Energy Eye™ System

Advanced Wireless RF HVAC Control and
Energy/Environmental Management System (EMS)

Installation & Operations Manual

For Use With:
IC V4.1 EERX and EERXS Models
2008

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

Notice: The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IMPORTANT NOTE: To comply with the FCC RF exposure compliance requirements, no change to the antenna(s) or the device(s) is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void the user's authority to operate the device.

The user should not modify or change this equipment without written approval
from Energy Eye, Inc. Modification could void authority to use this equipment.

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1.0 IMPORTANT – PLEASE READ THIS SECTION FIRST

Please read through the important information below before getting started with the WIRELESS ENERGY MANAGEMENT SYSTEM (WEMS).

- Carefully follow the instructions in this manual when installing, setting up and programming the WEMS. Failure to follow these directions and recommendations may result in voiding your Limited Warranty.
- Take special notice of any specified notes, bullet points, and so on throughout this manual.
- **Please take the following precautionary measures while handling, using and installing the WEMS:**

1. Keep the WEMS away from water or damp areas.
2. Do not install the WEMS in direct sunlight or near extreme heat.
3. Do not install the WEMS near strong electrical current or magnetic force.
4. Avoid dropping the WEMS or placing it in an area with strong vibration.
5. Do not disassemble the product – Doing so will void the Limited Warranty.
6. **Use only approved Power Supply Voltages and Recommended Connectivity.**
7. HVAC units may contain hazardous voltages of 110 VAC to 277 VAC.
8. **To prevent personal injury and/or death, insure that all power is disconnected before installation and connection inside the HVAC unit**.
9. The Energy Eye System should be installed by qualified personnel only.
10. All electrical connections and wiring must conform to the National Electrical Code and applicable local codes at the time of installation.
11. The Energy Eye receiver and sensors contain sensitive electronic components, DO NOT attempt to repair or clean with chemicals or abrasives.
12. **DO NOT touch the infrared lens located inside the passive infrared sensor OR the temperature sensor IC located on the bottom of the Controller with your finger. Static electricity will damage these components.**
13. Never remove components from their original packaging until you are ready for installation. Doing so may cause damage that will VOID your Limited Warranty.
14. Be careful with any tools near or around your working/installation environment.

- Note where each of the components of your WEMS should be placed inside the guestrooms and whether more than the standard components are required.
- It is important to understand each component, how it works, and its limitations in order to ensure that the system functions correctly after installation. Because no two properties are exactly alike, make it a point to understand the particular physical layout of each guestroom and your operating environment.
- The WEMS is considered an “Energy Reduction Device” by most Utilities and Electric Providers, which may qualify for certain incentives and/or rebates.

Please check with your Electric Utility Provider account representative for more details.

NOTE: The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss, whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function.

1.1 Required Tools

- Philips Screwdrivers (various sizes)
- Wire cutter/stripper
- Digital Multi-meter or Equivalent (FLUKE type recommended)
- Pulse Load Battery Tester (ZTS type recommended)
- UL or Equivalent Plastic Electrical tape
- UL or Equivalent Approved Electrical Wire Caps (various sizes)
- 3M Brand or Equivalent Industrial Quality #40 2 Sided Mounting Tape
- Thermostat wire
- MS Excel or similar spreadsheet software (for record keeping)

NOTE: Additional tools might be required depending on property construction type, local environment, HVAC accessibility and HVAC age.

1.2 Introduction

Congratulations on the purchase of your Energy Eye System! Finally you can begin controlling your wasted guestroom electricity expenses using the most efficient system of its kind. The Energy Eye System uses passive infrared and door/window contact sensors to control wasted energy costs by setting back a guestroom's HVAC (Heating, Ventilation, Air Conditioning) to an optimized level while guests are enjoying the beach, mountains or important business meetings. The Energy Eye System's components communicate using radio frequency (RF) technology to minimize installation and maintenance costs. Because each property has different needs, the Energy Eye System allows for full customization of setbacks and timer settings that should be determined before installation.

The Energy Eye WEMS will aid your business in reducing its electricity operating overhead expenses. Because a significant portion of electricity in commercial businesses is consumed by HVAC this is an ideal target to economize and reduce consumption. The Energy Eye will AUTOMATICALLY control your HVAC so that it does not get used excessively or unnecessarily. It will not require your full attendance, programming or any additional staffing at your facility.

The system operates seamlessly with your businesses HVAC users. By reducing the amount of time that the HVAC has to run in order to heat or cool the rooms we can proportionately reduce your electricity consumption.

For any questions you may have that are not covered in this instruction manual please contact your Sales Representative or call Energy Eye Toll Free (in USA): 1 866 463 3135 or International: 001 858 202 0001.

1.3 Features, Functions and Benefits (IC V4.0)

Wireless RF Technology	• Wireless 315 or 433 MHz RF Technology allows flexible and rapid installation on seldom used UHF band. • Does not require complicated low voltage wiring. • Installation not limited by line-of-sight elements of Infrared wireless data transmission. • Superior RF data transmission from sensors allows flexible multi-room and multi-level installation. • Robust and Reliable.
Multiple Sensor Loops	• EERX and EERXS model Receiver/Controllers allow programming of UP TO 6 individual sensors for all types of installations. • Sensor Loops allow programming ANY combination of Wireless Door Sensors, Passive Infrared Motion Sensors and/or Exterior Balcony/Lanai/Window Door Sensors.
Fail-Safe	• Controllers maintain autonomous operation for each guestroom/apartment/office preventing dangerous system-wide type failures. • All Controllers default to USER controlled setting on HVAC in case of failure. • AUTO/MANUAL button allows OPERATOR flexibility to choose if system is active or passive.
Simple Humidity Control	• Humidity controlled by 15 minute Air Conditioner cycling in order to re-fresh room air volumes every 2 hours. • Eliminates costly and un-necessary hygrometers.
Entry Door Control	• Wireless entry door sensor allows system to operate with superior occupancy control. • Constant detection vs. setback timer compromise is not necessary because entry door control allows controller logic to understand a closed room environment. • Does not require occupant to move constantly affecting sleep, HVAC cycling or battery life.

1.3 Features, Functions and Benefits (cont.)

Balcony/Lanai/Window Door Control	• Controller can communicate data from multiple entry/exit sensors in order to turn off HVAC when the COSTLY and ABUSIVE practice of operating with external doors/lanais or windows open. • Instant OFF prevents cold air attracting moisture. Two and Five Minute delay timers allow guests to come in and out of rooms without disrupting HVAC operation. • Reduces FF&E replacement expense from moisture damage and excellent mold remediation benefits.
Deep Setback (DSB) Function	• Allows incremental increases (decreases) in temperature setback of 5 degrees Fahrenheit after 24 hour period in order to increase energy saving potential in un-sold rooms. • Intelligent logic differentiates housekeeping activity from normal guest behavior to maximize performance.
Deep Setback II (DSB II) Function	• Intelligent logic differentiates housekeeping activity from normal guest behavior to maximize performance. • Operator selected operation (active/passive).
Table Setback (TST)	• Operator selected temperature setback modes simplify operation and allow flexible programming to “optimal” ranges. • Operator selected operation (active/passive).
Climate Logic	• Controller operates on pre-defined drift and drive patterns to ensure optimal energy savings during setback operation.
EERX Model Controller	• For use with High/Line Voltage applications 110/220/277 VAC using Power-Pack type interface/applications.
EERXS Model Controller	• In-built switching power supply allows up to 27VAC or 40VDC power input for Controller operation. • Flexibility for use on low voltage type interface/applications (Heat Pump Electronic Control Board/Thermostat/Front Desk Control) which commonly output >24VAC. • Decreased Operating temperatures increase thermistor accuracy and Controller reliability.
LiMn02 Transmitter Batteries	• Special Lithium Manganese Dioxide Batteries developed for Formula 1 Racecars increase operational life of Wireless transmitters and allow operation in extreme temperature environments (both high and low). • Ideal for transmitters located in proximity to outdoor environments/ambient temperatures. • Life expectancy of 1+ years* *Under normal operating conditions, depending on transmitter type. See Table 9.

1.3 Features, Functions and Benefits (cont.)

Easy Jumper Selection	• Vital programming of occupancy timers and modes, including testing modes (for installers) done with easily changed jumpers. • Eliminates need to use complicated software interfaces, Costly and easily lost or damaged Palm type devices and/or computer interfaces.
EEPROM IC	• Controller software is stored in EEPROM "memory chip" type IC • Stores Vital Data, even during power outages to insure that further programming/maintenance is not necessary. • Easily upgradeable software to ensure Operator has the latest available features and fixes, simply by changing the IC Microcontroller.
2 Year Limited Warranty	• Extensive engineering and quality testing allow industry leading Limited Warranty on parts and workmanship.

Table 1 – IC V4.0 Features, Functions and Benefits

2.0 How the Energy Eye System Works

The Energy Eye WEMS is especially designed for your operating environment. This is not an "off the shelf" type product because your facility most likely has particular needs that cannot be met with simple engineering. Your system has very unique PIC and IC type microcontrollers that allow the Wireless transmitters and receivers to work reliably and consistently in ALL types of RF environments including hotels with hundred's of rooms. Proprietary algorithms and controller platforms (U.S. patents pending) allow your WEMS to operate worry free and unattended while efficiently and economically reducing your HVAC energy usage. This one-of-a-kind type system is flexible enough to be used in many special programs for use in large scale apartment blocks and hotel operations.

The WEMS works by accurately detecting room occupancy with a combination of Wireless entry/door/window sensors and Passive Infrared motion detection technology. When a room becomes un-occupied the WEMS takes over control of your HVAC to economize it in the most practical and efficient manner in order to save you significant quantities of KWh and consequently a proportionate monetary gain on your Heating/Cooling Utility.

For example:

1. You are a hotel operator with significant energy expense. Electricity consumption is primarily caused by HVAC usage and is commonly the second highest operating expense of a hotel. Your guest regularly leaves his/her room to visit the beaches, mountains or business activities whilst leaving your HVAC operating to heat/cool the room unnecessarily.
2. The Wireless sensors used by your WEMS accurately detect if the guest is in their room.
3. If they detect that the guest is not present in the room for an operator selected time period the Energy Eye Controller will take over operation of your HVAC.
4. Intelligent digital temperature detection will actively monitor and adjust the room temperature to economize the HVAC usage whilst the room remains unoccupied.
5. When the guest returns to his/her room the controller will relinquish control to the guest to maintain their comfort and satisfaction.
6. All the while the guest will enjoy their stay and the WEMS will have saved you several dollars unbeknownst to them.

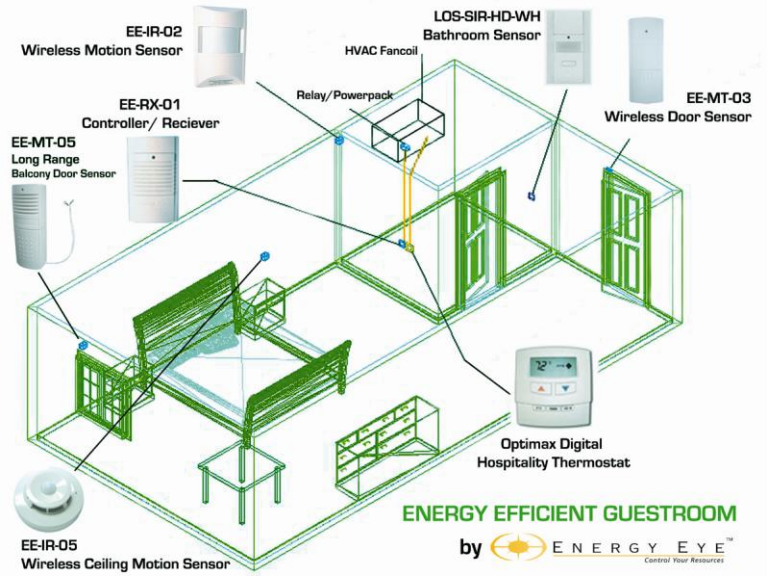


Figure 1

2.1 Energy Eye Operations Chart

This chart will guide you through the operational process by which the Controller processes its signals and logic. It should serve to help you understand exactly how the product functions and can help during troubleshooting. When Re-set the system will always restore to the original starting point Unoccupied MODE (HVAC OFF). When set to MODE B there will be a slight variation as indicated by the "IF MODE B" flow series.

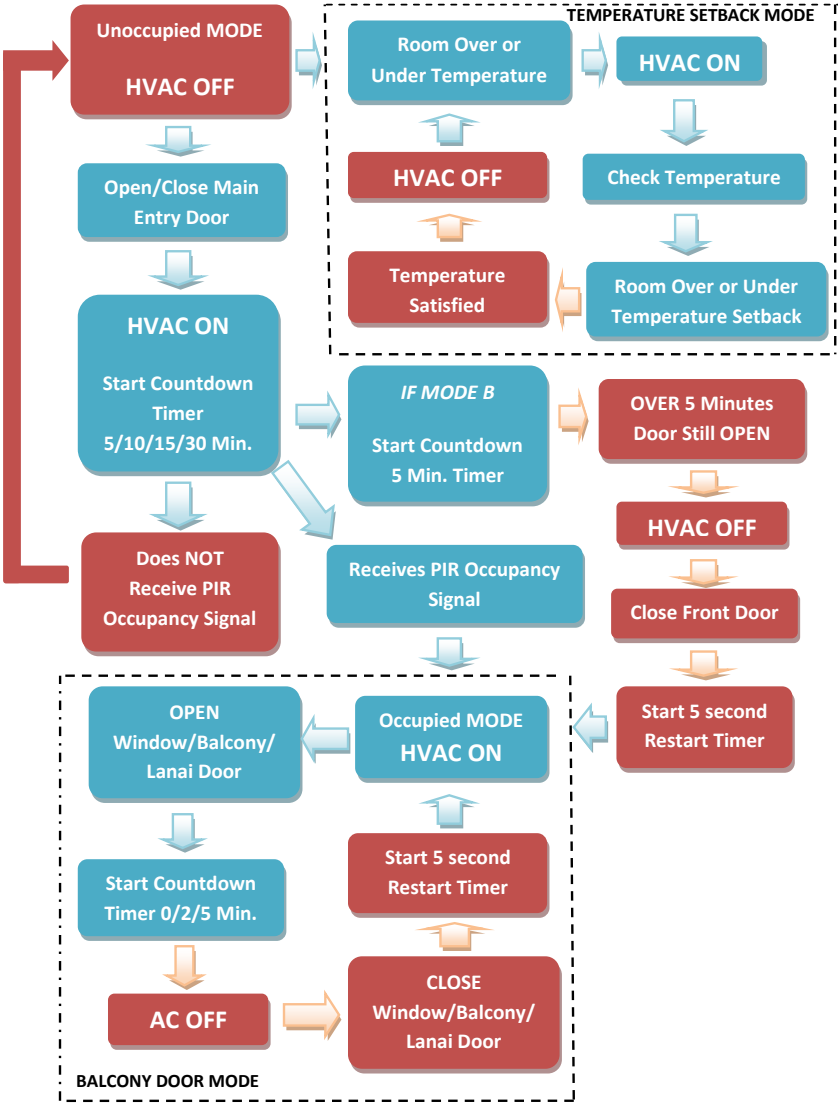


Figure 2

2.2 Main Components and Optional Accessories

EERX	Controller for use with HIGH VOLTAGE INTERFACE (RELAY/POWERPACK/OTHER)
EERXS	Controller for use with LOW VOLTAGE INTERFACE (13VAC~27VAC Thermostat/HP Control Board/Dry Contact)
EEPB-1	Powerbox for Heat Pump Retrofit 125VAC*
EEPB-2	Powerbox for Heat Pump Retrofit 240VAC*
EEMT03	Wireless Door Transmitter and Reed Assy.
EEMT05	Long Range Wireless Door Transmitter
EEIR02	Wireless PIR Motion Sensor/Transmitter
EEIR05	Ceiling Mounted Wireless PIR Motion Sensor
SM01	Signal Strength Meter
Ball Type PIR Mount	Kit for wall mounting EEIR02
Small Screw Mounting Kit Transmitter	Screw kit for mounting EEMT03 Door
Large Screw Mounting Kit	Screw kit for mounting Door Reeds, PIR Mount
CR2450 Battery	Lithium battery for operating EEMT03
CR123A Battery	Lithium battery for operating EEIR02
Sensorswitch MP-20	Powerpack/Relay for 120~277VAC Interface
Sensorswitch MSP-20	Slave Relay for 208VAC type Interface
Wattstopper/Legrand BZ-100	Powerpack/Relay for 120~277VAC Interface (small)
AC2/4-125	Powercord for EEPB-1 (2/4 Foot Lengths)*
AC2/4-250	Powercord for EEPB-2 (2/4 Foot Lengths)*
Belden Shielded Wire	Control Cable for “Powerpack” Interface
GS-106	Guest Information Sticker For Sliding Door/AC Coverplate/Thermostat
TT-106 “Tent Card”	Tabletop informational card for guests
Magnet Spacer	Magnet Gap Spacer for EEMT03 Reed Mounting
Glass Reed	Spare Glass Reed for EEMT03 Sensor

Table 2 – Energy Eye Components List

Your Energy Eye WEMS is capable of handling all different types of HVAC and applications. Because there are 6 Memory “Loops” available to store sensor positions, you may install using only one Controller for several different configurations. Your installation package will contain the specific amount of Sensors and Controllers you will need for your specific location.

