

ES160

Z-wave^{plus} outdoor PIR motion detector module

The ES160 is a PIR module to retrofit onto existing outdoor floodlight. It features a PIR detector to detect motion through movement of heat sources and a lux sensor for determining brightness of its surroundings. It is equipped with Z-wave^{plus} wireless communication capability to upgrade the ordinary outdoor floodlight into a smart home device.

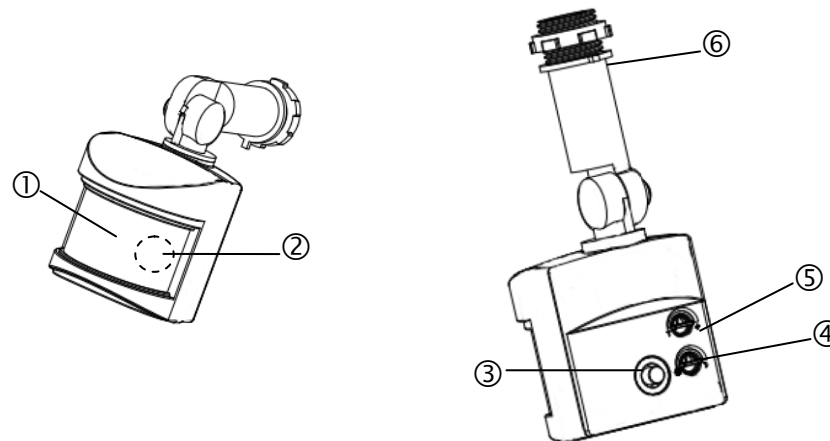
When not connected to a Z-wave network, ES160 when fitted on a floodlight is fully operational as a standalone security floodlight. During hours of darkness its PIR detector turns on the floodlight when it detects movement in the protected area. Its built-in timer will then turn off the floodlight after a preset time has elapsed. During daylight hours, its lux sensor saves energy by deactivating the motion sensor and the floodlight. The lux level and the timer can be set through knobs on the device itself.

When added into a Z-wave network, ES160 communicates directly with other end devices such as smart plugs, or to report directly to a Z-wave controller (usually a gateway). It alerts the controller when motion is detected and through Z-wave commands, the controller can remotely turn on/off the floodlight at any time and be able to configure its lux level and timer setting.

This product supports the S2 security protocol that uses encrypted Z-Wave^{plus} messages to communicate to other security-enabled Z-Wave^{plus} products. A security-enabled Z-Wave^{plus} Controller must be used in order to fully utilize the security features of this product.

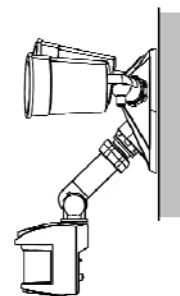
ES160 can be installed on standard external outdoor lighting fixture without a motion sensor, or to replace existing motion sensor on security floodlights.

Product Overview

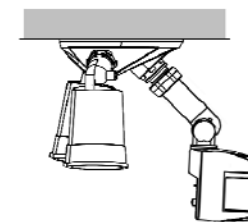


① PIR Lens	④ Lux knob
② LED indicator (hidden behind lens)	⑤ Timer Knob
③ Link button	⑥ Threaded arm

Below diagram show a typical assembly of ES160 onto a floodlight fixture (fixture is not included).



(Wall mount)



(Under Eave mounting)

Note: Please read this entire instruction manual before you start the installation.

IMPORTANT

Installation must be performed by skilled technicians who are informed about the standards and technical requirements of the appliance and its proper installation.

Check your local codes as they apply to your situation. If the house wiring is of aluminum, consult with an electrician about proper wiring methods.

Before proceeding with the installation, **TURN OFF THE POWER TO THE LIGHTING CIRCUIT AT THE CIRCUIT BREAKER OR FUSE BOX TO AVOID ELECTRICAL SHOCK.**

SAFETY PRECAUTION

- DO NOT install when it is raining.
- Isolate the power supply before installation.
- Ensure that local Wiring and Building regulations are complied with.
- The unit is supplied with a pre-wired supply cable this must be used and must not be removed.
- Total lighting load to ES160 not exceed:
 - 300W incandescent @ AC120V
 - 100W LED @ AC120V with 0.8 pF Driver

