling-mounted (FIGURE 5a) based on the coverage angles shown in FIGURE 4b and FIGURE 5b. Hold the rear cover in position and mark the two mounting holes. Drill the holes, insert the plastic wall plugs and screw the rear cover to the wall or ceiling using the screws supplied.

5. Engage the detector to the rear cover firmly.

(I) Wall Mounting

The recommended position for wall mounting is at the height of 1.8m (5.91 ft) from the floor. At this height, the optimum detection range is up to 10m (32.81 ft) with coverage range of 110 degrees (FIGURE 4b).

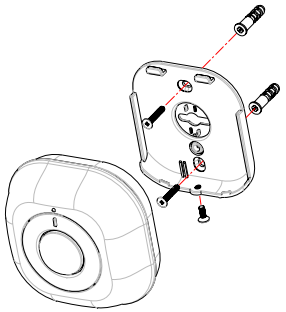


FIGURE 4a

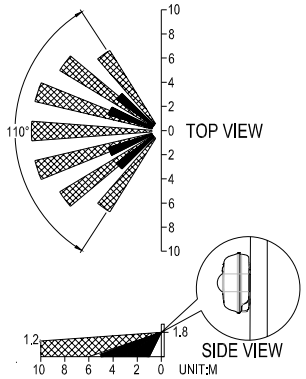


FIGURE 4b

(II) Ceiling Mounting

The recommended position for ceiling mounting is at the height of 2.8m (9.19ft) from the floor. At this height, the optimum detection range is up to 5m (16.41ft) with coverage range of 360 degrees (FIGURE 5b).

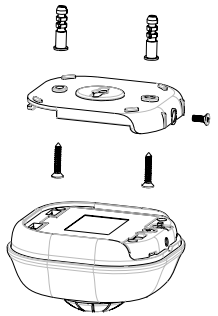


FIGURE 5a

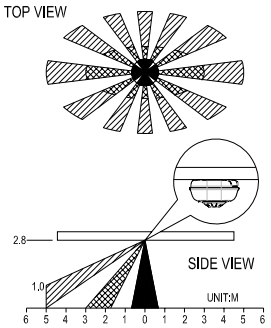


FIGURE 5b

Settings

Coverage Range Adjustments

Two types of lens covers are provided for the detector. Wall-lens cover (FIGURE 6a) is to be used when the detector is wall-mounted, whereas ceiling-lens cover (FIGURE 6b) is to be used when the detector is ceiling-mounted. The coverage range adjustment is only applicable to ceiling-lens cover; choose correct lens cover before mounting.

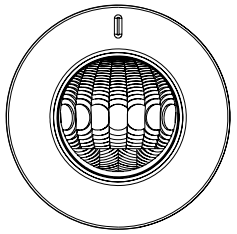


FIGURE 6a

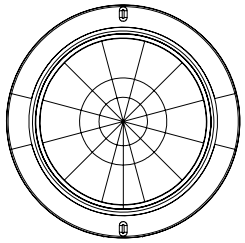


FIGURE 6b

The shading cap is composed of 12 segments for limiting the detection coverage, and each segment covers detection angle of 30 degrees (FIGURE 6c). Follow the grooves on the cap, cut the cap to a suitable size and place it onto the ceiling-lens cover (FIGURE 6d). The remaining segments are used for blanking off an undesirable detection area.

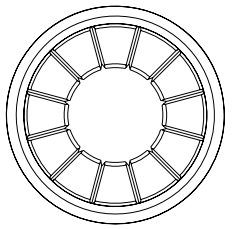


FIGURE 6c

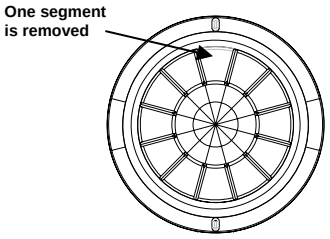


FIGURE 6d

Simply turn the cover anticlockwise to remove the wall-lens cover from the detector (FIGURE 6e).