3.0 Installation

It is recommended that the installer familiarize themselves with the parts and the configuration before beginning the installation process. MOST installations are different from one another, even sometimes within one installation location. It is advised that the instructions be followed as closely as possible, however your final configuration may not be exactly as advised. If any questions should arise during installation please call Energy Eye Toll Free (USA): 1 866 463 3135 or International: 001 858 202 0001.

*WARNING – USE ONLY APPROPRIATLY MARKED COMPONENTS FOR THE VOLTAGE YOU ARE WORKING WITH. NOT DOING SO WILL VOID THE LIMITED WARRANTY AND MAY RESULT IN PERMANENT INJURY OR DEATH AND/OR PRODUCT FAILURE.

Determine what kind of HVAC system you will be installing your Energy Eye WEMS with. There are several basic types of HVAC. The following type systems USUALLY are controlled by a remote thermostat. These thermostats may be LINE VOLTAGE ANALOG (110VAC+), LINE VOLTAGE DIGITAL (110VAC+), LOW VOLTAGE ANALOG (24~36VAC), or LOW VOLTAGE DIGITAL (24~36VAC):

- Residential Split - Outside Condensing Unit and inside Fan and Ducting.
- 2 Pipe Commercial - Fan and Coil Unit Controlling Cold water from Chiller and Pump station. Electric resistance heating strip or similar electric heat source.
- 4 Pipe Commercial – Fan and Coil Unit Controlling Hot/Cold water mixture from Chiller/Boiler and Pump station. Allows heating and cooling at same time. May contain secondary resistive heating element.

The following type HVAC systems are USUALLY controlled by mechanical or digital onboard controls (Mechanical controls are usually DIAL settings, Digital controls with Temperature Display):

- Mini-split – Outside Condensing Unit with inside Fan and Electric Ventilators. Uses Digital Infrared “REMOTE” control for temperature selection.
- PTAC – Packaged Terminal Air Conditioner with fan and condenser in one unit, usually found in “window” type installations. Uses electric resistance for heating and normally with Mechanical controls.
- Heat Pump – Similar to PTAC but uses Heat Pump reversing cycles for heating AND cooling. May use secondary electric resistive heat as back up (2 stage). Newer models (less than 3 years old) USUALLY electronically controlled even with mechanical dials.

Once you have determined the HVAC type please refer to the Wiring Supplement for your specific application.

WARNING: BEFORE INSTALLING BE ABSOLUTELY CERTAIN THAT YOU WILL NOT BE EXPOSED TO ANY ELECTRICAL CURRENT WHICH MAY CAUSE BODILY HARM, INJURY OR DEATH. THE ONLY WAY TO BE CERTAIN IS TO CLOSE ALL ELECTRICAL JUNCTION BREAKERS AND DOUBLE CHECK THAT THE WIRES YOU ARE WORKING ON ARE NOT HOT WITH A CURRENT METER, VOLTMETER OR SIMILAR.

3.1 Installation Example – Necessary Components for Different Room Configurations

Depending on your installation configuration you will require a different array of Controllers and sensors. Below you will find some different configuration examples:

Standard Hotel Room: If your installation is a standard single or double hotel room you would use one (1) Controller (EERX/EERXS), one (1) Front/Main entry door sensor (EEMT03) and one (1) Motion sensor (EEIR02/05).

Beachfront Suite Hotel Room: If your installation has two bedrooms and a balcony door that enters beachfront, you would use one (1) Controller (EERX/EERXS), one (1) Front/Main entry door sensors (EEMT03) and one (1) Balcony/Back door sensor (EEMT05) and three (3) Motion sensors (EEIR02/05, one for each room).

Apartment Home: If your installation is a one bedroom apartment home you would use one (1) Controller (EERX/EERXS), one (1) Front/Main entry door sensor (EEMT03) and two (2) Motion sensors (EEIR02/05, one for each room).

Executive Office: If your installation has 4 private offices in an Executive Suite, you would use one (1) Controller (EERX/EERXS), one (1) Front/Main entry door sensor (EEMT03) and four (4) Motion sensors (EEIR02/05, one for each room).

3.2 Installation Example - Interface Depending on HVAC type

Installation on 240VAC Fancoil w/2 pipe and line voltage thermostat: An EERX Controller would interface with a Powerpack transformer/relay. The Powerpack will draw from the high voltage and step the power down to 18~24VDC in order to operate the controller. The relay function would interrupt power going into the fancoil or cooling valve solenoid in order to affect cooling/heating operation.

Installation on 24VAC Digital Thermostat (operating standard residential condenser/split unit): An EERXS Controller would interface with the 24VAC Digital Thermostat. By interrupting the thermostats power (and heating/cooling "calls") using the Controllers onboard dry contact relay we can affect heating/cooling operation.

3.3 Main Points to Consider When Installing Your Energy Eye System

The Energy Eye System is designed specifically to promote easy installation. Because of this all of the sensors that make your system work accurately and properly are built using wireless RF technology. The ONLY wiring that will be necessary is to interface the Controller to your HVAC system. If you follow the steps outlined below you should have an easy and effective installation. The main points to consider when installing this system are:

1. Proper wiring of the Controller to power the circuit that operates the HVAC.
2. Optimal choices of Operator selectable settings to achieve maximum comfort vs. performance.
3. Optimal detection and transmission of wireless RF signals from sensors to receiver to achieve maximum performance.

Due to the nature of radio physics, it is often tricky and difficult to achieve desirable results when working with low powered radio devices. Your Energy Eye System is designed using proprietarily developed technology specifically to perform optimally in a high density radio environment such as hotels. Our products have been designed to eliminate both common room to room interference and atmospheric interference found near high population areas, high rise buildings, airports, military facilities etc… Your sensors use a unique algorithm offering over 4 Billion possible signature identity combinations. Unlike previous low voltage RF designs, such as commonly found car remotes or residential garage remotes which use manually selected "dip switches" to assign a sensor identity, our internal software program does this automatically, making the job much easier and less prone to error for the installer. Our radio platform is based on 315/433MHz UHF transmissions that will not normally interfere with cellular phones, radios, remotes, cordless phones, Wi-Fi connections, Bluetooth or other modern radio devices.

Please note: The Energy Eye System and its Wireless components are listed and certified under FCC Part 15 and Industry Canada RSS for Radio Operation. Because of this they are required by law to accept harmful interference and for reasons out of our control may not function during certain conditions.

3.4 Steps you will take to install the Energy Eye System properly

By following these steps in the right order you will ensure the easiest, fastest and most successful installation technique. After many years of experience we have found that the best way is the right way, the first time. If for any reason you find yourself "second-guessing" on the installation, please don't hesitate to call us for a clarification Toll Free 1 866 463 3135 or International 01 858 202 0001 to speak with a knowledgeable technician.

1. Determine proper wiring configuration of the Controller. Use the appropriate wiring guide supplement. Your wiring configuration will achieve two points:
   1.1. Provides low voltage power to operate your Energy Eye Controller.
   1.2. Provides a relay circuit to interrupt power to your thermostat control, HVAC compressor, HVAC fan and compressor, or Solenoid control valve.
2. Controller wiring and mounting
3. Program settings on Controller
4. Determine proper locations for Wireless Sensors
5. Mount Wireless sensors (EEIR and EEMT)
6. Program Wireless sensors
7. Testing and Operation

We pride ourselves on an exceptional quality standard. Due to reasons outside any manufacturing controls however it is possible that a defective unit may find itself in your hands. If you are installing ANY Energy Eye component and it does not seem to operate properly or according to the installation instructions, please set this part aside for a possible warranty claim and continue your installation with a NEW part.

3.5 Installation Step 1 - Determine Proper Wiring Configuration

This is the most difficult part of your installation and the first step in our process. Because every HVAC configuration varies we have tried to limit ourselves to several "general" installation configurations. Please see the Wiring Supplement that is appropriate for your HVAC type, as defined below in Section 3.6

These configurations will cover the types of HVAC in the User Guide. If you have any questions or doubts, or your HVAC does not fit any of the following configuration descriptions, please call Toll Free 1 866 463 3135 or International 01 858 202 0001 to speak with a knowledgeable technician.

3.6 Installation Step 2 – Controller Wiring Configurations by HVAC type

Please review the various HVAC types below to determine which configuration best fits your application. Refer to the Wiring Supplement appropriate for your application.

For applications with existing thermostats, generally speaking an older HVAC system will utilize a mechanical thermostat and a newer HVAC system will use a digital type thermostat. Each system has its own configuration requirements. We highly recommend that any mechanical thermostat be replaced with a Digital type unit. Not only will this result in additional HVAC efficiency and reduced power consumption, but may also be necessary to comply with current Mercury absolution laws. Please check with your Local, State or Federal Government regulations to be sure that you are not operating a thermostat containing illegal Mercury substance.

IMPORTANT NOTE: Before wiring or installing Energy Eye components always follow the procedure to check HVAC Functionality.

3.6.1 Checking HVAC for Functionality

It is HIGHLY RECOMMENDED that when working on ANY HVAC the installation technician be trained in HVAC diagnostics and repair. The first step is to **ALWAYS ENSURE PROPER OPERATION OF THE HVAC BEFORE INSTALLING ANY NEW EQUIPMENT, INCLUDING THE ENERGY EYE SYSTEM**. This can be easily done by following these steps:

1. Find the wall thermostat or other means of temperature control.
2. If you are working on a PTAC or Heat Pump type HVAC, you may not be able to find a wall thermostat. In this case the HEAT and COOL controls are usually located under a plastic flap or cover on the face of the unit. You should see several dials with the user settings.
3. If you are working on a Mini-Split type HVAC the controls are usually on an IR Remote control, much like a television controller. Locate this remote to test proper operation.

4. Depending on your outside environment put the system to MAXIMUM HEAT or COOL (in case of cold weather, use HEAT and in case of hot weather use COOL)
5. Find the HVAC vent. It is usually located high up on an inside wall. For PTAC, Heat Pump and Mini-Split type HVAC the vent is usually located on the face of the unit. Notice if hot or cold air is coming from the vent.
6. MAKE SURE IT IS NOT JUST THE FAN RUNNING. THE FAN SETTING SHOULD BE SET TO "AUTO" OR "OFF."
7. If you feel hot or cold air, try the opposite setting, turn the thermostat setting to MAXIMUM HEAT or COOL.
8. You should likewise feel hot or cold air coming from the VENT.

If you have completed these steps satisfactorily you can continue with your Energy Eye installation. If you have any doubt or questions it is **NOT ADVISED** to continue with the Energy Eye installation. Please contact the property, site or local HVAC technician to inspect the system to make sure it is operating properly.

3.6.2 Residential Split

A residential split type HVAC almost always has a ducted air system with an interior fan motor and an external condensing unit. These types of HVAC are usually controlled with a mechanical or digital thermostat.

PLEASE REFER TO THE SUPPLEMENT FOR RESIDENTIAL SPLIT HVAC WIRING ADVICE

3.6.3 Two Pipe Commercial HVAC

Two Pipe Commercial type HVAC almost always has a ducted air system with an interior fan motor and cooling coil typically referred to as a "fancoil" unit. They commonly have a solenoid valve that operates to affect the cold water flow through the cooling coils. These types of HVAC are usually controlled with a mechanical or digital thermostat.

When installing on this type HVAC we have two (2) configuration options depending on if low or high voltage control is available. Depending on the design of the system it is very important to make sure the installation configuration is correct.

IMPORTANT NOTE: Some 2 pipe systems DO NOT HAVE A RETURN. In this case it is very important NOT TO STOP THE FLOW OF COLD WATER. This is because the water will stagnate and heat up in the coils. When the valve is opened the

hot water will be injected into the system increasing the return water temperature to the chiller. In this case only the FAN MOTOR should be controlled. If the coils have a return, the flow should be operated by the solenoid valve, either through the direct thermostat control or by using an external relay.

PLEASE REFER TO THE SUPPLEMENT FOR TWO PIPE COMMERCIAL HVAC WIRING ADVICE

3.6.4 Four Pipe Commercial HVAC

Four Pipe Commercial type HVAC usually have a similar layout to the 2 pipe system, comprised of a fan and coil pack vented through a ducted air system however this system has hot and cold water supplied simultaneously to allow heating and cooling at the same time. These types of HVAC are usually controlled with a mechanical or digital thermostat.

PLEASE REFER TO THE SUPPLEMENT FOR FOUR PIPE COMMERCIAL HVAC WIRING ADVICE

3.6.5 Mini-split type AC

Mini-split type AC units are most commonly found in high humidity tropical environments because of their relatively high cooling capacity. They are mostly cooling only units and work with an outside condensing unit and an inside air distribution (air handler) system. They nearly unanimously use a digital thermostat control located on the face of the air handler and/or an InfraRed (IR) remote control user interface.

IMPORTANT NOTE: When installing on a mini-split type AC it is critical to make sure that the **"auto-restart" function is enabled**. Please refer to the user documentation from your particular unit in order to determine this setting.

PLEASE REFER TO THE SUPPLEMENT FOR MINI-SPLIT WIRING ADVICE

3.6.6 PTAC (Packaged Terminal Air Conditioner)

PTAC type AC units are usually called "window AC" units. These units package the Compressor, condenser fan and heating element into one small unit. These units typically have a mechanical control to select temperature and fan speed settings. Some modern units may also have digital or electronic controls. This gives us two options for installation configuration.

PLEASE REFER TO THE SUPPLEMENT FOR PTAC WIRING ADVICE

3.6.7 Heat Pump (PTHP)

Heat Pump type AC units are typically referred to as “through-the-wall” units. These units usually have an air source heat pump with reverse cycling heating and cooling functions, sometimes accompanied by an electric heat strip (2 stage). These units may have mechanical controls or on most new units, a digital control board which facilitates energy management installations and increases efficiency. Some modern units may also have digital or electronic controls.

IMPORTANT NOTE: If installing a digital thermostat in conjunction with the Energy Eye System it is recommended to set the “fan cycle switch” or feature to the “Continuous” setting in order reduce possibility of guest interaction.

PLEASE REFER TO THE SUPPLEMENT FOR PTAC WIRING ADVICE

3.7 Controller Mounting

Before Wiring and Energy Eye Controller (EERX/EERXS) you must follow these preliminary steps first:

3.7.1 Controller Wiring and Mounting Advice

1. **NEVER REMOVE THE CONTROLLER FROM ITS ORIGINAL PACKAGING UNTIL YOU ARE READY TO INSTALL IT. DOING SO MAY CAUSE DAMAGE THAT WILL VOID YOUR LIMITED WARRANTY**. Remove the unit from its original packaging. You will find the controller and a small bag with mounting screws. Set the mounting screws aside for now.

2. Locate the small screw on the bottom of the unit. Using a small Philips type screwdriver remove the screw. When you are finished installing an Energy Eye Controller always be sure to replace the cover and screw to prevent Guest tampering.

Figure 3

3. Carefully remove the cover by lifting from the bottom an unhinging the top. Take special care not to damage the GREEN LED on the face of the

unit. Take care in handling the unit as static electricity from your body-may transmit into the temperature IC (located on the bottom of the unit – see Figure 4) and damage it.

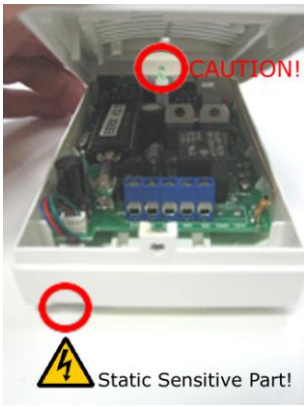


Figure 4

4. Follow these guidelines before mounting the controller:

- Controller should be out of sight as much as possible from guests and children.
- Controller should be within a quick view of hotel maids or staff to read LED status indications.
- The Controller uses its own internal thermostat to gauge a room's temperature. For this reason, the Controller should not be placed directly in front of a vent, on an outside wall or anywhere that could substantially compromise temperature reading. Near the air return is often a good mounting position.
- To avoid reception problems due to range the Controller should not be more than 30 feet (10 meters) birds fly from any Energy Eye sensors or components.
- Controller should be placed to avoid contact with any guestroom door(s) and guest luggage.
- Make sure that you leave sufficient room for wiring of the power pack when determining Controller placement.
- Keep at least 6" of space between the Controller and any metal surfaces and that it is not mounted over any metal studs or surfaces. If the Controller is too close to metal surfaces it will decrease reception range and signal performance dramatically.