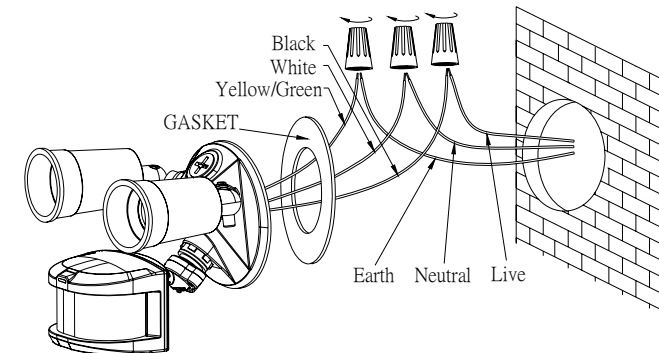
Installation & Wiring instructions

Note : As with any outdoor installation work it is always recommended to start early during the day.

WARNING : TURN OFF POWER BY REMOVING POWER FUSE OR TURNING OFF CIRCUIT BREAKER BEFORE INSTALLATION.

Taking down the existing floodlight

1. With mains supply turned off, if possible remove the lamps from the bulb holders of the existing floodlight to avoid any damage during the installation.
2. Carefully detach the floodlight from the wall by removing its mounting screws. Keep all parts for reuse later, including any rubber rings. Take note the direction of the rubber gasket as it needs to be reassembled later in the same way.

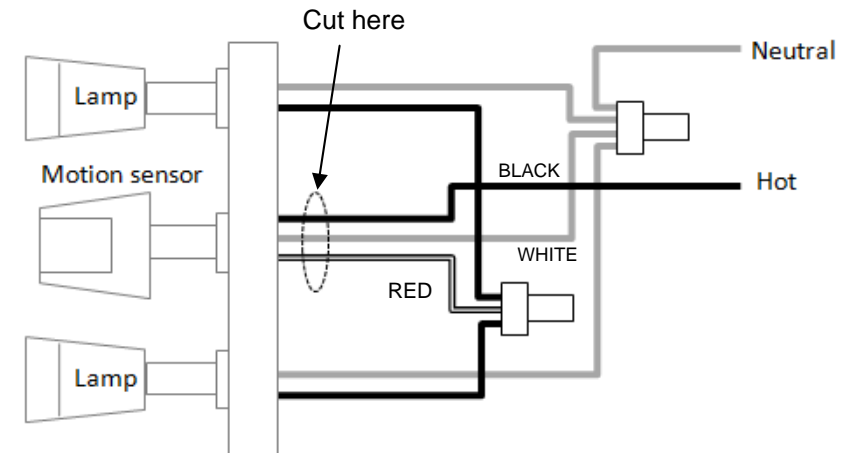


3. Disconnect the mains wire from the floodlight by untwisting the wire nuts.
4. When done, place the floodlight on a table to prepare for wiring the ES160.

Removing old motion sensor

(Skip this section if the existing floodlight has no motion sensor)

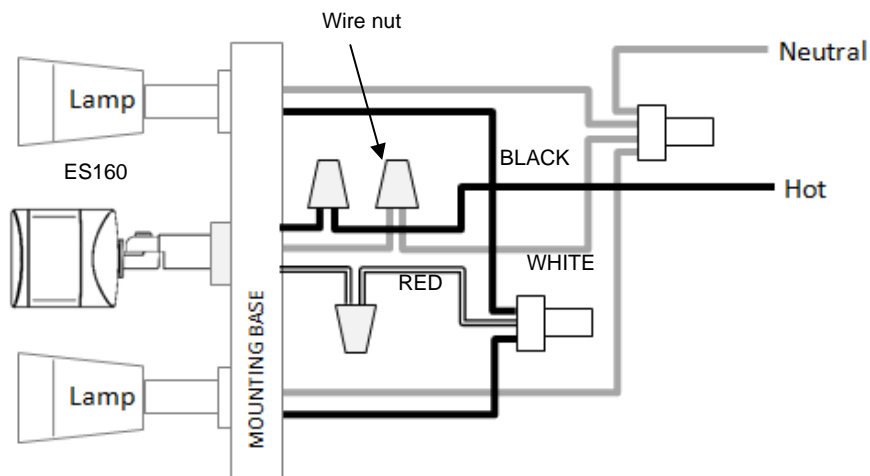
5. Locate the wires coming from the old motion sensor, usually colored black, white and red.