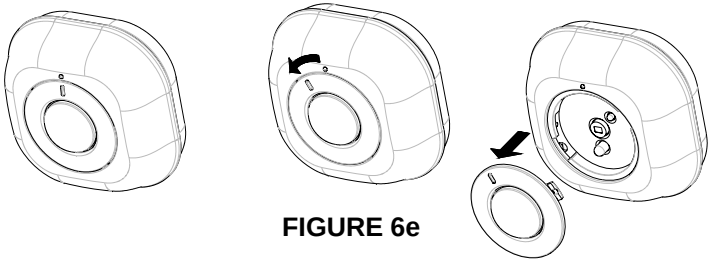


FIGURE 6e

Once the wall-lens covers is removed, reload the detector with ceiling-lens cover and turn it clockwise, ensure the mark on the cover is pointing towards and aligned with the mark on the detector (FIGURE 6f).

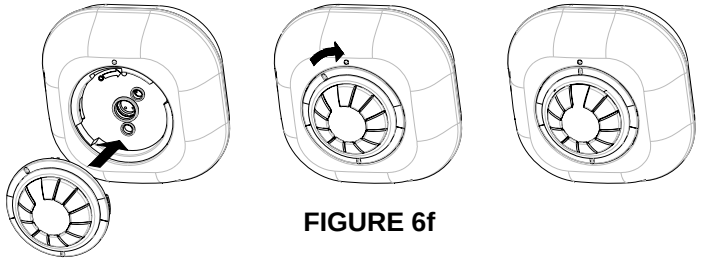


FIGURE 6f

Note: To detect movements with detection coverage up to 360 degrees, simply reload the ceiling-lens cover without shading cap. No movements can be detected if the detector is reloaded with a shading cap which maintains 12 lens segments.

Warm-Up

It will take approximately 2 minutes to warm up after battery has been connected. During this period, the detector beeps once every 3 seconds. When a long beep is sounded with red LED turns on steadily for 5 seconds, it implies warm-up procedure is completed and the detector is ready for detection.

Operation

(I) General Operation

Mounting location is a critical factor for deciding the type of lens to be used for the detector. Please decide whether the detector is going to be wall-mounted or ceiling-mounted before the operation procedure is carried on.

Wall Mounting

1. Place the wall-lens cover onto the detector.

2. By walking into a protected area within coverage of 110 degrees, the detector will now be triggered each time the detector senses movement. The orange LED on the detector will be illuminated and the associated appliances will be activated. For example, siren will be sounded or indication of movement detection will be shown on the controller. It implies that the unit is working properly.

Ceiling Mounting

1. Place the ceiling-lens cover (shading cap free) onto the detector.

2. By walking into a protected area within coverage of 360 degrees, the detector will now be triggered each time the detector senses movement. The orange LED on the detector will be illuminated and the associated appliances will be activated. For example, the siren will be sounded or indication of movement detection will be shown on the controller. It implies that the unit is working properly.

3. Place the shading cap onto the ceiling-lens cover.

4. Check whether same results can be gained by walking into a protected area within coverage that is at your disposal.

(II) Configuration of Z-Wave Command

The following information is for someone that has some experience in setting up a Z-Wave or someone that has computer software running a Z-Wave controller. Please get familiar with software of Z-Wave controller before getting started.

Basic Set Level

If PIR/light sensor of the detector has been triggered, the detector will send a Basic Set Command to the associated devices. For instance, the ambient illumination falls below a set detecting percentage of lux level, the detector sends a Basic Set Command to a Lamp Module and the Lamp Module turns on with 70% of brightness after receiving the commend. To adjust the value of Basic Set, please configure with the following value:

Parameter number: 1
Size: 1
Value: 0 (indicating “Off”)
1-99, 0xFF (indicating “On” for binary switch, e.g. On/Off Module or Indicating “Dim Level” for multilevel switch device, e.g. Lamp Module)

Note: The default value is 99, which implies that the associated device will turn on (or illuminate with highest brightness) after receiving the command.