3.7.2 Setting the Controller VOLTAGE INPUT

EERXS Controller

1. Locate the voltage jumper block on the bottom of the PCB (see Figure 7).
2. Make sure that the **VOLTAGE JUMPER BLOCK** is set properly to avoid damage to your Energy Eye Controller.
   1.1. RIGHT CONNECTOR PIN POSITION = AC VOLTAGE INPUT/OUTPUT (MAX 26VAC)
   1.2. LEFT CONNECTOR PIN POSITION = DC VOLTAGE INPUT/OUPUT (MAX 36VDC)
   1.3. CENTER CONNECTOR PIN POSITION = AC VOLTAGE INPUT W. DRY CONTACT (DEFAULT) (MAX 26VAC)

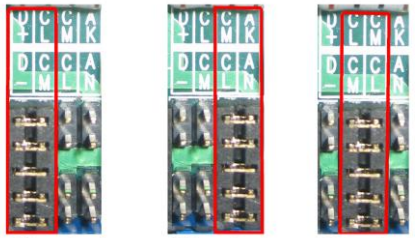


Figure 5

EERX Controller

1. Locate the voltage jumper block on the bottom of the PCB (see Figure 8).
2. Make sure that the **VOLTAGE JUMPER BLOCK** is set properly to avoid damage to your Energy Eye Controller.
   1.1. HORIZONTAL POSITION = DC VOLTAGE INPUT/OUTPUT (DEFAULT) (MAX 19VDC)
   1.2. VERTICAL POSITION = AC VOLTAGE INPUT/OUTPUT (MAX 13VAC)
   1.3. CENTER POSITION = AC VOLTAGE INPUT W. DRY CONTACT (MAX 13VAC)

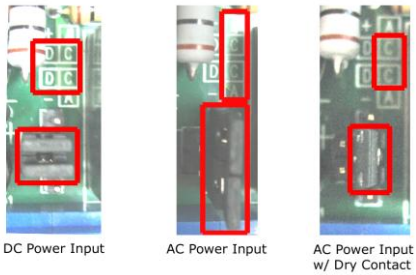


Figure 6

3.8 Controller Reference Diagram – EERXS

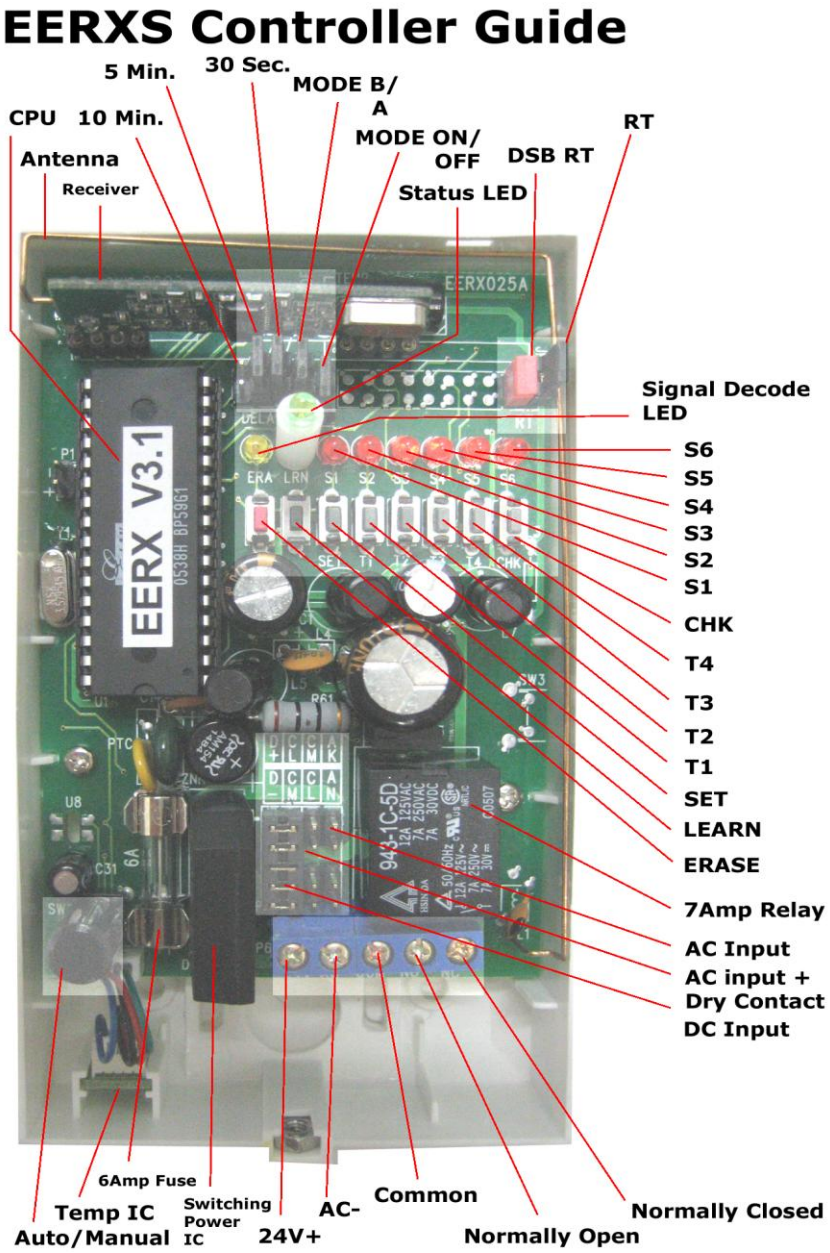


Figure 7 - Main Reference Diagram EERXS

3.8.1 Controller Reference Diagram – EERX

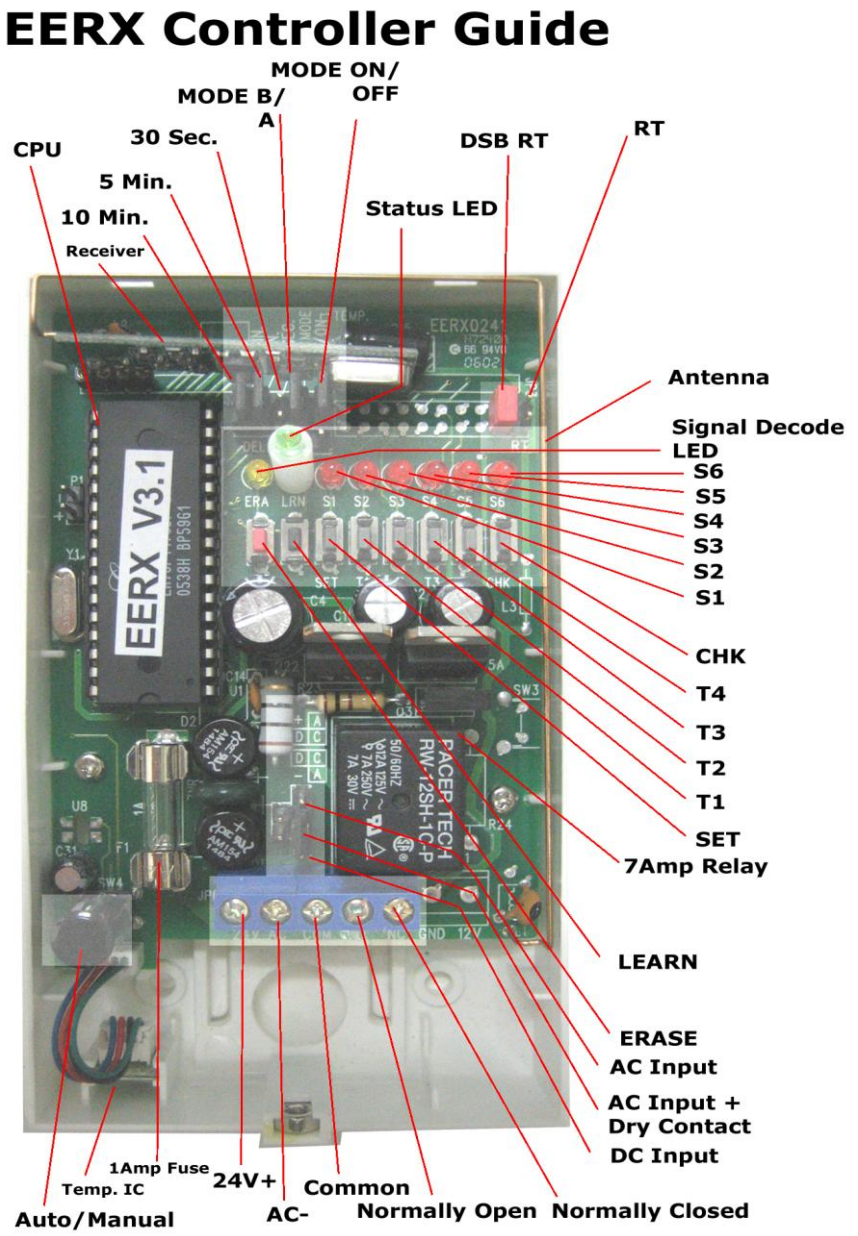


Figure 8 - Main Reference Diagram EERX

3.9 Installation Step 3 - Programming Settings on Controller (V4.0 IC)

Once you have wired the Controller (EERX or EERXS) and tested the HVAC for functionality you are ready to program the User selectable settings. This is easily done with the on-board jumpers and tactile switches. The settings will determine the TEMPERATURE SETBACK OPERATION and TIMERS that will determine the Energy Reduction characteristics and performance vs. the Guest or User input. These settings have been pre-selected to give you the most flexibility while maintaining ideal limit ranges. Please refer to the table below for a list of individual settings, determine the best setting for your application using the Settings Guide and then follow the step-by-step instructions for programming these settings.

3.9.1 SETTINGS GUIDE

Temperature Setback Delay Timer	• Jumper selectable delay timer determines how long the Energy Eye Controller will wait before it has determined a room is completely unoccupied and will enter setback operation. • Operator settings allow for 5, 10, 15 and 30 minute periods along with a 30 second “test” mode. • Default setting is Five (5) minutes. • To achieve the 15 minute timer setting leave the jumpers for BOTH the 10 Minute and 5 Minute setting in place. • To achieve the 30 minute timer setting ALL jumpers must be removed from the timer settings (i.e. remove the 5 minute AND 30 second jumper). • For Limited Service, Midsize and Midsize Full service hotels with an exterior corridor (main entry door opens outdoors) recommended setting is 5 minutes. • For Limited Service, Midsize, Full Service and Large Hotels with an indoor corridor (main entry door opens to inside hallway) recommended setting is 10 minutes. • For Resort and Luxury type Hotels recommended setting is 15 or 30 minutes. Having a 30 minute timer will allow the staff to pre-heat or cool a room as the guest checks in by opening the door before they get to their room. • For Apartments, Offices and Multi-family applications recommended setting is 5 minutes.

Mode A/B	• Jumper selectable mode determines if the Energy Eye Controller will allow HVAC operation with the Main Entry Door left open. • MODE A setting allows HVAC operation with Main Entry Door left open. • MODE B setting DOES NOT allow HVAC operation with Main Entry Door left open >5 minutes. • Default Setting is MODE B. • For Limited Service, Midsize and Midsize Full service hotels with an exterior corridor (main entry door opens outdoors) recommended setting is MODE B. • For Limited Service, Midsize, Full Service and Large Hotels with an indoor corridor (main entry door opens to inside hallway) recommended setting is MODE A. • For Resort and Luxury type Hotels recommended setting is MODE A. • For Apartments, Offices and Multi-family applications recommended setting is MODE B.
Temperature Setback ON/OFF	• Jumper selectable setback operation determines if the Energy Eye Controller will enter a controlled setback temperature range during Unoccupied operation or if it will simply turn the HVAC OFF until the guest/user returns to the room. • Default Setting is OFF. • OFF setting will not allow HVAC operation in an unoccupied room except for one 15 minute air exchange session every Two (2) hours. • ON setting will allow HVAC operation during unoccupied periods whenever the Operator selected temperature setback limits have been exceeded (either heating or cooling). • Recommended setting for ALL HOTEL applications is ON. • For extremely energy conscious Operators or when total guest comfort is not a consideration the recommended setting is OFF. • Recommended setting for Office or Multi-family Applications is OFF. • **Apartment Operators with children or pets should use the ON Mode to ensure comfortable temperatures when adult or human occupants are away.** • **IF located in EXTREME TEMPERATURE ENVIRONMENTS with temperatures regularly > 90F or < 50F recommended setting is ON.** ***Not doing so may allow pipes to freeze in extremely cold environments causing SEVERE DAMAGE. Energy Eye will not be liable if damages occur because the Operator selected the OFF setting.***

Automatic Humidity Control	• Humidity controlled by 15 minute Air Conditioner cycling in order to re-fresh room air volumes every 2 hours when set to Temperature Setback OFF Mode. • When set to Temperature Setback ON Mode, air is Conditioned during un-occupied periods during Heating or Cooling duty cycles to maintain setback limits even when un-occupied. • The T4 TST setback setting should be used for environments with >75% humidity to ensure a dry room. • Humidity controlled by electronic logic. • HVAC Operation reduces humidity.
Deep Setback RT (DSB RT)	• Red Jumper for testing purpose ONLY. • Default setting is ON. • DSB RT JUMPER MUST REMAIN IN PLACE DURING NORMAL OPERATION of the Energy Eye System.
Re-start Timer (RT)	• Jumper selectable allows user to activate or deactivate compressor protection delay on timer. Two (2) minute delay for use with PTAC or PTHP AC units >6 years old. Five (5) second delay for use with all modern and central type (thermostat controlled) HVAC. • Default setting is Two (2) Minutes (jumper on). • **RT Jumper should be REMOVED for all HVAC applications EXCEPT PTAC or PTHP more than 6 years old. Modern HVAC include automatic compressor protection so RT jumper is not necessary.**
Deep Setback (DSB) Function	• Allows incremental increase (or decrease) in temperature setback of roughly 5 degrees Fahrenheit after 24 hour unoccupied period of in order to maximize energy saving potential in un-sold rooms. • Intelligent logic differentiates housekeeping activity from normal guest behavior to maximize performance. If room is occupied for < 30 minutes over a 24 hour period DSB Temperature Range will remain in effect. If room is occupied for >30 minutes over a 24 hour period Regular Setback Temperature Range will be enabled. • Operator selected using tactile switches with LED indication. • Default setting is ON.

Deep Setback (DSB) Function (cont…)	• When DSB set to ON will have Temperature Setback limits including: ○ **T1 – HIGH: 88°F LOW: 52°F 31°C 11°C** ○ **T2 – HIGH: 82°F LOW: 54°F 28°C 12°C** ○ **T3 – HIGH: 79°F LOW: 57°F 26°C 14°C** ○ **T4 – HIGH: 75°F LOW: 59°F 24°C 15°C** • Recommended settings for All HOTEL applications is ON. Allows for additional savings during extended periods of un-occupancy such as an un-sold room or room block. • Recommended setting for Office applications is ON. Allows for additional savings during extended periods of un-occupancy such as during Holiday Closures (when Temperature Setback is ON). • Recommended setting for Apartments or Multi-family is ON (when Temperature Setback is ON).
Deep Setback II (DSBII) Function	• Turns unit into Temperature setback MODE OFF after 24 hour unoccupied period in order to maximize energy saving potential in un-sold rooms. • After 24 hours will turn HVAC OFF in an unoccupied room except for one 15 minute air exchange cycle every Four (2) hours. • Intelligent logic differentiates housekeeping activity from normal guest behavior to maximize performance. If room is occupied for < 30 minutes over a 24 hour period DSBII Temperature Range will remain in effect. If room is occupied for >30 minutes over a 24 hour period Regular Setback Temperature Range will be enabled. • Useful for seasonal properties where large room blocks remain un-sold for extended periods of time. Reduces maintenance need to manage every HVAC. • Default setting is OFF. Must be user enabled. • If preferred maximized energy savings, recommended setting for hotels is ON (when Temperature Setback is ON). • Five Star or Luxury hotels recommended setting is OFF. • If preferred maximized energy savings, recommended setting for Office applications is ON. (when Temperature Setback is ON). • If preferred maximized energy savings, recommended setting for Apartments or Mulit-family is ON (when Temperature Setback is ON).

Deep Setback II (DSBII) Function (cont…)	• **IF located in EXTREME TEMPERATURE ENVIRONMENTS with temperatures regularly > 90F or < 50F recommended setting is ON.** ***Not doing so may allow pipes to freeze in extremely cold environments causing SEVERE DAMAGE. Energy Eye will not be liable if damages occur because the Operator selected the OFF setting.***
Temperature Setback Table (TST) Selection **Temperature Setback Table (TST) Selection**	• Operator selected temperature setback modes simplify operation and allow flexible programming to "optimal" ranges. • Operator selected using tactile switches with LED indication. • Default setting is T1. • Available Temperature Setback Table limits include: ○ **T1 – HIGH: 82°F LOW: 55°F 28°C 14°C** ○ **T2 – HIGH: 77°F LOW: 59°F 25°C 15°C** ○ **T3 – HIGH: 75°F LOW: 63°F 24°C 17°C** ○ **T4 – HIGH: 72°F LOW: 64°F 22°C 18°C** • **T4 is NOT RECOMMENDED for HEATING or WINTER ENVIRONMENTS. USE T3.** • For Limited Service or Midsize recommended setting is T2 or T3 (select T3 for additional guest comfort). • For Midsize, Large and Full service hotels recommended setting is T2 or T3 (select T3 for additional guest comfort). • For Resort and Luxury type Hotels recommended setting is T3 or T4 (select T4 for MAXIMUM guest comfort OR areas with high humidity). • For Apartments, Offices and Multi-family applications recommended setting is T1 or T2 (select T2 for additional guest comfort).
Power Input Mode	• Jumper selectable setting allows operator to select between AC and DC voltage input or AC input with Dry Contact circuit separation. • Default Setting is for AC voltage input with Dry Contact circuit separation (EERXS CONTROLLER ONLY) or • Default Setting if for DC voltage input (EERX CONTROLLER ONLY). • **JUMPER MUST BE IN DC SETTING FOR DC VOLTAGE INPUT (from Mini-powerpack power supply). CAUTION:** ***Not using this setting may cause permanent damage to your Energy Eye controller when using DC voltage input.*** • **JUMPER MUST BE IN AC SETTING FOR AC VOLTAGE**

	INPUT (from thermostat, electronic HVAC control board or external AC transformer power supply) CAUTION: ***Not using this setting may cause permanent damage to your Energy Eye controller when using AC voltage input.*** • **JUMPER MUST BE IN DRY CONTACT SETTING FOR AC VOLTAGE INPUT WITH SERPERATE DRY CONTACT CIRCUIT (from thermostat, electronic HVAC control board or external AC transformer power supply) CAUTION:** ***Not using this setting may cause permanent damage to your Energy Eye controller when using AC voltage input with separate dry contact circuit.***

Table 3 – Controller Settings Guide

Once you have determined the ideal setting follow these Step-by-step programming instructions.