6. Disconnect the wires of the motion sensor by cutting it if necessary.
7. Remove the old motion sensor from the mounting base by twisting its threaded arm counter clockwise.

Wiring up the ES160

- Screw the threaded arm of ES160 into the mounting base. For typical wall installation, ES160 should be located at the bottom of the mounting base.
- Connect up the wiring as in the diagram below, using wire nuts to join the wires. If replacing an old motion sensor, simply follow the same wiring color as the old motion sensor.



- Route the power leads Hot and Neutral through the rubber gasket to get ready for wall mount. Ensure the rubber gasket is facing the same direction as it was before.
- When completed, turn the Timer knob on the unit to "T" mark, and turn the Lux knob to the "*" mark.



Assembling back the floodlight

- Connect back the mains wire as before. Tuck the wire nuts and excess cable neatly inside the junction box.
- Screw the lighting floodlight back into position using its mounting screws. Place the rubber rings back into their positions.
- Insert the lamps removed earlier back into the bulb holders, adjust the lamp direction if necessary.
- Reinstate the power supply to the floodlight and switch on the wall switch, if

installed. The floodlight will turn on for around 5 seconds for warm up and then turn off. It is now in 'Test Mode'.

Walk Test

The user can perform a walk test to ensure the PIR detector's range falls within the desired area of coverage.

- Walk through its PIR Detector coverage area. The floodlight turns on when you move and turns off after approximately 5 seconds. Wait for the floodlight to turn off before the next test.
- When you are satisfied with the coverage area you can now set the desired Time period and Lux level.

Time and Lux adjustment

You can set desired Time period and Lux level through;
 (i) the Z-Wave controller after connecting to a Z-wave network (see next section) or,
 (ii) manually adjusting the knobs on the unit if not connected to a Z-wave network. The following section describes the steps for manual setting.

(1) Time adjustment

Time-off knob controls how long the floodlight will stay on after the motion is detected. Turning the knob towards the + sign increases the time (up to about 12 minutes) or towards the T decreases it (down to about 8 seconds). The recommended setting is around midpoint of the scale giving approximately 5 minutes.



About 5 seconds



About 12 minutes

(2) Lux level adjustment

The LUX knob sets the threshold of ambient brightness level that will activate the motion sensor. The knob can be adjusted between T (always trigger regardless of light level) and the moon symbol (trigger only when dark). The adjustable Lux range is about 30 - 200 Lux.



1. To set the lux level, turn the Time-off knob to “T” for maximum response.
2. Turn the LUX control knob to the “moon” (dusk) position.
3. Wait until the ambient light reaches the level of darkness at which you wish the floodlight to activate.
4. Slowly rotate the Lux knob anti-clockwise while keep creating motion during the process until the floodlight turns on. At this position the light will operate at approximately the same level of darkness each evening.
5. Set the Time-off knob back to the desired preset time.

Note: When connected to a Z-wave controller, this manual setting will be

Commands from Controller	Commands
Turn on Floodlight	Switch Binary Set On/ Basic Set On
Turn off Floodlight	Switch Binary Set Off/ Basic Set Off. Note: The floodlight will revert back to its own self control only after this command is sent.
Set Timer	Configuration settings, Parameter 1
Set Lux level	Configuration settings, Parameter 2
Read Lux level	Multilevel sensor : 0x03

overwritten by the settings through the Z-wave controller.

Z-wave Auto Inclusion

The unit supports Auto Inclusion feature where it will automatically enter Inclusion mode when first powered up after a factory reset.

1. Turn off power to the floodlight by turning off the wall switch.
2. Try to relocate the Z-wave controller nearer to the floodlight, with at most one wall separation between them.
3. Put the Z-Wave Controller into Inclusion mode.
4. Turn on the wall switch of the floodlight. The floodlight will then turn on for 5

seconds and the Link LED will start to blink slowly.

5. When the Link LED stops blinking the Inclusion process is complete.

Note: If you are connecting this unit to a Z-wave controller that utilizes the S2 security protocol, you may be asked by your controller to enter a 5-digit Device Specific Key (DSK) that is unique to each unit. This can be found in one of two places:

- on the QR code label on the back of the unit
- on the insert card inside the packaging.

6. Turn on the floodlight using the Z-wave controller to check if the auto inclusion is working properly.

If Auto Inclusion fails, refer to the Troubleshooting section regarding Manual Inclusion

Operation

Z-Wave Group

The unit supports either one of two Z-wave Association Groups:

Group 1: Association with 1 Controller node.

