



EcoSense+

Firmware Version 2.x

Installation, Operation & Maintenance Guide



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Rev. 2

Updated 4/27/16 to add troubleshooting tip, if EcoSense+ loses network connection. See page 10.

The EcoSmart Energy Management System

The EcoSmart Energy Management System is designed to reduce HVAC energy consumption without interfering with an occupant's comfort.

EcoSmart thermostats will automatically learn and adapt to the heating and cooling patterns of each room. For example, a room on the east side of a building will receive direct sunlight in the morning and will either need less HVAC heating or more HVAC cooling. However, as the day progresses, the room will need more HVAC heating or less HVAC cooling as it moves into the shade. An EcoSmart thermostat will continually monitor the room, learn its patterns, and adjust its heating and cooling profiles accordingly.

EcoSmart thermostats also learn and adapt to occupant schedules. When a room is unoccupied, an EcoSmart thermostat will enter an energy saving mode, allowing the room to drift away from the desired setpoint. During this drift period, the thermostat will operate the HVAC unit less often, reducing energy costs. When the room becomes occupied again, the EcoSmart Recovery Time™ technology built into each thermostat will return the room to the setpoint without the occupant noticing.

FCC Notice

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 the 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 or more of the following measures:

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

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate the equipment.

To satisfy RF exposure requirements, this device and its antennas must operate with a separation distance of at least 20 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.

FCC ID: XV6SS6205

Conventions Used in this Guide



This is an informational tip, used to convey relevant but not necessarily urgent information.



This is a warning, used to convey important information.



This is a strong warning, used to convey urgent and often safety-related information.

Chapter Names

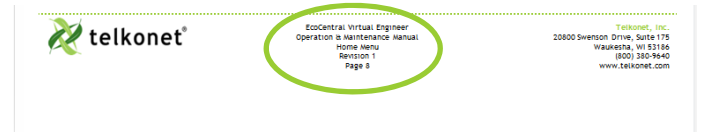
Main chapters in this manual will have headings in large green font as shown above. Main chapter names also appear in the footer.

Sub-Chapter Names

Within the main chapters will be relevant sub-chapters, which are presented with bold, black headings as shown above.

Footers

Footers contain the document name, chapter name, document version number and page number, as shown here:



Procedure: Steps Described Here

Procedural Steps are indicated as such in the heading, which begins with the word, "Procedure:" as shown above. The steps are outlined as shown in the following example:

- Step 1** Navigate to the Config Menu > Alert Setup.
- Step 2** Click the **Add New Alert Trigger** button in the top left corner of the Alert Setup Screen.
- Step 3** Enter a descriptive Alert Name.

Assistance with troubleshooting begins with the red "Troubleshooting" header as shown above.

EcoSense+ Introduction



The EcoSense+ contains a PIR that detects both motion and heat to determine occupancy. It communicates information wirelessly to the EcoSmart thermostat.

Remove the cover you'll discover that the sensor is directional. Aim it in the appropriate direction to

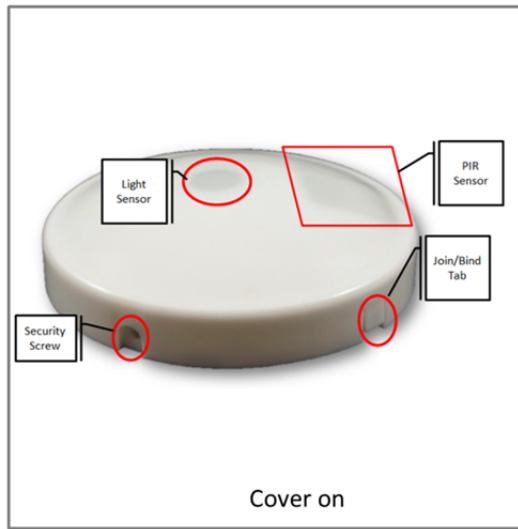
detect heat and motion. **It is important to install the device in the optimal location and to aim the PIR correctly.**

EcoSense vs EcoSense+: Installation Differences

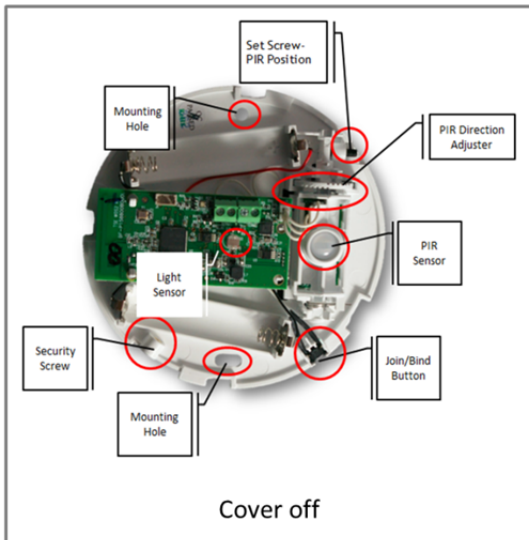
If you're accustomed to installing our traditional EcoSense, you'll find we've made some installation changes:

<p style="text-align: center;">*NEW* EcoSense+</p> 	<p style="text-align: center;">Traditional EcoSense</p> 
<p>May need to install in different location in the room than traditional EcoSense. We recommend mounting the EcoSense+ on the wall next to the bed, pointed down near the pillows of the bed. Details on page 6.</p>	<p>Old location rules apply.</p>
<p>Before mounting, ensure backplate is rotated to the correct position so that PIR is facing the appropriate direction.</p>	<p>Once installation location is determined, backplate can be rotated in any direction before mounting to surface.</p>
<p>Adjust the PIR direction (between 40-90°).</p>	<p>PIR is stationary, therefore no need to adjust direction.</p>
<p>Zone of Detection is elliptical and narrower (smooshed cone).</p>	<p>Zone of detection is circular and wider.</p>
<p>Joining/Binding "tab" can be pressed with finger, after cover is put on.</p>	<p>Must use paperclip to press the Joining/Binding button.</p>
<p>Join network and bind to thermostat in one process.</p>	<p>Bind only, no need to join to network.</p>
<p>EcoSense+ joins the EcoSmart network, therefore it takes up a slot on the coordinator and counts toward the maximum devices per coordinator (65).</p>	<p>Does not count toward maximum devices per coordinator.</p>

Anatomy of an EcoSense+

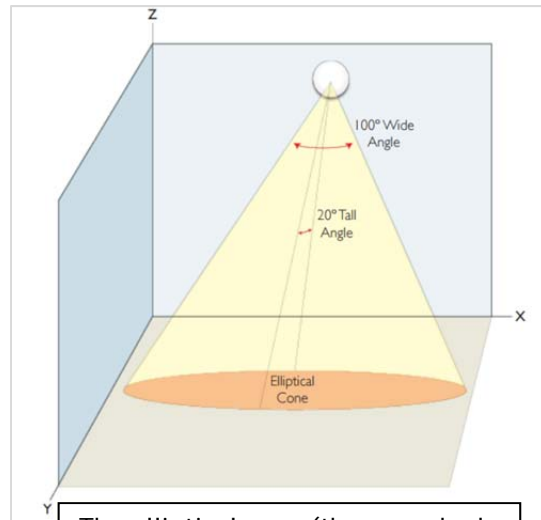


Cover on



Cover off

Field of View



The elliptical cone (the smooshed cone) provides a viewing angle of 100° horizontally (x-direction) and 20° vertically (y-direction).