NOTE: The jumper selectors are quite small. If the Operator is having difficulty handling the jumpers with their fingers they should use a small pair of pliers or tweezers to remove and replace the jumpers.

NOTE: AFTER CHANGING JUMPER SETTINGS ALWAYS RESET THE ENERGY EYE CONTROLLER BY DEPRESSING THE AUTO/MANUAL BUTTON TWICE. THIS IS INDICATED BY THE GREEN LED ON THE FACE OF THE CONTROLLER GOING ON AND OFF.

1. Locate your Energy Eye Controller (EERX/EERXS). If the cover is in place pleas follow the steps above under Section 3.7.1 to remove the Energy Eye Controller Cover/faceplate. If the cover is already removed continue with programming.
2. All Energy Eye Controllers come pre-set from the factory with the default settings listed in the Settings Guide. If you require different settings follow the steps below.
3. During all Controller programming, including jumper changes, TACT switch mode changes, and sensor programming the Controller should be set to MANUAL MODE. This can be done by pressing the AUTO/MANUAL button once (see Figure 7/8 - Controller Reference diagram). This will be indicated by the GREEN LED on the face of the Controller turning OFF.
4. It is recommended to have the HVAC set to OFF during Energy Eye Controller Programming. This can be done at the thermostat or on the A/C Controls. Please refer to the HVAC User Documentation in order to do this properly.

3.9.2 For Jumper Selectable Settings:

1. Start by locating the row of jumpers at the top of your Energy Eye Controller PCB (see Controller Reference diagram) Starting from left to right, the first three jumpers will affect the Temperature Setback Delay timer. The Energy Eye Controller comes from the factory with one jumper on the 5 Minute setting and one jumper on the 30 Second (test mode) setting.

2. To select the 5 Minute Timer remove the jumper on the 30 Second (test mode) position. This is the third jumper position from the left. This jumper should not be discarded as it is necessary if the Operator wishes to select a 15 Minute Timer setting at a later date. The jumper can be easily saved by replacing it on only ONE PRONG of the jumper bridge (see picture below).

Figure 9

OR

3. To select the 10 Minute Timer move the jumper from the 5 Minute position one jumper position to the left so that it bridges the prongs on the 10 Minute position. Remove the jumper on the 30 Second (test mode) position. This is the third jumper position from the left. This jumper should not be discarded as it is necessary if the Operator wishes to select a 15 Minute Timer setting at a later date. The jumper can be easily saved by replacing it on only ONE PRONG of the jumper bridge (please see Figure 9).

OR

4. To select the 15 Minute Timer you should combine use of the of the 5 Minute and 10 Minute jumper positions. Move the jumper from the 30 second (test mode) position to the first jumper position from the left so that it bridges the prongs on the 10 Minute position (see Figure 10). Leave the remaining jumper on the 5 Minute position.

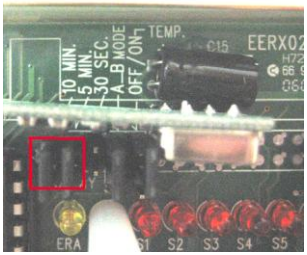


Figure 10

OR

5. To select the 30 Minute Timer you should remove all of the occupancy timer related jumpers. Move the jumper from the 30 second (test mode) position to the bottom prong so it does not bridge the jumper. Also move the 5 minute jumper position to the bottom prong so that it does not bridge the jumper. (see Figure 11).

Figure 11

6. The fourth jumper position from the left is the Mode A/B selector. The default position is UP or Mode B. To select Mode A move the jumper to the DOWN position by removing it and bridging the two lower prongs on the jumper selector.

7. The fifth jumper position from the left is the Temperature Setback ON/OFF setting. The default position is DOWN or Temperature Setback OFF. To turn Temperature Setback operation ON move the jumper to the UP position by removing it and bridging the two upper prongs on the jumper selector.

8. The DSB RT Jumper should ALWAYS REMAIN IN PLACE during normal operation of your Energy Eye Controller. The RT Jumper should ALWAYS BE REMOVED for normal HVAC applications EXCEPT if installing on PTAC or PTHP applications MORE THAN SIX (6) YEARS OLD. The default setting has the jumpers in place.

3.9.3 For Tactile (TACT) button with LED indication settings:

AFTER CHANGING TACT BUTTON SETTINGS ALWAYS RESET THE ENERGY EYE CONTROLLER BY DEPRESSING THE AUTO/MANUAL BUTTON TWICE. THIS IS INDICATED BY THE GREEN LED ON THE FACE OF THE CONTROLLER GOING ON AND OFF.

1. During all sensor programming the Controller should be set to MANUAL MODE. This can be done by pressing the AUTO/MANUAL button once (see Figure 7/8 - Controller Reference diagram). This will be indicated by the GREEN LED on the face of the Controller turning OFF.

2. Depress the Grey tact switch over position “SET” and “T1” simultaneously. You will see the RED LED flashing over positions S2~S5 (or T1~T4 likewise) for *10 seconds* and the YELLOW “decode” LED flashing in regular intervals as a reference (see Figure 12).

Figure 12

3. You can end the flashing indication early by pressing the ERASE button.

4. Each RED LED represents a different Regular Temperature Setback Table Selection i.e. if the RED LED is flashing over Position “T1” this means that Temperature Setback “Table 1” has been selected, if the RED LED is flashing over Position “T2” this means that Temperature Setback “Table 2” has been selected and so on…

Figure 13

5. To select a different Setback Table depress the Grey tact switch over position “SET” and the Grey tact switch over the corresponding Table Selection that you would like to make simultaneously for AT LEAST 2

SECONDS i.e. if you press the Grey tact switch "SET" while simultaneously pressing the Grey tact switch over position "T3" for AT LEAST 2 SECONDS you will see the RED LED over position "T3" begin to blink. You would then know you were operating in Temperature Setback Table Range "T3."

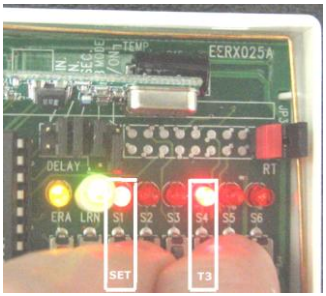


Figure 14

6. Depress the Grey tact switch over position "SET" and "CHK" simultaneously. You will see the RED LED over position "S6" *Flashing for 10 seconds* and the YELLOW "decode" LED flashing in regular intervals as a reference.

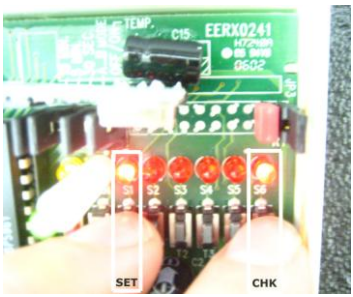


Figure 15

7. The flashing cycle will indicate which mode the Unit is set to:

    a. DSB OFF = VERY SLOW FLASH

    b. DSB ON = FAST FLASH

    c. DSB II ON = NORMAL FLASH (0.5 SEC)

8. **You can end the flashing indication early by pressing the ERASE button.** This will not affect the setting. To change the DSB MODE (default is ON) simultaneously depress the Grey tact switches over "SET" and "CHK" for AT LEAST 2 SECONDS. The RED LED over "S6" will change flashing pace accordingly. Repeat the procedure in steps 4 and 5 to change the mode again. ALWAYS RESET THE BRAIN after changing modes by depressing the AUTO/MANUAL button located on the lower left corner of the Controller PCB twice (indicated by GREEN LED turning OFF and then ON SOLID).

9. NOTE: Controller JUMPER POSITION “ON” MUST BE SELECTED IN ORDER TO ENABLE TEMPERATURE SETBACKS and DSB OPERATION.

4.0 Installation Step 4 - Determine Proper Location for Wireless Sensors

4.1 Understanding how your wireless RF sensors work

As you probably know your Energy Eye System uses Wireless Radio Frequency (RF) signals for the sensors to communicate their states with the Controller that will operate the HVAC system and logic functions. Because we use RF transmissions this adds a great deal of flexibility and simplicity to the installation. It is important however to understand basic principles of wireless RF in order to achieve optimal performance from your System. There are limitations to wireless transmissions including FCC regulation which states the sensors MUST accept harmful interference from other sources. The following are important points to consider when installing your Energy Eye System:

1. Radio Signals become weaker the further they travel. Try to imagine someone talking to you from across a crowded room, if other people are talking their voice may not be distinguishable. If they were to continue talking to you as they walked in your direction at some point you would be able to hear and understand them. Radio signals work much in the same way, therefore it is always recommended to place the sensors as close as possible to the receiver.

2. While radio signals can travel through walls they will be affected by the materials around them. The following is a general guide to signal degradation:

    a. Wood, glass or drywall: <20% signal loss
    b. Brick or aerated concrete: <50% signal loss
    c. Metal/Aluminum: >90% signal loss

3. Try to send the signal straight through a wall. If the signal must pass through a wall at an angle the distance it will travel through the wall material will be greater and the signal strength will be decreased.

4. All metal objects reflect radio waves. Wall studs, foil, insulation or siding made of metal will affect the radio signal and create a radio shield or “dead spot.” If the radio signal must pass through this area it will most likely be degraded beyond acceptable limits. Fire safety walls, elevator shafts and stairwells are all considered radio shields or screens.

5. Try not to place the receiver and the sensor on the same wall. The signal will make reflections on the wall and may be degraded. It is always better to send the signal perpendicular than parallel to the receiver.

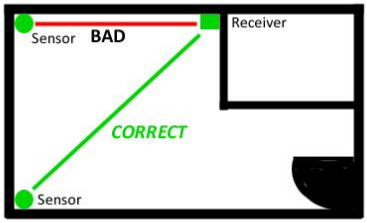


Figure 16

6. Electronic devices create interference including computers, electrical sources and motors. In order to achieve the best radio performance the receiver should be mounted at least 1'-2' (0.5m) from the interference source.

4.2 Wireless PIR Motion Sensor Location (EEIR02)

Always follow these guidelines before mounting the EEIR02:

- The sensor should be 7 feet (2.5 meters) from floor if placed in a corner.
- 10 – 15 feet (3.3 – 5 meters) from floor if positioned parallel with the wall (not in the corner).
- PIR should look down 15 degrees (+/-) at the guestroom.
- Avoid locating the detector facing a window or where it is exposed to or facing sunlight.
- Avoid locating the detector in areas which contain objects likely to produce a rapid change in temperature, such as central heating, ventilator, radiator. Boiler, ducts etc.
- Avoid locating the detector in a position where it is subject to excessive vibration.
- Make sure the detection area is not obstructed by curtains, large furniture, plants which etc which may block the pattern of coverage.
- Avoid installing 2 PIR detectors in one room protecting the same area.
- Like all Energy Eye wireless components, PIR should be less than 30 feet (10 meters) from Controller Unit.

- PIR detection range coverage: 24 – 30 feet (8 - 10 meters) long, 110 degrees wide.
- PIR cannot be exposed to steam (example: do not install unit in bathrooms).
- When the battery is first connected to the PIR a 2~3 minutes period must be allowed for "Warming up."
- It is recommended that the PIR DOES NOT face the main entrance but in a position that still allows for it to detect movement as the occupant enters the room. It is important that the PIR is mounted so that it will ONLY see the movement of the occupant AFTER the entry door has been CLOSED.
- The IR sensor includes a special function to preserve battery life. Therefore, it is not expected to send an occupancy signal to the Controller unless it has NOT SEEN ANY MOVEMENT for AT LEAST 10 seconds.

With the guidelines in mind you should be able to determine the optimal mounting location. Please refer to the images below as an example. Once you have determined the optimal location you can move on to section 5.1 MOUNTING WIRELESS PIR SENSOR (EEIR02).

Figure 17

4.3 Wireless PIR Motion Sensor Location (EEIR05)

Always follow these guidelines before mounting the EEIR05:

- The sensor should be centered over the beds on the ceiling of the main sleeping area if possible.

- If you were to draw an imaginary line straight down from the center of the sensor to the floor, the edge of the bed should not be more than four feet from this line.
- PIR should NEVER be more than 6 feet away from the bed
- Avoid locating the detector facing a window or where it is exposed to or facing sunlight.
- Avoid locating the detector in areas which contain objects likely to produce a rapid change in temperature, such as central heating, ventilator, radiator, boiler, ducts etc.
- Avoid locating the detector in a position where it is subject to excessive vibration.
- Make sure the detection area is not obstructed by curtains, large furniture, ceiling fans or plants which etc which may block the pattern of coverage.
- Avoid installing 2 PIR detectors in one room protecting the same area.
- Like all Energy Eye wireless components, PIR should be less than 30 feet (10 meters) from Controller Unit.
- Optimal PIR detection range coverage: 16 feet wide, 10 feet high.
- PIR cannot be exposed to steam (example: do not install unit in bathrooms).
- When the battery is first connected to the PIR a 2~3 minutes period must be allowed for "Warming up."
- It is recommended that the PIR DOES NOT include the main entrance in its coverage pattern but in a position that still allows for it to detect movement as the occupant enters the room. It is important that the PIR is mounted so that it will ONLY see the movement of the occupant AFTER the entry door has been CLOSED.
- The IR sensor includes a special function to preserve battery life. Therefore, it is not expected to send an occupancy signal to the Controller unless it has NOT SEEN ANY MOVEMENT for AT LEAST 10 seconds.
- Avoid locating the sensor directly next to the room smoke detector so that it does not confuse the guest as to why two smoke detectors are mounted in the same proximity.

With the guidelines in mind you should be able to determine the optimal mounting location. Please refer to the images below as an example. Once you have determined the optimal location you can move on to section 5.2 MOUNTING WIRELESS PIR SENSOR (EEIR05).

Figure 18

4.4 Wireless Door Sensor Location (EEMT03)

Always follow these guidelines before mounting the EEMT03:

- It is recommended that the EEMT03 sensor be used for entry or front doors ONLY. When installing a balcony/window or lanai door sensor it is recommended to use the EEMT05. If there is any question or doubt please call Toll Free 1 866 463 3135 or International 001 858 202 0001 to speak with a knowledgeable technician.
- Sensor is mounted above or next to the door frame of the main entrance door. The umbilical cord leading to the remote magnetic reed should be positioned vertically to send the best signal transmission. Stretch out the cord for best transmission signal (please see Figure 20 below).
- If you have MORE THAN ONE entry way into the room (i.e. a front door plus a patio door that opens onto a beach) it will be necessary to use two sensors programmed as entry door positions. For back doors it is always recommended to use the EEMT05 Long Range sensor. Please see section 6.2, 6.4 or 6.5 below for Programming Door Sensors.
- If you have external widows you may use additional sensors as Window sensors to turn off the HVAC when left open inadvertently. For windows it is always recommended to use the EEMT05 sensor. Please see section 6.2, 6.4 or 6.5 for Programming Door Sensors as a Window sensor.
- Minimize gap as much as possible between magnet and remote magnetic reed. Magnet should have a gap of 0.4” to 1.2” from remote magnetic reed. When aligning the sensor line up the rectangular indentations to ensure correct alignment.

Figure 19

- Sensor should be mounted firmly to the wall using the supplied mounting kit. In certain circumstances it may not be possible to use anchors and screws (such as in a concrete construction) in which case it may be possible to use the recommended double-sided tape. ALWAYS try to secure the sensor with AT LEAST one mounting screw. Falling sensors may cause damage that will VOID your Limited Warranty.
- The sensor is vertically polarized and will receive the best range if mounted in a vertical up/down positioning. It is recommend to use this mounting position if possible however it is also possible to mount in a horizontal position if absolutely necessary (please see Figure 20 below).
- The transmitter will not operate properly on or near a metal surface. It is necessary to mount the sensor as far from possible to any metal surface such as the door frame. This is the purpose of the remote umbilical cord attached to the magnetic reed in order to keep the transmitter away from metal surfaces. It is recommended to keep at least 6" between the transmitter and metal surfaces.
- If you have a Lanai/Balcony Door or Window that you wish to control you may use an additional Door Sensor to turn off the HVAC upon door opening. It is ALWAYS recommended to use the EEMT05 sensor for this configuration.
- If possible, try to keep the transmitter away from extreme heat or cold as this can affect the battery life and performance.

With the guidelines in mind you should be able to determine the optimal mounting location. Please refer to the images below as an example. Once you have determined the optimal location you can move on to section 5.2 DOOR SENSOR MOUNTING (EEMT03).

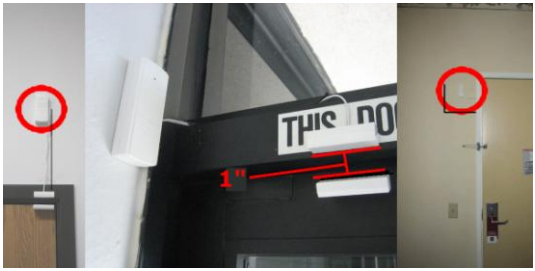


Figure 20 – MT03 Mounting Examples (Vertical)

Figure 21 – MT03 Front Door Mounting

Figure 22 - internal door reed

4.5 Wireless Door Sensor Location (EEMT05)

Always follow these guidelines before mounting the EEMT05:

- If mounting on the main entrance the MT05 sensor can mounted above or next to the door frame. Ideally the sensor should be mounted directly next to the door frame in order to keep the leads going to the reed as short as possible (see Figure 23 below). Unlike the MT03, the MT05 sensor will not be affected by altering the length of the leads or having them pass through metal will not decrease the sensors transmission range. This can allow you to use an internal type reed and magnet so that the reed is not visible on the outside (please see Figure 30 below).