Group 2: Association with 4 nodes (i.e. end devices such as smart plugs and other lighting controllers). This allows the PIR detector on the unit to transfer commands directly to other Z-wave end devices without the participation of the controller. This has the effect that when its detector triggers, all devices associated with unit will be operated.

Command overview

Table below are control commands that can be sent from the controller. Refer to Programming section for details on sending these commands.

Notification overview

Table below shows the notifications sent by the unit whenever an event occurs. Refer to Programming section for details of these notifications.

Sensor Event		Floodlight behavior	Z-wave commands/notification	Remark
Lux sensor	PIR sensor			

Daylight	Trigger	Off	When Trigger: - Notification, <i>PIR Trigger ON : Group 1</i> When timer expire : - Notification, <i>PIR Trigger OFF: Group 1</i>	Z-wave command is sent even if floodlight is off
Night, or Lux knob set to "T"	Trigger	On, until timer expires	When Trigger: - Notification, <i>PIR Trigger ON : Group 1</i> - <i>Switch Binary Report : Group 1</i> - <i>Basic Set On : Group 2</i> When timer expire : - Notification, <i>PIR Trigger OFF: Group 1</i> - <i>Switch Binary Report : Group 1</i> - <i>Basic Set Off : Group 2</i>	

Other Events	Floodlight behavior	Z-wave commands/notification	Remark
1st power on	On for 5 seconds	Notification : <i>First Power Up : Group 1</i>	
Device Factory reset	NA	Device Reset Locally Notification : <i>Group 1</i>	

Programming

Z-Wave Plus Info

Role Type	Node Type	Installer Icon	User Icon
Slave Always ON	Z-Wave Plus node	Sensor Notification Device Type (Home Security)	Sensor Notification Device Type (Home Security)

Association Command Class

Group	Max Node
1	1
2	4

Version

Protocol Library	3 (Slave_Enhance_232_Library)
Protocol Version	5.3 (6.71.03)
Firmware Version	xVy (x=1,y=1 means 1V1)
Hardware Version	1

Manufacturer

Manufacturer ID	Product Type	Product ID
0x0060 (Everspring)	0x0010	0x0001

AGI (Association Group Information) Table

Group	Profile	Command Class & Command (List) N bytes	Group Name(UTF-8)
1	General	Device Reset Locally Notification Notification Report Binary Report Sensor Multilevel Report Basic Report	Lifeline
2	Control	Basic Set	PIR Control

Notification Report

Event	Type	Event	Event Parameters Length	Event Parameters
First power up	0x08	0x01	0x00	
PIR Trigger ON	0x07	0x08	0x00	
PIR Trigger OFF	0x07	0x00	0x01	0x08

Basic Report

Parameter Number	Size	Range	Default
4	1	0/1	1: send Basic Report 0 : not sent Basic Report

Switch Binary: LED Floodlight Status

Switch Binary Report (value)	Description

0x00	Floodlight is off
0xFF	Floodlight is on

Z-wave Configuration settings

1. PIR Trigger Off period : Period to send Trigger Off command after PIR is triggered. Before this period expires, the PIR will not be able to detect any subsequent motion.

Parameter	Size	Range	Default
1	2	8~720 secs	15

2. Lux sensor threshold : Ambient Lux level to turn on light. This setting overwrites the Lux level set by the Lux knob. When the lux level falls below this threshold and the PIR gets triggered, the floodlight will turn on.

Parameter	Size	Range	Default
2	2	When PIR triggers: 30~200 : Lux level to turn on floodlight 0 : Floodlight always off 255: Floodlight always on	50

Regardless of this setting, the PIR will always send a notification report to the controller when triggered.

3. Auto Report luminance interval : sets the interval of periodic lux level report to the controller.

Parameter	Size	Range	Default
3	2	0~1440 (min.)	0 (OFF)

4. Basic Report : Enable/Disables Basic Report commands

Parameter	Size	Range	Default
4	1	0 : Disable Basic Report 1 : Enable Basic Report	1 (Enable)

5. Multilevel Sensor : Reads back the lux level measured. (Tolerance of ± 30 lux. Level above 250 will be read back as 250)

Sensor Type	Precision	Scale	Size	Sensor Value
0x03	0	1	2	<250

Command Classes

The module supports Command Classes including...