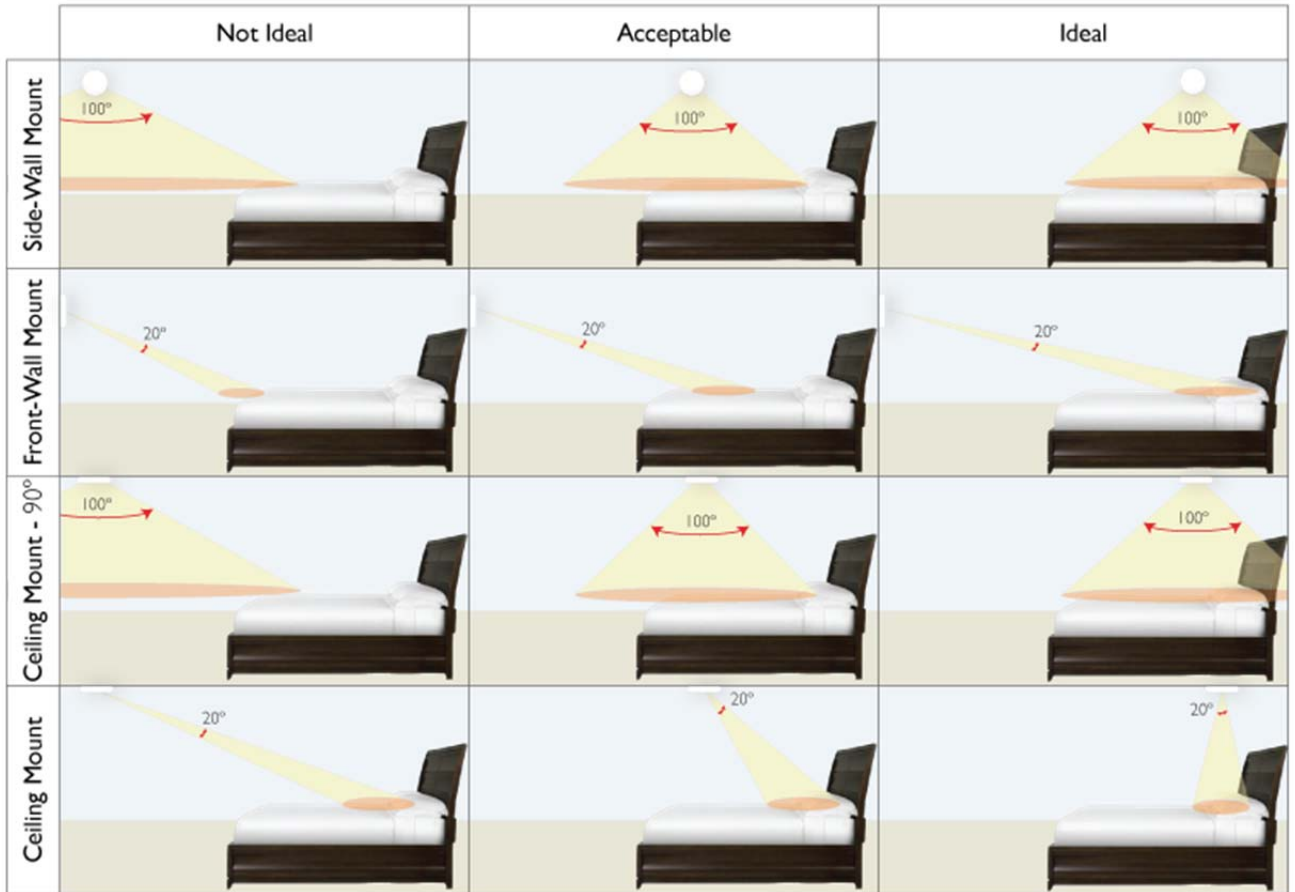


Examples of applications in 3 common room configurations

Where to Aim PIR

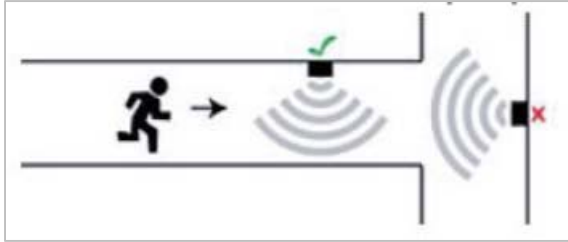
If There's a Bed

- Mount close to pillows.
- Aim at the pillows.



If There's No Bed

- Mount on wall that people walk alongside.
- Aim at area that will detect the most foot traffic.



Distance to Occupant:

- If the occupants will likely be stationary (e.g. sleeping in bed), position the EcoSense within 12 feet of their expected location.
- If the occupants will move occasionally (e.g. working at desk), position the EcoSense within 12-18 feet of their expected location.
- If the occupants will move regularly (e.g. walking in hall), position the EcoSense within 18-30 feet of their expected location.

Distance to EcoInsight or EcoSource

- There is no minimum distance between the EcoSense+ and the EcoInsight or EcoSource.

Line of Sight

- The EcoSense+ should not have its line of sight to the EcoInsight or EcoSource partially obstructed by grills, registers, or spinning fan blades.

Obstructions

- Ensure the EcoSense+ is mounted with a direct line-of-sight to the target area.
- The line-of-sight to the target should not be obstructed by grills, registers, or spinning fan blades.

Orientation and Facing

- The EcoSense+ can be mounted on a ceiling or a wall.

PIR Rotation Design

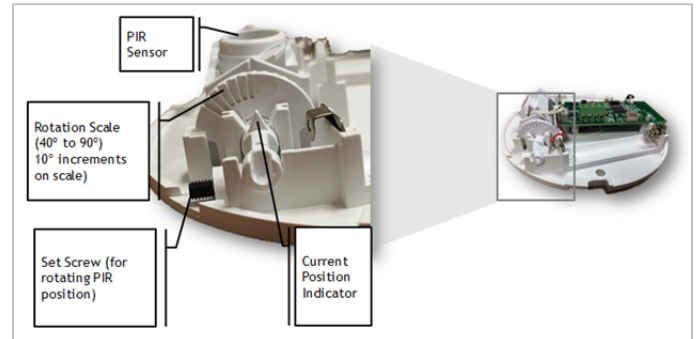
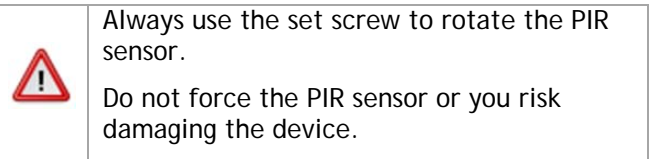


Figure 1 PIR Rotation Design



Installation

Required equipment

- 2 AA batteries (included in shipment)
- Pigtails (included in shipment)
- 2 x 50lb EZ-Anchors with screws
- Screwdriver for wall screws
- 1 Security screw screwdriver
- 1 Angle set screw driver (to adjust PIR direction)

Step 1 Remove the EcoSense+ cover by gently twisting the cover counterclockwise and lifting it off.