Figure 23 – MT05 Mounting Example

- If may be possible to minimize the appearance of the sensor by mounting it up in the corner of the entrance and running the leads to the reed behind the wall or through raceway. Another alternative may be to hide the sensor in the false ceiling (if available). A final variation would be to hide the sensor in a closet next to the door (if available) and also run the wires behind the wall. Ultimately the sensor should be as hidden from view as possible.

- If mounting on a Lanai/Balcony Door or window it is recommended to mount the sensor above or next to the (aluminum) frame. It is advised NOT to mount the sensor directly on the aluminum frame as this will significantly reduce transmission range and performance. If it is possible to mount the sensor behind a curtain or window dressing this is recommended in order to minimize its appearance.

- If you have MORE THAN ONE entry way into the room (i.e. a front door plus a patio door that opens onto a beach) it will be necessary to use two sensors programmed as entry door positions. Please see section 6.2, 6.4 or 6.5 below for Programming Door Sensors.

- If you have a Lanai/Balcony Door or Window that you wish to control you may use an additional Door Sensor to turn off the HVAC upon door opening. It is ALWAYS recommended to use the EEMT05 Long Range sensor for this configuration.

- If you have external widows you may use additional sensors as Window sensors to turn off the HVAC when left open inadvertently. For windows it is always recommended to use the EEMT05 sensor. Please see section 6.2, 6.4 or 6.5 for Programming Door Sensors as a Window sensor.

- Because the EEMT05 sensor does not come with the reeds connected to the leads as a standard the installation configuration will depend on

which reeds have been supplied with your order. Please check the reed manufacturer's specification and recommendations before mounting. It is important to note the GAP distance requirements between the Reed and the Magnet.

- With the EEMT05 it is possible to connect more than one set of reed contacts to a single transmitter. Wire the contacts in series to form a "loop" circuit. If any one of the contacts are broken this will trigger an open door condition. It is not recommended to connect more than four (4) sets of contacts to one (1) sensor.
- Sensor should be mounted firmly to the wall using the supplied mounting kit. In certain circumstances it may not be possible to use anchors and screws (such as in a concrete construction) in which case it may be possible to use the recommended double-sided tape. ALWAYS try to secure the sensor with AT LEAST one mounting screw. Falling sensors may cause damage that will VOID your Limited Warranty.
- The sensor is vertically polarized and will receive the best range if mounted in a vertical up/down positioning. It is recommended using this mounting position ONLY (see Figure 23 above).
- The transmitter performance will be significantly decreased if mounted on or near a metal surface. It is recommended to keep at least 6" between the transmitter and metal surfaces (including aluminum).
- If possible, try to keep the transmitter away from extreme heat or cold as this can affect the battery life and performance.
- With the EEMT05 it is possible to extend the lead wires up to 100 meters (roughly 300 feet). This will not affect the transmission as the antenna is printed internally.

With the guidelines in mind you should be able to determine the optimal mounting location. Please refer to the images below as an example. Once you have determined the optimal location you can move on to section Mounting Wireless Door Sensor (EEMT05).

5.0 Installation Step 5 - Mount Wireless Sensors (EEIR02 and EEMT03)

5.1 Mounting Wireless PIR Sensor (EEIR02)

Using the supplied Ball Mount kit mount the sensor according to the guidelines listed in Section 4.1 of this User Guide.

1. Remove PIR sensor from its original packaging or container. Using the supplied anchors and screws mount the ball mount plate on the wall. If the wall is made from Concrete it may be necessary to use a specialized tool.
2. Once the plate is mounted to the wall, use the palm of your hand or a small hammer (being careful not to damage the plastic) to push the ball into place in the receiving socket.
3. Slide the PIR over the mount as shown below.

Mounting Diagram

Figure 24

5.2 Mounting Wireless PIR Sensor (EEIR05)

Use the supplied Mounting kit to mount the sensor according to the guidelines listed in Section 4.3 of this User Manual.

1. Remove PIR sensor from its original packaging or container. Use the supplied anchors and screws mount the base plate to the ceiling. If the ceiling is made from Concrete it may be necessary to use a specialized drill or tool.
2. You should always try to anchor the two (2) mounting screws into the ceiling to ensure that the sensor is securely mounted and will not fall. A falling sensor could damage the sensor or create a potential hazard for the room occupants. Energy Eye will not Warranty a sensor that has been damaged due to improper mounting and the resulting damage.

Figure 25

3. Once the plate is mounted to the ceiling and ready for sensor installation it will be necessary to insert the batteries and “learn” the sensor into the Controller (EERX/EERXS).

4. Please refer to Section 6.0 – *Installation Step 6* – Programming Wireless Sensors on page 48 in your Energy Eye Installation and Operations Manual in order to learn how to program the PIR sensor into the Controller (EERX/EERXS).

5. When the Controller is set to program the PIR sensor follow the instructions in Section 6.4 Programming the EEIR05 Passive Infrared (PIR) sensor (EXAMPLE).

5.3 Mounting Wireless Door Sensor (EEMT03)

Using the supplied mounting screws mount the sensor to the wall according to the guidelines listed in Section 4.4 of the User Guide**:**

1. Remove MT Sensor from its original packaging or container. Remove the battery cover plate to access the screw hole.

2. Determine the best mounting position being sure to follow the installation guidelines.

3. Using the supplied anchors and small screws mount the sensor to the wall. If the wall is made from concrete it may be necessary to use special mounting tools. It is advised to use the slotted “hanger” fitting on the back side of the sensor first. After the sensor is sitting on the hanging screw you can complete the mounting by securing the final screw through the hole located in the lower right hand corner near the battery cradle.

Figure 26

4. Remove the plastic cover plate of the Reed Sensor (located on the end of the umbilical cord) using your thumb and fingers or a flat head type screwdriver.

5. Mount the reed to the door frame using the supplied anchors and large screws. **BE CAREFUL NOT TO BREAK THE GLASS REED DURING MOUNTING.**

6. If there is additional cord this can be folded inside the reed as shown below, *HOWEVER it is ALWAYS RECOMMENDED to stretch the cord as long as possible since this will provide the BEST RADIO RECEPTION PERFORMANCE. CUTTING THE CORD WILL REDUCE WIRELESS RANGE.*

Figure 27

7. Replace the Reed Cover.

8. Remove the cover from the Magnet part using your fingers or a small flat head screwdriver.

9. Mount the magnet on the door within the specified mounting guidelines, so that it aligns properly with the Reed Sensor using the supplied anchors and small screws.

Mounting Diagram

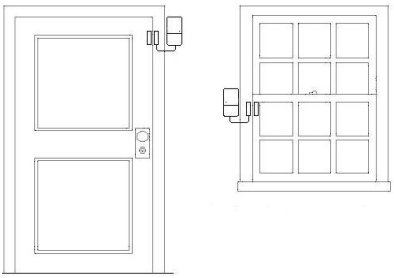


Figure 28

5.4 Mounting Wireless Door Sensor (EEMT05)

Using the supplied mounting screws mount the sensor to the wall according to the guidelines listed in Section 4.2 of the User Guide:

1. Remove MT05 Sensor from its original packaging or container. Remove the battery cover. Take note that the cover fits very securely. If you look you

will see a small cutout at the bottom of the sensor. Using a small coin it is easy to pry the cover upon by inserting the coin into the slot and making a twisting action on the coin.

Figure 29

2. Determine the best mounting position being sure to follow the installation guidelines in Section 4.4.

3. Depending on the type of reed and door configuration you will be installing on there are three alternate variations to prepare for mounting the reed.

   3.1. Internal type reed – It will be necessary to drill a small hole (depends on reed/magnet type, from approx. ¼" – 1") from the outside of the door frame to the inside of the door frame. The lead wires going to the reed will pass through the hole. Once the wires are passed through the hold the reed can be mounted in the door frame. This is explained after mounting the sensor.

Figure 30

   3.2. External type reed – The best position for the reed would be the most inconspicuous one. It is not necessary to drill any holes. We recommend that the sensor be as close to the reed as possible without touching the metal door frame in order to minimize any exposure of the lead wires. Please follow the specifications and guidelines for the specific reed part you are using when mounting.

Figure 31

3.3. Multiple reed circuit – It is possible to wire multiple reeds to one sensor. This would be used in the case that you are controlling a double-sliding balcony door or multiple windows from one sensor. Wire the reeds in series so that one end of circuit is connected to one of the MT05 leads and the other end of the circuit is connected to the other lead, forming a "loop." This way if any one of the contacts is broken it will trigger and open door or window status (Please see Figure 31 above).

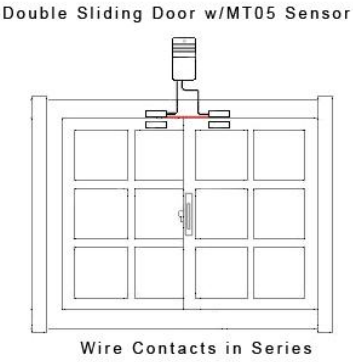


Figure 32 – Double sliding door with multiple contacts

4. Using the supplied anchors and small screws mount the sensor to the wall. If the wall is made from concrete it may be necessary to use special mounting tools. Mark the mounting points with a felt pen or pencil before drilling holes for the anchors. Once the anchors are inserted mount the sensor using the supplied screws through the mounting holes.

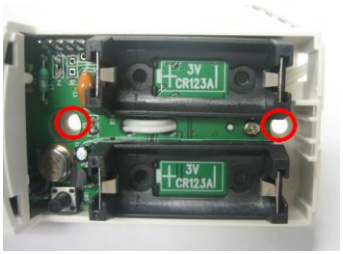


Figure 33

5. Once the sensor has been mounted and the leads are in their appropriate place it is time to mount the reed and connect the reed to the leads. Cut down the leads so that there is just enough wire to connect to the reed while the reed is in its final place. If the reed is a long distance from the sensor it may be necessary to extend the leads with additional wire. Please contact Energy Eye or your authorized Distributor if you need to obtain 24AWG wire for this purpose. Connecting the wire to the reed can be done using either Quick Connect type terminals or "butt splice" connectors. Mount the reed according to the manufacturers instructions supplied with that part. It is ALWAYS RECOMMENDED to use screws in addition to double sided tape. Energy Eye will not be liable for poorly mounted reeds or magnets which can result in undesired operation. **NOTE: The connection is very important as a poor connection will result in malfunctioning product.**

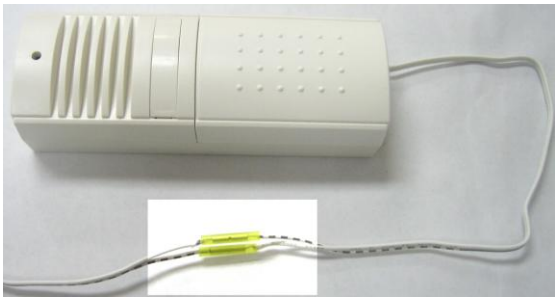


Figure 34

6.0 Installation Step 6 - Programming Wireless Sensors

Now that you have your Controller wired and your sensors mounted it is time to program their functions and positions into the Controller. *It is ALWAYS RECOMMENDED to mount the sensors temporarily with tape or other temporary adhesive before programming in order to ensure that they will have good radio reception in the final position.* Before programming sensor

positions make sure that the Controller is powered up indicated by the GREEN LED being illuminated.

AFTER PROGRAMMING SENSORS ALWAYS RESET THE ENERGY EYE CONTROLLER BY DEPRESSING THE AUTO/MANUAL BUTTON TWICE. THIS IS INDICATED BY THE GREEN LED ON THE FACE OF THE CONTROLLER GOING ON AND OFF.

1. Locate your Energy Eye Controller (EERX/EERXS). If the cover is in place please follow the steps above under Section 3.7.1 to remove the Energy Eye Controller Cover/faceplate. If the cover is already removed continue with programming.

2. During all sensor programming the Controller should be set to MANUAL MODE. This can be done by pressing the AUTO/MANUAL button once (see Controller Guide). This will be indicated by the GREEN LED on the face of the Controller turning OFF.

3. Sometimes there may be sensors "pre-learned" into the Controller while Quality Control (QC) testing during production. This would be indicated by an illuminated RED LED over positions S1~S6. If you notice that there are sensors learned in this must be erased before proceeding.

4. The procedure for ERASING a sensor is very easy. If in the future a sensor needs to be replaced it should be erased before the replacement is learned in. To erase a sensor from the Controller memory depress the RED TACT switch labeled ERASE and the GREY TACT switch under the position (S1~S6) you wish to erase simultaneously. This will be indicated by the RED LED over that position turning OFF.

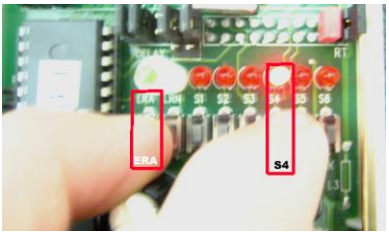


Figure 35

5. To learn in a sensor depress the BLACK TACT switch labeled LEARN and the GREY TACT switch over the sensor position (S1~S6) you wish to learn simultaneously. Each time you depress the GREY sensor position switch while holding down the LEARN switch simultaneously it will change which sensor type is being programmed.

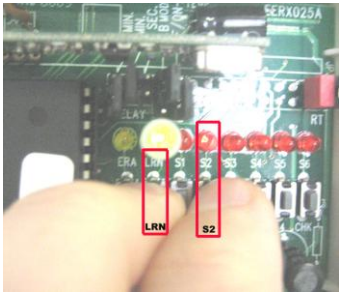


Figure 36

6. It is recommended to record which sensor (i.e. Main entry door sensor or PIR sensor) you learn into which position (S1~S6) so that you can reference this at a later date if you need to change transmitter batteries or replace a damaged sensor. See Table 4 below (Can be made in MS Excel or similar software program):

ROOM#	S1 – Front Door	S2 – Secondary Door	S3- Lanai Door	S4 –Main PIR	S5- Suite PIR 1	S6 – Suite PIR 2
307	X		X	X		
312 (suite)	X		X	X	X	

Table 4 – Sensor Installation Record

7. Each sensor position (S1~S6) can "memorize" ANY sensor type depending on how you set it up during programming. We recommend using the following sensor positions throughout your installation to keep uniformity (see Table 4):

   S1: Main Entry or Front Door Sensor
   S2: Secondary Entry Door, Back Door or Beach access point
   S3: Sliding glass, Lanai, or Window Sensor (0, 2, or 5 minute adjustable HVAC OFF delay when opened)
   S4: Main room PIR sensor
   S5: Second room PIR sensor
   S6: Third room PIR sensor

   Because each installation may require different configurations, please choose the sensor positions accordingly. For example, if you do not have a Secondary entry door leave positions S2 empty, or you may have only one entry point and 5 rooms, therefore requiring PIR sensors to occupy positions S2~S6.

8. The flashing cycle will indicate which sensor type is being programmed:

	FLASHING CYCLE	LED INDICATION
1	ONE FLASH, PAUSE = Main entry (Front) door	
2	TWO FLASHES, PAUSE = Balcony/Lanai/Window Sensor (0 min. OFF DELAY)	
3	THREE FLASHES, PAUSE = PIR Motion Sensor	
4	FOUR FLASHES, PAUSE = Balcony/Lanai/Window Sensor (5 min. OFF DELAY)	
5	FIVE FLASHES, PAUSE = Balcony/Lanai/Window Sensor (2 min. OFF DELAY)	

Table 5 – Sensor Type LED Indicator

9. Concurrently the programming procedure for each sensor is:

   Main Entry (Front or Back) door = Press and hold LEARN + (S1~S6) ONE TIME

   Balcony/Lanai/Window Sensor (0 min. OFF DELAY) = Press and hold LEARN + (S1~S6) TWO TIMES

   PIR Motion Sensor = Press and hold LEARN + (S1~S6) THREE TIMES

   Balcony/Lanai/Window Sensor (5 min. OFF DELAY) = Press and hold LEARN + (S1~S6) FOUR TIMES

   Balcony/Lanai/Window Sensor (2 min. OFF DELAY) = Press and hold LEARN + (S1~S6) FIVE TIMES

10. To change which type of sensor you are programming repeat step 5. Each time you depress the LEARN and Sensor Position buttons simultaneously the RED LED will change its flashing pace correspondingly, indicating which type of sensor it is trying to learn in.

6.1 Programming the Main Entry Door (Front door) sensor (EXAMPLE)

1. Depress the LEARN and S1 TACT buttons simultaneously. You will notice the RED LED above position S1 flashing quickly at regular intervals (ONE FLASH, PAUSE).
2. The Controller is now "looking" for the main entry door sensor. Test your CR2450 Coin Cell battery with a voltmeter or battery tester before installing to ensure that it has >3V power. If you have a pulse load tester use this to be certain you are using a new battery. Although every effort is made to ensure the highest quality batteries they can short or lose power during storage and transportation. *ANY BATTERY SHOWING LESS THAN 3V SHOULD BE DISCARDED AND REPLACED WITH A NEW PART.*
3. Go to the Main Entry door sensor and remove the battery cover. Insert the CR2450 Coin cell battery provided with your system into the battery cradle and replace the battery cover. *MAKE SPECIAL EFFORT TO INSERT THE BATTERY GENTLY AS IT MAY BE POSSIBLE TO DAMAGE THE BATTERY CRADLE OR SENSOR BY FORCING THE BATTERY.*
4. The sensor will have sent a "learning in" signal upon first power up and should now be programmed into position S1.
5. If you have difficulty with this method you may alternatively depress the small round BLACK button inside the door sensor. This will "force" a learning signal only.
6. Verify that the sensor is learned into place as indicated by a SOLID RED LED over position S1 on the Controller
7. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.6 TESTING YOUR SENSORS below.