- COMMAND_CLASS_ZWAVEPLUS_INFO_V2

- COMMAND_CLASS_ASSOCIATION_V2
- COMMAND_CLASS_ASSOCIATION_GRP_INFO
- COMMAND_CLASS_TRANSPORT_SERVICE_V2
- COMMAND_CLASS_VERSION_V2
- COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2
- COMMAND_CLASS_DEVICE_RESET_LOCALLY
- COMMAND_CLASS_POWERLEVEL
- COMMAND_CLASS_SECURITY_2
- COMMAND_CLASS_SUPERVISION
- COMMAND_CLASS_FIRMWARE_UPDATE_MD_V4
- COMMAND_CLASS_NOTIFICATION_V4
- COMMAND_CLASS_SWITCH_BINARY
- COMMAND_CLASS_SENSOR_MULTILEVEL_V7
- COMMAND_CLASS_CONFIGURATION
- COMMAND_CLASS_SENSOR_BINARY

Troubleshooting

Table below lists typical problems encountered:

Symptom	Possible Cause	Recommendation
Floodlight does not turn on for 5 seconds after power is connected.	Power is not connected properly.	Check if wall switch is on. Confirm wiring is correct. Check supply breaker / fuse.
Cannot carry out inclusion and association	Floodlight already paired to another Z-Wave Controller.	Perform a factory reset.
Floodlight flashes on and off	The unit's lux sensor is being triggered off by reflected light	Change the angle and direction of the lamps.
Z-wave controller cannot communicate with the unit	Out of range.	1. Relocate the controller closer to the unit. 2. Install a Z-wave repeater such as smart plugs or other AC devices that can operate as a Repeater.
Floodlight remains on	PIR detector triggered by	1. Check time setting 2. Cover the PIR Detector with

	unknown heat source.	black insulating tape. If after the timer expires and the floodlight turns off this indicates that the PIR Detector can see a moving heat source e.g: radiator, heater, boiler outlet, open window, open exterior door or moving branches or bushes retaining heat from the daytime period.
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Manual Inclusion/Exclusion

The table below lists the several steps involved when adding or removing the unit from the Z-wave network.

Action/Status	Description	LED indication
No node ID	The Z-Wave Controller does not allocate a node ID to the unit.	2-second on, 2-second off for 2 minutes.
Auto Inclusion	The power is applied for the first time and no node ID has been stored in the module, or after executing reset. This process times out in 30 seconds.	LED blinks rapidly during Inclusion, LED stops blinking when Inclusion is complete.
Manual Inclusion	1. Put the Z-Wave controller into inclusion mode.	LED blinks rapidly during Inclusion, LED stops blinking when Inclusion is complete
	2. Press the Link button 3 times within 1.5 seconds to put the unit into inclusion mode.	
Exclusion	1. Put the Z-Wave Controller into exclusion mode.	
	2. Press the Link button 3 times within 1.5 seconds to put the unit into exclusion mode.	
Factory Reset (This procedure should only be used when the controller is inoperable.)	1. Press the Link button 3 times within 1.5 seconds to put the unit into exclusion mode.	
	2. Within 1 second of step 1, press the Link button again and hold until LED is off (about 5 seconds).	
	3. Node ID is excluded. The device reverts to factory default state and	

	will be in auto-inclusion mode for 4 minutes.	
* Failure or success in Inclusion/Exclusion can be viewed on the Z-Wave Controller user interface.		

Specifications

PIR Tilting Angle	140°
Mounting Height	Recommended 1.8 ~ 2.0m on Normal Brick Wall
PIR Detection area	Max. distance 12m, max. angle of 120° (@1.9m height, 20°C ambient temperature)
PIR Swivel Angle	Up to 90° Leftward, Up to 90° Rightward
PIR warm-up time	5 secs maximum
Lux Adjustment	Approximately 30 ~ 200 Lux
Timer Adjustment	Approximately 8 seconds ~ 12 minutes
Working Temperature	-20°C - +40°C
Dimension (H x W x D)	60mm x 55mm x 60mm
Protection Degree	IP44 – Weather proof

Specifications are subject to change without notice

A501xxxxxxR



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.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. General Requirements for Compliance of Radio Apparatus RSS-Gen 24 (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Énoncé d'exposition au rayonnement radioélectrique.