Step 2 Install 2 AA batteries in the backplate.

Step 3 With the cover still off, rotate the backplate so that the PIR will point toward the appropriate occupancy detection zone. (For more information, see "Where to Aim PIR

page 6.)

Step 4 Using 2 x 50lb EZ-Anchors with screws, mount the EcoSense+ backplate into the wall or ceiling.

Aim the PIR ***IMPORTANT STEP***

Step 5 Insert the angle set screwdriver into the set screw.

Step 6 Rotate the set screw which in turn rotates the PIR sensor to the desired position. Use the Current Position Indicator as your guide. See Figure 1 PIR Rotation Design.

Step 7 Replace cover by lining up the backplate with the cover and gently twisting it clockwise until it is seated correctly.

Step 8 Insert the security screw and tighten.

Join and Bind

Step 9 Join the EcoSense+ to the network and bind it to the thermostat. See [Device Association Guide](#) for instructions.

Maintenance

Replacing the Batteries

Estimated battery life is 6 years.

Batteries are monitored by the network. You will be notified when to replace them. For non-networked installations, the "Service Sensor" will light up when it is time to change the battery.



Standard alkaline batteries are recommended for use in EcoSense+ sensors. Lithium-Ion, Nickel-Cadmium, or other specialized batteries may not provide acceptable long-term performance.

Step 1 Remove the security screw from the EcoSense+.

Step 2 Disconnect the EcoSense+ cover from the back plate by twisting the cover counter-clockwise and lifting the cover out of the back plate.

Step 3 Disconnect the thermostat communication wires from the green dry contact connector, if any.

Step 4 Remove the batteries.

Step 5 Verify the battery terminals are clear of oxidation and battery acid.

Step 6 Insert the replacement batteries.

Step 7 Verify the batteries are firmly in place.

Step 8 Reconnect the thermostat communication wires coming from the wall to the green dry contact connector, if necessary.

Step 9 Align the EcoSense+ cover with the backplate.

Step 10 Reconnect the face of the EcoSense+ to the backplate by placing it inside the backplate, then twisting the face clockwise until it is secure.

Step Reinsert and tighten the security screw on the EcoSense+.







If the device must be removed, always reinstall in the same location and the same position.

Troubleshooting

Problem	Potential Cause	Potential Solution
<p>"Service Sensor" appears on thermostat.</p>	<p>One or more sensors have lost association to the thermostat.</p>	<p>Dispatch Maintenance to the room. Re-associate all sensors via procedures.</p> <p>Replace the batteries in all sensors within the room.</p> <p>For wireless installations, ensure the EcoSense+ is mounted with a direct line-of-sight to the thermostat. The line-of-sight should not be obstructed by grills, registers, or spinning fan blades.</p> <p>For wired installations, evaluate the wiring between each sensor and the thermostat.</p>
<p>Occupant reports HVAC shuts down while they sleep.</p>	<p>Sensor is not accurately detecting occupancy. This is typically seen in deployments where the bed placement within the room was changed after installation.</p>	<p>Ensure the EcoSense+ is aimed towards the bed.</p> <p>Ensure the EcoSense+ is mounted within 12 feet of the bed.</p> <p>Ensure the EcoSense+ is mounted with a direct line-of-sight to the bed. The line-of-sight should not be obstructed by grills, registers, or spinning fan blades.</p> <p>For spacious rooms, consider adding an additional EcoSense+ sensor.</p>

Problem	Potential Cause	Potential Solution
EcoSenset+ lost communication with the network.	The EcoConnect Coordinator has lost power.	<ol style="list-style-type: none"> 1. Plug the EcoConnect to its power source. 2. Expect automatic EcoSource+ re-connection based on a specific interval attempt pattern (see table below*). <p>How it Works: When EcoConnect power is lost, the EcoSource+ will automatically jump into action, attempting to reconnect to the EcoConnect at regular intervals. It will eventually reconnect to the (powered) EcoConnect, but be mindful of the interval: the EcoSource+ will try to reconnect every 15 minutes for a total of 3 attempts, then every hour (4 attempts), then every 4 hours (4 attempts) and once every 24 hours thereafter.</p>

***Network Re-Connection Pattern and Timing:**

	X 3 attempts
	X 4 attempts
	X 4 attempts
	thereafter

Circuit Board Details