6.2 Programming the Balcony/Lanai/Window Sensor for INSTANT OFF (EXAMPLE)

1. This sensor position should be used is for the BALCONY/LANAI/WINDOW WITH INSTANT OFF ONLY. Its function will not operate the entry/exit timers it will simply turn the HVAC OFF when the portal is opened and ON again upon closure.
2. Depress and hold the LEARN button while pressing the S3 TACT button TWO (2) TIMES, then release. You will notice the RED LED above position S3 flashing at regular intervals (TWO FLASHES, PAUSE).
3. The controller is now "looking" for a balcony/lanai/window sensor PROGRAMMED FOR INSTANT OFF. Test your CR2450 (EEMT03) or CR123A (EEMT05) battery(s) with a voltmeter or battery tester before installing to ensure that it has >3V power. If you have a pulse load tester use this to

be certain you are using a new battery. Although every effort is made to ensure the highest quality batteries they can short or lose power during storage and transportation.

4. Go to the BALCONY/LANAI/WINDOW door sensor and remove the battery cover. Insert the battery(s) provided with your system into the battery cradle and replace the battery cover.

5. The sensor will have sent a “learning in” signal upon first power up and should now be programmed into position S3. If you have difficulty with this method you may alternatively depress the small round BLACK button inside the sensor. This will “force” a learning signal only.

6. Verify that the sensor is learned into place as indicated by a SOLID RED LED over position S3 on the Controller

7. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.6 TESTING YOUR SENSORS below.

6.3 Programming the EEIR02 Passive Infrared (PIR) sensor (EXAMPLE)

1. Depress and hold the LEARN button while pressing the S4 TACT button THREE (3) TIMES, then release. You will notice the RED LED above position S4 flashing at regular intervals (THREE FLASHES, PAUSE).

2. The Controller is now “looking” for the PIR sensor. Test your CR123A Camera battery with a voltmeter or battery tester before installing to ensure that it has >3V power. If you have a pulse load tester use this to be certain you are using a new battery. Although every effort is made to ensure the highest quality batteries they can short or lose power during storage and transportation. *ANY BATTERY SHOWING LESS THAN 3V SHOULD BE DISCARDED AND REPLACED WITH A NEW PART.*

3. Go to the PIR sensor and remove the face cover. Insert the first CR123A camera type battery provided with your system into the battery cradle. Then insert the second CR123A battery into its cradle.

Figure 37

4. The sensor will have sent a “learning in” signal upon first power up and should now be programmed into position S4.

5. If you have difficulty with this method you may alternatively depress the small round BLACK button inside the sensor. This will “force” a learning signal only. Make sure you cover over the Infrared Sensor with a small coin or plastic cover or the sensor will not immediately transmit the learning code. Pay special attention not to touch this with your finger as static electricity may damage the part!!!!

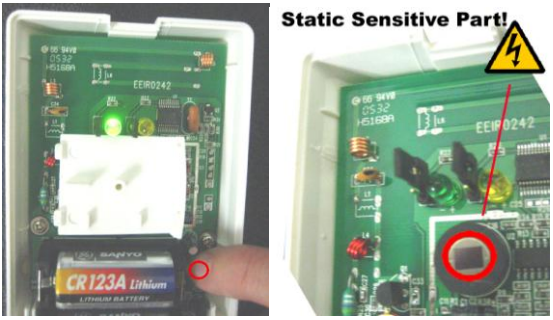


Figure 38

6. Verify that the sensor is learned into place as indicated by a SOLID RED LED over position S4 on the Controller.

7. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.7 TESTING YOUR SENSORS below.

8. After the sensor has been learned in, and the signal transmission has been verified you the two jumpers located inside the PIR MUST be un-bridged. Un-bridge the jumpers by removing them and replacing them onto the TOP PRONG in case you wish to keep the jumpers to test the sensor using the LED’s at a later time. This will turn OFF the LED indicators inside the PIR and drastically improve battery life (see Figure 39 below).

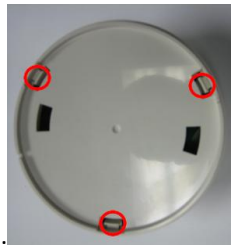
Figure 39

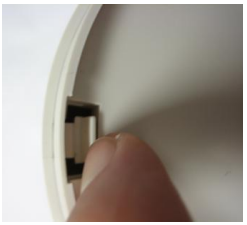
6.4 Programming the EEIR05 Passive Infrared (PIR) sensor (EXAMPLE)

1. Depress and hold the LEARN button while pressing the S4 TACT button THREE (3) TIMES, then release. You will notice the RED LED above position S4 flashing at regular intervals (THREE FLASHES, PAUSE).

2. The Controller is now "looking" for the PIR sensor. Test your CR123A Camera battery with a voltmeter or battery tester before installing to ensure that it has >3V power. Although every effort is made to ensure the highest quality batteries they can short or lose power during storage and transportation. *ANY BATTERY SHOWING LESS THAN 3V SHOULD BE DISCARDED AND REPLACED WITH A NEW PART.*

3. Go to the PIR sensor and remove the back plate. The back plate can be removed using your fingernail or a small flat head screwdriver. You will notice three (3) security prongs that hold the back plate in place, push this inward and remove the plate.

1. 

2. 

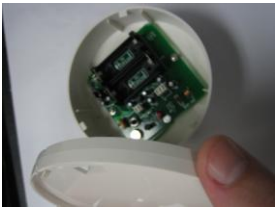
3. 

Figure 40

4. Insert the first CR123A camera type battery provided with your system into the battery cradle. Then insert the second CR123A battery into its cradle.

Figure 41

5. The sensor will have sent a “learning in” signal upon first power up and should now be programmed into position S4.

6. If you have difficulty with this method you may alternatively depress the small round BLACK button inside the sensor. This will “force” a learning signal only.

Figure 42

7. Verify that the sensor is learned into place as indicated by a SOLID RED LED over position S4 on the Controller.

8. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.7 TESTING YOUR SENSORS on page 58.

9. After the sensor has been learned in, and the signal transmission has been verified you the jumpers located inside the PIR MUST be programmed. By altering the jumper settings you will change the LED flashing patterns which greatly affects battery life. During jumper programming always ignore the 7 prongs on the far edge of the sensor.

    a. ECONOMICAL SETTING – This setting turns OFF all LED activity on the PIR. This setting will yield the longest battery life for the sensor. REMOVE THE JUMPER MARKED “P3” and make sure the 3 pronged jumper marked “P2” next to it is in the lower position (see Figure 43 below).

Figure 43

    b. SMOKE DETECTOR SETTING – This setting turns OFF LED activity for movement and transmission indication (YELLOW LED = MOVEMENT, GREEN LED = TRANMISSION), however FLASHES THE RED LED EVERY 85 SECONDS mimicking the

indicator common to smoke detectors. This will most closely resemble the action of a typical guestroom smoke detector. To activate this setting REMOVE THE JUMPER MARKED “P3” and make sure jumper “P2” is in the upper position (see Figure 44 below).

Figure 44

c. LED INDICATION (“TEST”) SETTING – This setting allows the LED’s to indicate movement and transmission. This is most commonly used for test purposes (YELLOW LED = MOVEMENT, GREEN LED = TRANMISSION). To activate this setting leave jumper position “P3” in place and make sure jumper “P2” is in the lower position (see Figure 45 below).

Figure 45

10. Once the sensor has been learned in and the proper jumper settings have been selected it will be necessary to attach the sensor to the base plate which you should have already mounted to the ceiling. Simply line up the two mounting points and turn counter clockwise to mount the sensor (see Figure 46 below).

Figure 46

11. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.7 TESTING YOUR SENSORS below.

6.5 Programming the Balcony/Lanai/Window Sensor for 5 MINUTE OFF DELAY (EXAMPLE)

1. This sensor position should be used is for the BALCONY/LANAI/WINDOW WITH FIVE MINUTE OFF DELAY ONLY. Its function will not operate the entry/exit timers it will simply turn the HVAC OFF after the portal has been open >5 minutes and ON again upon closure. This function is useful if there are many people coming in and out through the balcony often to prevent the HVAC turning on and off and disrupting the guest.
2. Depress and hold the LEARN button while pressing the S3 TACT button FOUR (4) TIMES, then release. You will notice the RED LED above position S3 flashing at regular intervals (FOUR FLASHES, PAUSE).
3. The controller is now "looking" for a balcony/lanai/window sensor PROGRAMMED FOR 5 MINUTE DELAY OFF. Test your Test your CR2450 (EEMT03) or CR123A (EEMT05) battery(s) with a voltmeter or battery tester before installing to ensure that it has >3V power. If you have a pulse load tester use this to be certain you are using a new battery. Although every effort is made to ensure the highest quality batteries they can short or lose power during storage and transportation.
4. Go to the BALCONY/LANAI/WINDOW door sensor and remove the battery cover. Insert the battery(s) provided with your system into the battery cradle and replace the battery cover.
5. The sensor will have sent a "learning in" signal upon first power up and should now be programmed into position S3. If you have difficulty with this method you may alternatively depress the small round BLACK button inside the sensor. This will "force" a learning signal only.
6. Verify that the sensor is learned into place as indicated by a SOLID RED LED over position S3 on the Controller
7. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.7 TESTING YOUR SENSORS below.

6.6 Programming the Balcony/Lanai/Window Sensor for 2 MINUTE OFF DELAY (EXAMPLE)

1. This sensor position should be used is for the BALCONY/LANAI/WINDOW WITH TWO MINUTE OFF DELAY ONLY. Its function will not operate the entry/exit timers it will simply turn the HVAC OFF after the portal has been open >2 minutes and ON again upon closure. This function is useful

if there are many people coming in and out through the balcony often to prevent the HVAC turning on and off and disrupting the guest.

2. Depress and hold the LEARN button while pressing the S3 TACT button FIVE (4) TIMES, then release. You will notice the RED LED above position S3 flashing at regular intervals (FIVE FLASHES, PAUSE).

3. The controller is now "looking" for a balcony/lanai/window sensor PROGRAMMED FOR 2 MINUTE DELAY OFF. Test your Test your CR2450 (EEMT03) or CR123A (EEMT05) battery(s) with a voltmeter or battery tester before installing to ensure that it has >3V power. If you have a pulse load tester use this to be certain you are using a new battery. Although every effort is made to ensure the highest quality batteries they can short or lose power during storage and transportation.

4. Go to the BALCONY/LANAI/WINDOW door sensor and remove the battery cover. Insert the battery(s) provided with your system into the battery cradle and replace the battery cover.

5. The sensor will have sent a "learning in" signal upon first power up and should now be programmed into position S3. If you have difficulty with this method you may alternatively depress the small round BLACK button inside the sensor. This will "force" a learning signal only.

6. Verify that the sensor is learned into place as indicated by a SOLID RED LED over position S3 on the Controller

7. Once the sensor has been learned in you will need to test the signal transmission. Please skip to section 6.7 TESTING YOUR SENSORS below.

6.7 Testing your sensors transmission signal

After you program each sensor you should test its transmission signal. This ensures that the sensor can properly send the transmission after it is mounted and that nothing is interfering with the radio transmission (such as a metal frame or a near by magnetic force). This is done using the YELLOW SIGNAL DECODE LED located on the Controller PCB (see Figures 7/8 - Controller Guide).

NOTE: YOU SHOULD TEST EVERY COMPONENET AFTER FINAL MOUTNING AND PROGRAMMING. THIS WILL ENSURE PROPER OPERATATION OF YOUR ENERGY EYE SYSTEM.

1. This step is most easily accomplished with two people so that one can watch the decode LED on the Controller while the other can activate the sensor from its final resting/installed position.

2. When testing sensors be sure to only activate ONE SENSOR AT A TIME so that you can be sure it was that sensor verifying transmission.

3. To check the sensor signal reception, activate the sensor. When the sensor is activated it will send the appropriate radio transmission to the Controller. The Controller will indicate a successful reception and "decode" of the signal as indicated by the YELLOW SIGNAL DECODE LED illuminating (see Figure 47 below).

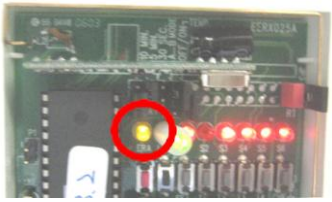


Figure 47

4. To activate the door sensor (EEMT03/05) and therefore send a radio transmission, simply separate the door magnet from the glass reed by opening the door. Shortly thereafter the YELLOW SIGNAL DECODE LED on the face of the Controller will illuminate to verify the transmission. The YELLOW LED will illuminate each time a signal is sent i.e. you will see it light up upon door opening, as well as door closing.

5. If you DO NOT see the LED light up upon activation you may need to adjust the sensor mounting. If you DO NOT see the LED light up upon BOTH door opening and closing this is sometimes related to a spacing issue with the magnet gap. Please see section "Troubleshooting" for further advice on either of these situations.

6. If you see the YELLOW LED illuminate after activating the sensor the transmission signal is verified. Repeat steps 4 and 5 with ALL DOOR SENSORS. Once all sensors are verified, installation of the door sensors will be COMPLETE.

7. To activate the PIR (EEIR02/05) you must stand completely still for at least ten (10) to fifteen (15) seconds. This will ensure that the battery preservation feature has reset and it will transmit a signal upon the next movement detection. After waiting move freely within the path of the sensor. This will activate the sensor to transmit an occupancy signal to the Controller, which will be indicated by the YELLOW LED illuminating. If you do not see this on the first attempt repeat the process but try to stand still for a longer period of time.

8. Alternatively the PIR transmission test can be conducted with the face cover removed. This method could be used to verify that the sensor is also sending the transmission. Test the sensor by placing a coin or small plastic cover over the IR sensor minding that it is a static electricity sensitive part DO NOT TOUCH this (please refer to diagram in Section 6.3

above). Wait for the YELLOW MOVEMENT DETECTION LED to extinguish and then **wait at least 10 full seconds**.

9. Remove the cover (or coin) placed over the IR sensor. You should see BOTH the YELLOW and GREEN LED's illuminate indicating both movement detection and signal transmission. Simultaneously you should see the YELLOW LED on the Controller illuminate indicated a successful signal reception. (**Please note** that if the jumpers have been already removed you will not see the LED's, replace the jumpers to complete this step if necessary).

Figure 48

10. If you DO NOT see the YELLOW DECODE LED illuminate on the Controller it means that it is not receiving the signals properly. Please see section "Troubleshooting" for further advice on either of these situations.

11. If you see the YELLOW LED illuminate after activating the sensor then transmission signal is verified. Repeat steps 7 through 9 with ALL REMAINING PIR SENSORS. Once all sensors are verified installation of the PIR sensors will be COMPLETE.

7.0 Installation Step 7 – Testing and Operation

7.1 Testing your installation setup

Once you have completely installed the Energy Eye Controller and all associated sensors we recommend conducting a simple test to verify the correct operation of your WEMS. You should conduct this test before leaving each installed location to verify correct operation of both the Energy Eye System and the HVAC.

AFTER SETTING JUMPER POSITIONS ALWAYS RESET THE ENERGY EYE CONTROLLER BY DEPRESSING THE AUTO/MANUAL BUTTON TWICE. THIS IS INDICATED BY THE GREEN LED ON THE FACE OF THE CONTROLLER GOING ON AND OFF.

1. Locate your Energy Eye Controller (EERX/EERXS). If the cover is in place please follow the steps above under Section 3.7.1 to remove the Energy Eye Controller Cover/faceplate. If the cover is already removed continue with programming. REMOVE the "RT" Jumper (see Controller Reference diagram) and set the "setback timer" to 30 Second "test" mode by removing either the 5 minute, 10 minute (or both) setback timer jumpers and replacing ONE jumper on the 30 Seconds position (see Controller Reference diagram).

2. Set the "ON/OFF" jumper to the "OFF" (lower) position (see Controller Reference diagram).

3. RESET your Energy Eye Controller by depressing the AUTO/MANUAL button two times as indicated by the GREEN LED going ON and OFF. Make sure the Controller is set to AUTO MODE, which will be indicated by a SOLID GREEN LED on the Controller.

4. Set the HVAC to AUTO FAN and Maximum Heat or Cooling (depending on outside environment, set to the opposite of the current climate conditions, i.e. if it is HOT outside set the HVAC to MAXIMUM COOL and vice versa).

5. Make sure you are detected by the wireless PIR sensors. Once you begin to move about you should hear the HVAC begin to operate and feel the airflow from the vents or ducting indicating that the system is operating in an OCCUPIED state. You can verify this using the GREEN LED on the face of the Controller. If the LED is lit solidly (ST1) this will confirm the Controller is in OCCUPIED mode (please refer to Table 7).

6. Go to the main entrance door. Make sure you are in a position that you are inside the room and able to audibly verify that the HVAC is operating but are still OUTSIDE the coverage pattern of the wireless PIR sensor, i.e. it cannot see your movement.