Enabling/Disabling Sensor Detecting Function

There might be times when users wish to suspend the detecting functions of the detector temporarily. To enable or disable PIR sensor and light sensor, please configure with the following value:

Parameter number: 2
Size: 1
Value: 0 (sensor disabled)
1 (sensor enabled)

Note: The default value is set in 1, which implies that the sensor detecting function is on. Reconnection of power supply will enable the sensor detecting function automatically.

Sensitivity Level (PIR sensor only)

In order to provide a best efficiency of the detector, it is recommended to test the detector with movements from a farthest end of the coverage area at first time of use. If movements cannot be detected sensitively, simply adjust the sensitivity level. The sensitivity level is between 1 to 10. To adjust sensitivity level of the detector, please configure with the following value:

Parameter number: 3
Size: 1
Value (range): 1 ~ 10 (the larger the number, the higher the sensitivity)

Note: The default value is set in 6, which implies medium sensitivity.

Re-trigger Interval Setting (PIR sensor only)

This function is designed for setting the interval which allows PIR sensor to be re-triggered after the detector has been triggered. For example, the interval is set in 20 seconds. If a movement is detected, only wait after 20 seconds the detector can be triggered again if it detects another movement. During 20 seconds period, the detector will not detect (FIGURE 7). The time interval can be set between 5 seconds to 3600 seconds. To adjust time interval, please configure with the following value:

Parameter number: 4
Size: 1
2 (if value is set larger than 127)
Value (range): 5 (sec) ~ 3600 (sec)

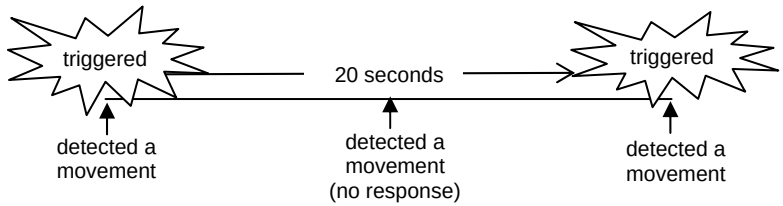


FIGURE 7

Note: The default value is set in 5, which implies that the detector can only be re-triggered after 5 seconds of interval. The orange LED is on for one second when the detector detects a trigger.

On-Off Duration Setting

The function of on-off duration setting will be useful if the detector is connected with a module or lighting. The duration determines how long the detector should wait to send a Basic Set Command (Value = 0) to the associated device after sending a Basic Set Command (Value = Basic Set Level). For instance, a movement has been detected, the detector sends a Basic Set Command (Value = Basic Set Level) to a Lamp Module and the Lamp Module turns ON. After 100 seconds (the user can set the time between 5 to 3600 seconds), the Lamp Module turns off after receiving OFF command (i.e. Basic Set Command (Value = 0)). To adjust the on-off duration, please configure with the following value:

Parameter number: 6
Size: 1
2 (if value is set larger than 127)
Value (range): 5 (sec) ~ 3600 (sec)

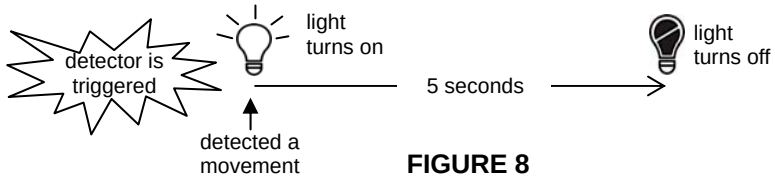


FIGURE 8

Note: The default value is set in 15, which implies that the detector will send an OFF command to associated appliances 15 seconds after they've been triggered. The green LED will stay on for 1 second after 15 seconds of interval.