7. Open and Close the front door one time.

8. Wait AT LEAST 30 seconds from the time you closed the front or main entry door. Make certain that you are not detected by the PIR sensors. After the 30 second timer has expired you will hear the HVAC turn OFF. You can verify that the unit goes into the UNOCCUPIED state by checking that the GREEN LED on the face of the Controller is blinking (ST2) which will confirm the status (please refer to Table 6).

9. Walk into the room. As the wireless PIR sensors detect your movement you will hear the HVAC turn ON. You can verify this using the GREEN LED on the face of the Controller. If the LED is lit solidly (ST1) this will confirm the Controller is in OCCUPIED mode (please refer to Table 6). This has verified that the system is working properly. Alternately, or if you are

having difficulty with this test it may be advised to cover the PIR sensor before opening and closing the main entry door. A washcloth, small towel or equivalent is sufficient to perform this correctly. If you are conducting the test with the PIR covered it will be necessary to remove the covering before verifying that the PIR sensor is correctly operating and turning the HVAC ON.

10. Once you have conducted this test and the HVAC turns OFF and ON then you have verified the operation of your WEMS. If you cannot get the system to behave according to the test above please call Toll Free 1 866 463 3135 or International 001 858 202 0001 to speak with a knowledgeable technician. Alternately please see section "Troubleshooting."

11. REPLACE ALL JUMPERS TO THEIR PRE-TESTING CONFIGURATION (I.E. BE SURE TO REPLACE "RT" JUMPER ETC…). REPLACE THE COVER ON THE CONTROLLER AND RE-SET THE CONTROLLER BY DEPRESSING THE AUTO/MANUAL BUTTON TWO TIMES. WALK THROUGH THE ROOM TO ENSURE THAT THE PIR HAS DETECTED YOUR OCCUPANCY. ALWAYS BE SURE THAT THE SYSTEM IS SET TO AUTO MODE AND IS IN AN OCCUPIED STATUS AS INDICATED BY THE SOLIDLY LIGHTED GREEN LED ON THE CONTROLLER (ST1) BEFORE LEAVING THE ROOM (please refer to Table 6).

7.2 Operation

Once you have completely installed all components and finished testing of your WEMS it will be ready for operation and *energy savings*. Your Energy Eye System is designed with simplicity and ease of operation in mind. It will operate completely unattended and worry-free and requires very little routine maintenance. Pleas see Section 8 "Maintenance" for advice.

Because each unit is autonomous and operates AUTOMATICALLY using intelligent logic there is no need to divert precious staff hours to monitor or adjust the system. The energy savings will be evident as a reduction of KWh on your monthly Utility bill. For further advice on tracking energy usage please see Section 11 "Energy Reduction Advice."

7.3 LED Status Indication

Your Energy Eye V4.0 CPU has been programmed to indicate the system status using the GREEN LED indicator on the face of your Controller. This will help with operation and verification of system status for any troubleshooting needs. This will also help diagnose what the necessary course of action will be necessary if diagnosing a problem. Please use the following guide to understand which status your Controller is operating in.

The six unique flashing cycles of the GREEN LED will indicate which Status the Controller is currently in:

MODE	DEFINITION	LED INDICATION
ST1	SOLID GREEN = OCCUPIED Status, All Doors CLOSED, HVAC ON	
ST 2	ONE FLASH, PAUSE = UNOCCUPIED Status, All Doors CLOSED, HVAC ON (Over Setback Limits) or HVAC OFF (within Setback Limits)	
ST 3	TWO FLASHES, PAUSE = DOOR OPEN Status (Front Door OPEN >5 minutes or Balcony/Lanai/Window OPEN, Corresponding RED LED will flash simultaneously to indicate which sensor has fault)	
ST 4	THREE FLASHES, PAUSE = LOW BATTERY STATUS (Corresponding RED LED will flash simultaneously to indicate which sensor has low battery)	
ST 5	FOUR FLASHES, PAUSE = NON-COMMUNICATION, DEAD BATTERY or SENSOR DAMAGED/MISSING (Corresponding RED LED will flash simultaneously to indicate which sensor has fault)	
ST 6	FIVE FLASHES, PAUSE = TEMPERATURE IC FAULT (Static damage, needs power reset)	
ST 7	LED OFF = BYPASS OPERATION/MANUAL MODE	

Table 6 – LED Indicator Guide

8.0 Maintenance

8.1 Routine Maintenance Practices

Your Energy Eye System requires very little routine maintenance. We do however recommend following the guidelines below in order to MAXIMIZE the performance of your WEMS.

1. Please provide your housekeeping or maintenance staff with a maintenance record form to track use of the Energy Eye components. It is advised to create a regular procedure for the staff to follow after installing the Energy Eye System. We recommend regular (daily if possible) audits and a policy for the housekeeping and maintenance staff to have a basic understanding of the system so that they can be informed when servicing or battery replacement is necessary.
2. During the daily audits housekeeping or maintenance should check:
   2.2. Battery status indication
   2.3. Location and verification of all sensor placements
   2.4. Operation of HVAC
   2.5. DO NOT CHANGE THEIR CURRENT INSTRUCTIONS OR THERMOSTAT POLICY. IF IT IS YOUR ROUTINE TO ALWAYS TURN THE THERMOSTAT OFF BETWEEN CHECKOUTS, YOU SHOULD CONTINUE TO MAINTAIN THIS POLICY, THE ENERGY EYE WILL ADAPT ACCORDINGLY.
3. We find it is best to provide a check list, much as with other room items. The checks will be very simple and ANY housekeeping or maintenance personnel should easily conduct this. Please see the following example of an Energy Eye maintenance Checklist:

ROOM# Date:_____ Name:____	S1 – Front Door	S2- Lanai Door	S3 – Main PIR	GREEN LED	AUTO/ MANUAL	HVAC
307	X	X	X	X	AUTO	X
308	X	X	X	X	AUTO	NO AIR
309	X	X	MISSING	BLINKING ST2	MANUAL	X

Table 7 – Maintenance Checklist

4. At the end of the shift the housekeeping or maintenance should turn their list into the property manager, property engineer or whomever is responsible for such items. If an item is missing it should be replaced as quickly as possible to ensure continued energy savings. Please note that if

a sensor is damaged or missing the Controller will enter a bypass mode so that continued use of the room is possible. It is recommended to develop a policy so that room occupants are responsible for missing or damaged components at the end of their stay just like any other room accessory or item. If it is necessary to order replacement parts please note the part number and type and call Toll Free 1 866 463 3135 or International 001 858 202 0001 to speak to a sales representative.

5. All rooms with a missing component or a blinking LED should be investigated further by a trained maintenance staff. Please see section 8.2 for more information and advice.

6. As with all electronics be sure to keep the Energy Eye components clean and dry. It is recommended to use an aerosol dusting agent such as computer keyboard cleaner to keep dust off of the circuitry. A quick blast of the compressed air through the Controller case vents or around the component will remove any excess dust and remove moisture.

7. In the event of a power failure no additional maintenance should be required. The Energy Eye System is designed to automatically re-set itself and no new programming will be needed as the sensor and programming data will be stored in the EEPROM. The HVAC should be protected by its own surge protection and delayed restart logic.

8.2 Investigating a blinking GREEN LED

The GREEN STATUS LED will indicate any necessary maintenance to be performed. The LED has three status states:

LED ACTION	STATUS	EXPLANATION
ST1	OCCUPIED STATUS/ ALL DOORS CLOSED	The Energy Eye System is operating correctly, battery levels are acceptable and all components are in place. The room is occupied (should be the case if you are looking at the Controller inside the room) and all doors are closed.
ST2	UNOCCUPIED STATUS/ ALL DOORS CLOSED	The Energy Eye System is in Unoccupied mode and all doors are closed. This would be seen directly after a system reset and before an occupancy signal is detected. Once the system receives an occupancy signal it should revert to ST1. If the

		HVAC is operating and the unit gives this indication it would mean that the unit is operating in over or under temperature limit setback operation. If the unit does not reset to ST1 after receiving a occupancy signal this could indicate a problem with the PIR transmitter or the Controller. (Please see troubleshooting Section 9.0)
ST3	DOOR OPEN STATUS	This will indicate that a door has been left opened. This will be indicated after the front door has been left opened for >5 minutes or for the duration of the Occupancy Countdown timer (5/10/15/30 minutes). If a Window/Balcony/Lanai door has been left open this will be indicated after the OFF countdown timer has expired (0/2/5 minutes). If all doors are already closed this would indicate that a "door closed" signal may have been missed. It would be necessary to re-open and close all doors. The indicator should revert to ST1.
ST4	LOW BATTERY STATUS	Corresponding RED LED (S1~S6) will blink with the GREEN LED indicating which sensor has a low battery. Low Battery status will be indicated slightly prior to total power loss in order to change batteries without interrupting operation (SHOULD BE AROUND 2 WEEKS TIME). **Check the battery charge with a voltmeter or pulse load discharger prior to replacing batteries. (See Section 8.3 Battery Maintenance)**
ST5	NON-COMMUNICATION/DEAD BATTERY/SENSOR MISSING/SENSOR	Corresponding RED LED (S1~S6) will blink with the GREEN LED indicating which sensor has a fault. It may be possible that the sensor is not

	DAMAGED	communicating due to interference. You should activate the sensor, if interference has subsided and the Controller receives the signal it should revert to ST1. If the sensor is missing or damaged it should be replaced as soon as possible to avoid a loss in energy savings. A new sensor MUST ALWAYS be reprogrammed and the old sensor erased from memory. If the battery is dead the sensor will not react when activated and the LED will remain in ST5. **Check the battery charge with a voltmeter or pulse load discharger prior to replacing batteries. (See Section 8.3 Battery Maintenance)**
ST6	TEMPERATURE IC FAULT TEMPERATURE IC FAULT (cont…)	The digital thermistor has been damaged or is socked by static electricity. In this case the temperature setback operation would not work. It may also have been disconnected from the main PCB. If the thermistor is not disconnected the unit must be re-set by removing and replacing the 24V power supply.
OFF	BYPASS OPERATION/ MANUAL MODE	The Controller is set to Manual Mode and is not controlling the room temperatures during any occupancy state. If RED LEDs are also off this may indicate a loss of power.

Table 8 – LED Status Indication Chart

Please see Section 9 “Troubleshooting” to for further instructions on resolving an LED issue.

8.3 Battery Maintenance

The Energy Eye Systems comes with Specially Approved LiMn02 Batteries ONLY. Because of the nature of batteries it is important to take special precautions to ensure the proper operation of your components.

1. If you believe there is a LOW BATTERY status as indicated by the blinking GREEN LED and an associated blinking RED LED it is imperative to check the battery charge level before replacing the battery.

2. The battery level can be easily checked using a volt-meter, pulse discharge tester or equivalent. Simply remove the battery from the component in question and touch your voltmeter positive and negative probes to the corresponding terminals on the battery.

    a. On the CR123A type battery the button head end is POSITIVE and the flat end is NEGATIVE.
    b. On the CR2450 the flat top part with writing is POSITIVE and the rough bottom side is NEGATIVE.

3. The EEMT03 Sensors are designed to enter a LOW BATTERY status when the batteries drop **BELOW 2.2V**. If the batteries are below 2.3V they should be replaced. EEIR02, EEIR05 and EEMT05 sensors are designed to enter a LOW BATTERY status when the voltage drops **BELOW 2.4V**. If the batteries are below 2.5V they should be replaced.

4. The EEMT03 operates on a 3V circuit. As the battery level decreases the range (signal output power) will also decrease. In order to prevent undesirable operation such as non-communicating status, it is recommended to change the batteries on a regular schedule and within the expected operating limits.

4. Lithium batteries are more sensitive to heat and cold than regular alkaline. The provided batteries are capable of withstanding extreme temperatures however their lifespan will be reduced by unusually hot or cold environments. Although battery life can be calculated a number of different ways, the following chart will help to guide reasonable expectations. Acceptable operating life is expected to be 1~2 years under normal operating circumstances. Ambient elements and usage will affect the battery lifespan.

Part Number	Transmissions/Day	Operating Life (Worst/Best)
EEIR02	50-70	7-13 Months
EEIR05	50-70	7-13 Months
EEMT03	50-70	13-27 Months
EEMT05	50-70	7-10 Months

Table 9 – Battery Operating Life

NOTE: Because the nature of batteries is unpredictable they will NOT BE COVERED UNDER YOUR LIMITED WARRANTY. PLEASE READ YOUR WARRANTY IN FULL TO UNDERSTAND YOUR RIGHTS AND LIMITATIONS.

NOTE: Because the nature of batteries is unpredictable they will NOT BE COVERED UNDER YOUR LIMITED WARRANTY. PLEASE READ YOUR WARRANTY IN FULL TO UNDERSTAND YOUR RIGHTS AND LIMITATIONS. ***USE ONLY APPROVED BATTERIES FOR REPLACEMENT.***

TYPE	APPROVED BRANDS
CR123A	SANYO, TOSHIBA, ENERGIZER, RAYOVAC OR PANASONIC ONLY
CR2450	SONY, TOSHIBA, MAXELL OR PANASONIC ONLY

Table 10 – Approved Battery Brands

NOTE: NEVER THROW BATTERIES INTO THE TRASH. BATTERIES CONTAIN TOXIC CHEMICALS WHICH ARE HARMFUL TO THE ENVIRONMENT. PLEASE CONSULT YOUR WASTE MANAGEMENT COMPANY OR LOCAL/CITY WASTE COLLECTION SERVICE ABOUT HOW TO PROPERLY RECYCLE OR DISPOSE OF LITHIUM BATTERIES. STAPLES BRAND OFFICE SUPPLY STORES OFFER A FREE RECYCLING SERVICE. IF THAT SERVICE IS NOT LOCALLY AVAILABLE PLEASE RETURN YOUR USED BATTERIES TO ENERGY EYE, INC. FREIGHT PRE-PAID AND WE WILL DISPOSE OF THEM PROPERLY FOR YOU.

9.0 Troubleshooting

Although the Energy Eye System is designed to operate automatically and trouble free there are certain conditions that may cause unexpected or undesirable operation. Energy Eye has been designed with this in mind so that your operation will work seamlessly and smoothly in the event of a malfunction. The Controller will default into a “standby” mode which is similar to the Manual function. This means that the Controller is by-passed and the HVAC power will be defaulted as active. This will ensure that the room occupant is not disturbed by a non-operating HVAC, even in the event of a Controller failure.

If any of the solutions below do not solve your problem or the HVAC will not operate after applying the fixes please call Toll Free 1 866 463 3135 or International 001 858 202 0001 to speak with a knowledgeable technician.

AFTER APPLYING A TROUBLESHOOTING FIX ALWAYS RESET THE ENERGY EYE CONTROLLER REMOVING AND REPLACING THE LOW VOLTAGE POWER SOURCE. THIS CAN BE DONE BY RE-SETTING THE ROOM CIRCUIT BREAKER OR BY SIMPLY REMOVING AND REPLACING THE LOW VOLTAGE POWER INPUT AT THE "24V" TERMINAL BLOCK INPUT IN THE CONTROLLER. THIS WILL ENSURE THAT THE UNIT IS FULLY RE-SET.

9.1 Troubleshooting Installation Related Issues – Door Sensor (EEMT03)

1. When installing the door sensor it will not "learn-in" to the Controller when following the procedure, or, after learning in you do not see ANY YELLOW DECODE LED upon sensor activation:

	POTENTIAL PROBLEM	FIX
1	Sensor is out of range	Make sure that the transmitter is polarized correctly. It should be mounted in the vertical up down position.
2	Background interference (threshold) is to high/intense	Try to mount the sensor as high up as possible. Make sure that the "lead" going from the transmitter to the glass "reed" is stretched out as far as possible. This also serves as an antenna and will increase range.
3	**Sensor is experiencing frequency shift from metal objects.**	**Make sure sensor is not mounted on top of or directly near to metal objects (including aluminum). Move to alternate location if necessary.**
4	Sensor has only received "partial" learning code	If you are experiencing repeated problems learning in sensor in your location it may be necessary to learn in the sensor close to the Controller in order to ensure a clean "learning code." Remove sensor from mounted location, ERASE from memory position. Complete learning procedure with sensor in hand, near by to Controller. Confirm good transmission with YELLOW DECODE LED. Repeat if necessary.
5	Low or dead battery	Replace battery. Test to make sure new battery is >3V. (**See Section 8.3 Battery Maintenance).**
6	Sensor is damaged/ functioning improperly	Replace sensor.

Table 10

2. When installing the door sensor you do not see the YELLOW DECODE LED upon BOTH DOOR CLOSING and DOOR OPENING sensor activation:

	POTENTIAL PROBLEM	FIX
1	Sensor Reed and Magnet are improperly aligned.	Make sure that the reed and magnet are properly aligned so that sensor can properly perceive the “opened” or “closed” states.
2	Sensor Reed and Magnet have improper spacing.	Make sure that the magnet is not placed too far or too close to the reed. This will disrupt the sensors “open” or “closed” state.
3	Sensor has only received “partial” learning code.	If you are experiencing repeated problems learning in sensor in your location it may be necessary to learn in the sensor close to the Controller in order to ensure a clean “learning code.” Remove sensor from mounted location, ERASE from memory position. Complete learning procedure with sensor in hand, near by to Controller. Confirm good transmission with YELLOW Decode LED. Repeat if necessary.
4	Sensor is damaged/ functioning improperly.	Replace sensor.

Table 11

3. When programming the door sensor it can be accepted into a memory position (i.e. RED LED above sensor position is solid after completing programming procedure) but does not receive any YELLOW DECODE LED confirmation upon sensor activation:

	POTENTIAL PROBLEM	FIX
1	Sensor is not programmed as correct “TYPE.”	Make sure that if you are learning in a front/main entry door sensor the Controller is not set to “look” for a secondary/lanai door sensor or PIR sensor during programming. See Table 5 for various sensor programming LED indications.
2	Sensor is damaged/ functioning improperly.	Replace sensor.
3	Controller is damaged/ functioning improperly.	Replace Controller.

Table 12

9.2 Troubleshooting Installation Related Issues – Door Sensor (EEMT05)

Please refer to troubleshooting installation related issues for EEMT03. Additional scenarios specific to this sensor may be found as follows:

1. When installing the door sensor using multiple contacts (i.e. more than one reed is being used in series to control more than one door or multiple windows) the HVAC unit turns off when the contacts are opened but does not turn on when the contacts are closed:

	POTENTIAL PROBLEM	FIX
1	Contacts are not wired in series.	When installing multiple contacts they must be wired in series. If the contacts are wired in parallel (i.e. you wire in a second contact circuit as a "loop" across the poles of the first contact circuit) the circuit will break when one contact is opened but it will not close when the contacts are realigned.

Table 13

9.3 Troubleshooting Installation Related Issues – PIR Sensor (EEIR02)

1. When programming the PIR sensor the sensor will not learn into position:

	POTENTIAL PROBLEM	FIX
1	PIR sensor is not "covered" over and cannot "rest."	Make sure that the YELLOW LED on the face of the PIR is extinguished before attempting to send the learning signal. You need to be sure that the PIR lens is covered for at least 10 seconds so that the circuit can "rest."
2	Sensor is out of range.	Move the sensor closer to the Controller.
3	Background interference (threshold) is to high/intense.	Move the sensor as close as possible to the Controller. Make sure it is mounted as high as possible. Wait for interference to subside.
4	Sensor has only received "partial" learning code.	If you are experiencing repeated problems learning in sensor in your location it may be necessary to learn in the sensor close to the Controller in order to ensure a clean "learning

		code." Remove sensor from mounted location, ERASE from memory position. Complete learning procedure with sensor in hand, near by to Controller. Confirm good transmission with YELLOW Decode LED. Repeat if necessary.
5	Low or dead battery.	Check that the battery voltage is >3V. Change the battery if necessary. (**See Section 8.3 Battery Maintenance).**
6	Sensor is damaged/ functioning improperly.	Replace Sensor.

Table 14

2. When programming the PIR sensor it can be accepted into a memory position (i.e. RED LED above sensor position is solid after completing programming procedure) but does not receive any YELLOW DECODE LED confirmation upon sensor activation:

	POTENTIAL PROBLEM	FIX
1	Sensor is not programmed as correct "TYPE."	Make sure that if you are learning in a PIR sensor the Controller is not set to "look" for a main entry door sensor or a secondary/lanai door sensor during programming. (see Table 5)
2	Battery saving circuit appears as a sending fault.	For battery longevity the PIR circuit will not allow an "occupancy" transmission to be sent to the Controller unless the circuit has been "at rest" (i.e. the sensor will not send a signal unless it has been "at rest" for least 10 seconds).
3	Background interference (threshold) is to high/intense.	Move the sensor as close as possible to the Controller. Make sure it is mounted as high as possible. Wait for interference to subside.
4	Sensor has only received "partial" learning code.	If you are experiencing repeated problems learning in sensor in your location it may be necessary to learn in the sensor close to the Controller in order to ensure a clean "learning code." Remove sensor from mounted location, ERASE from memory position. Complete learning procedure with

		sensor in hand, near by to Controller. Confirm good transmission with YELLOW Decode LED. Repeat if necessary.
5	Low or dead battery.	Check that the battery voltage is >3V. Change the battery if necessary. (**See Section 8.3 Battery Maintenance).**
6	Sensor is damaged/ functioning improperly.	Replace sensor.
7	Controller is damaged/ functioning improperly.	Replace Controller.

Table 15

9.4 Troubleshooting Installation Related Issues – PIR Sensor (EEIR05)

Please refer to troubleshooting installation related issues for EEIR02.

9.5 Troubleshooting Installation Related Issues – Controller (EERX/EERXS)

1. Green LED will not light up on face of Controller:

	POTENTIAL PROBLEM	FIX
1	Incorrect power supplied to Controller.	Make sure that there is at least 13VDC supplied to the Controller and that all wiring is correct. Refer to the individual wiring supplement for your installation type.
2	Controller is damaged/ functioning improperly.	Replace Controller.
3	Take care not to break the LED when replacing or removing the Controller cover.	If LED broken, replace Controller.

Table 16

2. When first powering Controller up, RED LED's are already lighted on sensor positions (S1~S6):

	POTENTIAL PROBLEM	FIX
1	Sensors have been learned into the Controller during factory quality testing.	ERASE sensor positions and commence new sensor programming.

Table 17

3. When first powering Controller, GREEN LED and ONE RED LED are blinking (check Table 6 - LED Indicator Guide):

	POTENTIAL PROBLEM	FIX
1	Temperature IC has been faulted.	Indicated by ST6. RESET the Controller by removing and re-applying the power source.
2	Receiver cache is full.	RESET the Controller by removing and re-applying the power source.
3	Controller is damaged/ functioning improperly.	Replace Controller.

Table 18

4. When programming function modes or sensor positions with TACT switches, mode or function will not switch (i.e. cannot change sensor programming from Main Entry Door Sensor to PIR sensor) as indicated by varying pace of RED LED flashing:

	POTENTIAL PROBLEM	FIX
1	TACT switch is damaged.	Replace Controller.
2	Controller is damaged/ functioning improperly.	Replace Controller.

Table 19

5. Controller will not RESET using the AUTO/MANUAL button:

	POTENTIAL PROBLEM	FIX
1	CPU lock-up.	RESET the Controller by removing and re-applying the power source.
2	Unit is in Standby MODE due to a sensor fault.	Indicated by ST4/5/6. Solve fault at sensor by either replacing battery, activating sensor or

		replacing sensor. If ST6 RESET Controller by removing and re-applying the power source.
3	Controller is damaged/ functioning improperly.	Replace Controller.

Table 20

6. When first powering EERXS Controller the black cube relay on the Controller PCB is switching ON and OFF rapidly with no user input:

	POTENTIAL PROBLEM	FIX
1	Controller input current is not sufficient to hold relay.	If installing Controller on low voltage line input from thermostat and current is not enough to support both devices, inquire about a dry contact "motion sensor" input configuration in your Thermostats User documentation. If one is available, change to a dry contact configuration. You may need to draw power from a secondary or external power supply. Refer to "Installing with a dry contact and external power supply" in the HVAC Wiring Configuration supplement for your installation configuration.

Table 21

NOTE: This occurs most commonly when installing EERXS Controller in line with Digital Thermostat or off of PTHP Control board.

7. When installing the Controller the unit will RESET using the AUTO/MANUAL button as indicated by the GREEN LED turning on and off, however black cube relay on PCB does not switch and HVAC will not operate:

	POTENTIAL PROBLEM	FIX
1	CPU lock-up.	RESET the Controller by removing and re-applying the power source.
2	Insufficient current to operate relay.	See Troubleshooting # 6 above.
3	Relay is damaged/ functioning improperly.	Replace Controller.
4	Incorrect input voltage.	Check input voltage. Be sure it is within the specified ranges for your Controller type.
5	Controller is damaged/ functioning improperly.	Replace Controller.

Table 22

8. After installing for some time Controller becomes VERY HOT or ceases function:

	POTENTIAL PROBLEM	FIX
1	Incorrect input voltage.	Check input voltage. Be sure it is within the specified ranges for your Controller type

Table 23

9. After installing Controller does not function and NO LED's are lighted:

	POTENTIAL PROBLEM	FIX
1	Fuse has been burned out.	Replace fuse
2	Controller damaged/ functioning improperly.	Replace Controller

Table 24

9.4 Troubleshooting Operations Related Issues

1. HVAC will not turn OFF after leaving or exiting room:

	POTENTIAL PROBLEM	FIX
1	Main door sensor improperly installed/poor signal reception.	Adjust door sensor position. Follow recommendations for door sensor mounting. Wait for interference to subside.
2	Countdown timer not expired.	Adjust countdown timer to shorter duration. Wait for timer expiration.
3	Unit entering setback cooling/heating mode immediately.	Adjust to higher/lower setback limits. Wait for room to cool/ heat up.

Table 25

2. HVAC turns ON when entering room but turns OFF after setback timer countdown:

	POTENTIAL PROBLEM	FIX
1	PIR sensor improperly installed/poor signal reception.	Adjust PIR sensor position. PIR SHOULD NOT be facing the entry door. PIR must ONLY send occupancy signal after entry door has closed. Follow recommendations for PIR sensor mounting. Wait for interference to subside.
2	Setback timer too short.	Make sure setback timer NOT set to 30 seconds mode (i.e. must be set to 5/10/15 minutes during normal operations)

Table 26

3. Green LED Blinking (check LED indicator guide first in Section 7.3):

	POTENTIAL PROBLEM	FIX
1	Unoccupied Mode but room is occupied by guests. ST2 LED Indication.	Check PIR sensors to make sure they are communicating. Verify with YELLOW LED that the Controller is receiving a PIR signal. If the PIR IS receiving a signal and does not shift to OCCUPIED status RESET the unit by removing and re-applying the 24V power source. Verify PIR transmission again. If the unit STILL does not change after RESET then replace Controller.
2	Door OPEN, HVAC not operating. Missed Door closing signal. ST3 LED Indication.	Check to make sure ALL doors are closed. Close any open doors. LED indicator should revert to ST1 status. If all doors appear closed then open and close each door. Should revert to ST1 indication. If STILL not turning on check YELLOW LED to make sure Controller is receiving signal properly. If not check for low or dead battery **(see section 8.3 Battery Maintenance)**. If sensor is damaged replace sensor.
3	Low Battery. ST4 LED indication. (Corresponding RED LED will flash simultaneously to indicate which sensor has fault).	Change batteries (**see section 8.3 Battery Maintenance**).
4	Non-communication (interference), Dead Battery, or Sensor Damaged.ST5 LED Indication. (Corresponding RED LED will flash simultaneously to indicate which sensor has fault).	Activate Sensor and verify transmission with YELLOW LED indication to see if interference is preventing transmission. LED indicator should revert to ST1 status. If not check to make sure that sensor is not damaged or batteries are not missing. If batteries are still in the sensor check with a voltmeter or pulse load tester to make sure they are not dead (**see section 8.3 Battery Maintenance).** If batteries are not dead sensor may be damaged. Replace sensor.
5	Temperature IC Fault. ST6 LED Indication.	Reset Controller by removing and re-applying 24V power. Check IC connection to PCB.

Table 27

4. HVAC will not operate even if room is occupied:

	POTENTIAL PROBLEM	FIX
1	Background interference (threshold) is to high/intense, poor sensor reception.	Adjust PIR sensor position. Follow recommendations for PIR sensor mounting. Wait for interference to subside.
2	Power interruption to Controller.	Check that the Controller is powered and the GREEN LED is lighted. Restore power to Controller and/or HVAC system.
3	Controller is damaged/ functioning improperly.	Replace Controller.
4	Relay is damaged/ functioning improperly.	Test relay using AUTO/MANUAL button on controller. If HVAC does not activate in during MANUAL MODE operation replace relay.
5	HVAC needs maintenance.	Schedule HVAC service.

Table 28

10.0 Hotel Guest Relations

The Energy Eye System has been designed to interact as seamlessly as possible with your hotel operations. Because of its advanced logic operation and sensors we have tried to reduce the variables which would be noticeable to your guests as much as possible. Even with such advanced features, there are still limitations however which must be observed. With a few standard procedures in place your property should be able to deal with these scenarios as effortlessly as possible.

10.1 Hotel environmental awareness campaign and product information

1. Your property will be supplied with one GS “Guest Information Sticker” and one TT “Table Tent card” with every system that is purchased. These are to be placed in the guestroom as a simple explanation as to what the equipment the guest might see in the room is and a way to contact us directly. The GS should be placed at eye level on the sliding door glass if you are using external Window/Balcony or Lanai door sensors. This will inform the guests that their HVAC will turn off if they leave the doors open. If this sticker becomes missing or damaged please contact us as soon as possible to order replacements.

The TT should be placed on the nightstand, desk or in your guest information packet. Because these can get worn with use we recommend laminating the card or placing it in an acrylic stand to increase the usable life. If you find that this is missing or damaged please contact us as soon as possible to order replacements.

2. We recommend writing a brief and simple letter explaining environmental management and including it with the guest check-in materials. This can explain that your property is striving to decrease its environmental impact and may have several programs in place to assist this cause. It should include the fact that you have an automatic control system on the HVAC unit which may be controlled by doors and motion; however it does not need your constant motion in the room to keep it cool. The guest should behave as they normally would. It should also include any information about laundry or recycling programs and also emphasize that a guest should not change their normal habits they would practice while at home just because they are staying in a hotel, such as turning off lights or appliances when they leave the room.

3. If your property has a local television network or informational channel that is displayed when the guestroom televisions are first turned on we recommend displaying some type of page concerning environmental awareness. This can include similar information or graphics that would be included in the guest check-in letter in case they look over or do not read that.

   With these measures in place we have found that the numbers of front desk calls from curious guests are significantly reduced and also the satisfaction that the guest is participating in something "good for the environment" is also significantly increased. This helps the overall operation of the hotel and improves the guests' experience.

10.2 Hotel Staff training about Energy Management

Because your hotel staff are first responders to guests comments and concerns it is very important for them to have a basic understanding of the systems within your operation. This includes all products within the hotel from the television remote to the air conditioning and even the Energy Eye System.

Every effort and technology available has been put into the Energy Eye System in order to make it as seamless and integrated as possible within the guestroom. Even with all this, it is still possible however to have a guest interaction with the system. People are naturally curious when they see things they don't have at home or experience something different than their

expectation. Therefore we feel it is critical that staff understand what a typical guest question might be and how to respond. The following is a list of typical guest inquiries and answers your staff should be trained to know. We recommend issuing this list to all staff members which come in contact with the properties guests.

	QUESTION	ANSWER
1.	What is this device in my guestroom and is it a camera?	This is a PIR occupancy sensor. It works like a motion sensor in your home alarm system and informs the HVAC that you are in the room. It does not contain any cameras, nor does it report outside the room. It does not need to see you moving constantly, just the first time that you enter the room.
2.	My HVAC is OFF and it won't turn on, what do I do?	Check to make sure that all of your guestroom doors are closed. This system is equipped not to operate the AC with the doors open in order to conserve energy. If your doors are already closed please go and re-open and close them. There may be a slight delay for the system to turn on because of the AC compressor safety delay. This is normal for all AC systems.
3.	My room is too hot/cold. I think the HVAC is broken, what do I do?	Please check that the HVAC is running by setting the fan mode to ON. If the fan is on and the HVAC is running it is not broken. You have a system that controls the room temperature after you leave for the day and when you enter the room you will find that it may be warmer or cooler than when you left. This is a standard practice for hotels and our automatic system is an improvement over previous systems because it does not simply turn off your AC, it just sets it to a more economizing level. The room will heat or cool to your desired temperature within minutes and it will not change from your desired setting unless you leave through the front or back doors.
4.	I'm sleeping and I think my HVAC is broken. There is no cold/hot air coming from the unit, what do I do?	It is natural for your HVAC to turn OFF when the required temperature (set by the thermostat) is met. If you are too hot or cold you should adjust the thermostat to a different setting. In some cases if there is extremely hot or cold weather the units will stop working for

		some minutes as a self protection. This is normal for all AC systems and in a few minutes the system will begin to blow hot or cold air again. Also, please check to make sure that all your doors are closed and if necessary re-open and close them.
5.	I've tried everything that you've told me and I think my HVAC is broken, what can I do?	I apologize for the inconvenience. There may be a broken part in your room. We are sending engineering staff to inspect your room now to reset the systems.

Table 29

11.0 Energy Reduction Advice

The Energy Eye System is a vital component to controlling your energy usage and costs. Although it is a big part of your electricity consumption, controlling your HVAC usage is just one part of your total "energy footprint." There are numerous ways to help control other parts or your consumption such as water, gas and/or oil.

As a consumer or a business operation it is important to develop an overall "plan" towards energy reduction. This should include implementing multiple systems and practices aimed at lowering consumption. There are several resources dedicated to this and we highly recommend you to look through them in depth.

1. Energy Star® Program

The Energy Star program is recognized worldwide and is full of resources to help consumers and businesses reduce their overall energy usage. As an Energy Star Partner we highly recommend visiting their website to learn more information about energy saving tips and products.
Internet: www.energystar.gov

2. Green Hotels Association

The Green Hotels Association is a great resource for environmentally friendly products and tips. They publish a monthly newsletter that has great tips for hoteliers on ways to save resources and money as its members share

information and successes. As a Green Hotels Association Partner we highly recommend visiting their website to learn more information about energy saving tips and products.
Internet: www.greenhotels.com

Finally, we recommend you to keep track of your energy usages. A simple spreadsheet monitoring your month to month energy usages (KWh, Therm and/or Water consumption) can help you to track the performance or results of your energy saving plan. This information can be easily found on your Utility bills. This will help show you which measures are making the biggest impact on the environment and your bottom line.

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