Lux Level Setting

The user can set a detecting percentage of lux level which determines when the

light sensor will be activated. If percentage of lux level of ambient illumination falls below this percentage, and a person moves across or within the protected area, the detector will emit Z-Wave ON Command (i.e. Basic Set Command (Value = Basic Set Level)) to controller and activate connected modules and lighting. Percentage can be set between 1% to 100%. To adjust percentage of lux level, please configure with the following value:

Parameter number: 5
Size: 1
Value (range): 1 (%) ~ 100 (%)

Note: The default value is set in 10, which implies 10% of lux level.

Advanced Operation

Low Battery Indication

When the battery level of the detector drops to a certain level, the detector will emit a low battery command to the node of Grouping 1; meanwhile, the detector will flash red LED once every 30 seconds. When this occurs, please replace the batteries as soon as possible.

The users can also enquire the battery status of the detector by sending a Battery Get Command via controller. Once the detector receives the command, it will return a Battery Report Command **[Command Class Battery, Battery Report, Battery Level = 20%-100%]** to the controller. If it displays with a message of "Battery Level = 0xFF (255)", it implies that the detector is at low battery status.

Wakeup Command Class

The detector stays in sleep status for the majority of time in order to conserve battery life. However, it can be woken up by either triggers of movement or set time.

The unit stays in sleep status for the majority of time in order to conserve battery power. However, it can be woken up at specified intervals by setting WAKE_UP_INTERVAL_SET command by Z-Wave Controller. After the unit wakes up, it will send Wakeup Notification Command to the node ID that requires to be reported. The minimum and maximum wakeup interval is 60 seconds and 194 days respectively. Allowable interval among each wakeup interval is 1 second, such as 60, 61, 62 ….

Note: The default value is 1 hour, which implies that the detector awakes and sends the Wakeup Notification Command to the set node every hour.

Command Classes

The Motion Detector supports Command Classes including…

* COMMAND_CLASS_ALARM
* COMMAND_CLASS_BASIC
* COMMAND_CLASS_BATTERY
* COMMAND_CLASS_VERISON
* COMMAND_CLASS_ASSOCIATION_V2
* COMMAND_CLASS_CONFIGURATION
* COMMAND_CLASS_SENSOR_BINARY
* COMMAND_CLASS_WAKE_UP_V2
* COMMAND_CLASS_MANUFACTURER_SPECIFIC

Troubleshooting

Symptom	Possible Cause	Recommendation
LED cannot be displayed	Run out of battery power	Replace a new battery
	Check if reverse battery polarity	Refit the battery with correct polarity
The detector not working	Check if mounting location is proper	Reposition its mounting location
		Remove the source of interference
	Check if the detector is out of order	Do not open the detector; send it to the local retailer.
Two minutes warm up is completed, but cannot hear long beep sound (LED flashes on & off repeatedly at 2-second intervals)	Check if detector is first power up or the detector has executed exclusion or reset procedure	Please carry out inclusion procedure; make sure there are ID codes stored in the detector.
The detector does not stay awake for 10 minutes when power is first supplied	Check if detector is out of order	Remove the batteries, press learning key several times to release the existing battery power and wait for 1 to 2 minutes before replacing the batteries.

Specifications*

Battery	1.5V AA size x 3
Battery Life	2 years**
Operating Range	Up to 30 meters line of sight (indoor)
Warm Up Time	About 2 minutes
PIR Detection Coverage	**Wall-Mounted:** Up to 10m x 110° (at 1.8m mounting height & 25°C) **Ceiling-Mounted:** Up to 5m x 360° (at 2.8m mounting height & 25°C)
Operating Frequency	908.42 MHz

Specifications are subject to change without notice

15 triggers per day

2013/10

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.

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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

WARNING:
Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
Contact your local government for information regarding the collection systems available.

If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

When replacing old appliances with new ones, the retailer is legally obligated to take back your old appliance for disposal at least for free of charge.