



# ***SiteSage***

## Installation Guide

Last Update – March, 2018

## Installation Process: Quick Overview

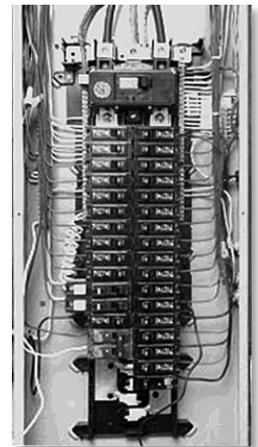
Please review the full *Installation Guide* before proceeding; this Overview provides basic steps for installing the SiteSage Gateway and Energy Monitor, but not the level of detail you will need to safely install these and other SiteSage components. **Installation should only be performed by a licensed electrician.**

**Step 3:** Plug in the SiteSage Gateway at a secure location within about 30 feet of the electric panels to be monitored, and connect it to the broadband Internet network in the facility. SiteSage can be connected either by Wi-Fi or via a wired Ethernet connection, as described in Section 2. Once the Gateway is connected to the Internet, the LINK light on the Gateway will turn solid green. When an Energy Monitor unit has been installed and registered and is seen by the Gateway, the DATA light will turn solid green as well.

**Step 2:** Turn off power to the circuit panel where the SiteSage Energy Monitor components are being installed and open the panel. Connect the black wire of the power cable to an empty (15A or 20A) breaker and the white wire to the neutral bar. Clamp the appropriate-size current transformer/sensors, first onto the incoming Main power lines (if they are being monitored), and then onto all branch circuits being monitored, recording each circuit's information on the Channel Setup Worksheet as you go.

1	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
3	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
5	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5

**Step 3:** Connect the other end of the sensors to the Channels (ports) on the SiteSage Energy Monitor "ePod" and "xPods", if any, as described in Section 3. Place the provided labels on the sensors and the wire near the Channel connections to keep track of which circuits have been connected to which SiteSage Monitor Channels. Connect the other end of the power cable to the SiteSage Monitor ePod and find a convenient space to mount the unit inside the panel. (Make sure the ePod is not powered up until all the xPods have been connected). You can then organize the wires with the provided wire ties. Close the circuit panel, turn power back on, and plug the SiteSage Gateway into an electrical outlet.



**Step 4:** Register and configure SiteSage online. Please go to <http://SiteSage.net/setup> and follow the on-screen instructions. This process can, but need not, be completed by the person who installed the unit, and will require completed Channel Setup Worksheets. **A Software License Key, which should be provided by the Authorized SiteSage Channel Partner, is also required for Registration.** After the Registration and Configuration process is completed it is possible to access the SiteSage Portal at [SiteSage.net](http://SiteSage.net). You are then able to configure the SiteSage Smart Thermostats. (See Section 4).

**NOTE:** In the case of 3-Phase power, it is best practice to install all sensors in the same direction, with the arrows FACING the breaker panel (or, in the case of 150A sensors, with the label facing AWAY from the panel). Please see Section 3.2 for further explanation.

# SiteSage Installation Guide

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## Important Safety Information

**NOTE: Installation should not be started until the qualified installer has read this entire Installation Guide.**

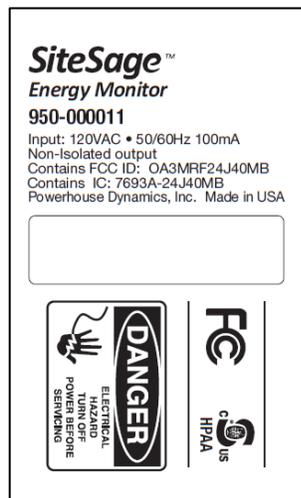
SiteSage can monitor all of the circuits in a facility independently, and therefore provide a detailed view of electricity usage. In order to do this, sensors need to be installed on circuit breakers inside the electrical panels. The installation is very straightforward and every effort has been made to provide for the safe, secure installation of the SiteSage components. However, the installation of SiteSage Energy Monitor units requires the cover of the electrical circuit breaker panels to be removed.



**When this is done, there is the potential hazard of shock, burn, or even electrocution.**

Even when the Main Circuit Breaker has been turned to the “OFF” position, there may still be areas within the circuit breaker panel that are electrified, or “hot”. **Installation should be performed by a licensed electrician only.**

SiteSage is suitable for installation with 120/240V single-phase 60Hz service as well as 3-phase 208v or 480v service normally found in North America. It is not suitable for 230V 50Hz service commonly found in other regions of the world. (This version of SiteSage also does not support 346/600V service still in use in parts of Canada).

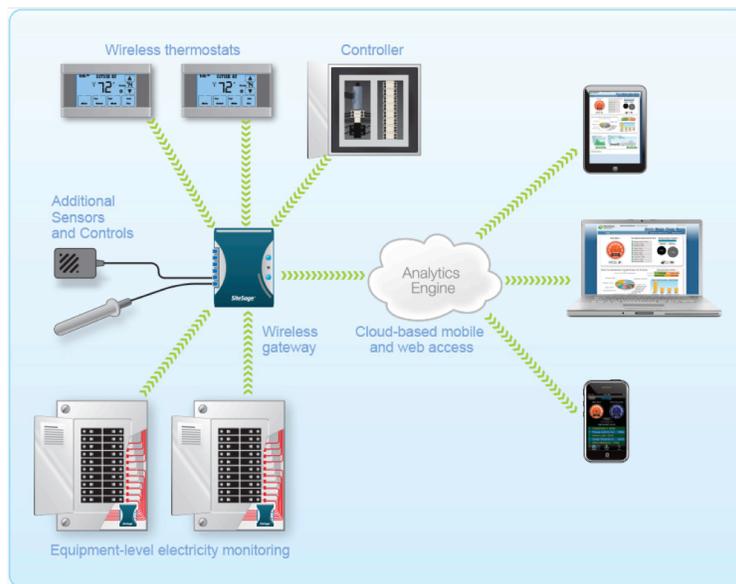


All wiring in the United States must be installed in accordance with the latest adopted edition of the National Electrical Code (ANSI/NFPA 70, NEC) and state or local requirements. All wiring in Canada must be installed in accordance with the latest adopted edition of the Canadian Electrical Code (CSA C22.2 CEC, Part I) and any provincial or local requirements.

A typical installation of a SiteSage Energy Monitor with 25 channels should take approximately one hour.

# 1. Introduction to SiteSage

SiteSage™ is an *Enterprise Energy and Asset Management System* that combines controls, monitoring, diagnostics, and alerts designed to reduce energy costs and enhance operational efficiencies across multiple small commercial facilities. Hardware components will vary from location to location depending upon both the physical layout and the roles that the system is intended to play. This Installation Guide addresses the hardware components most likely to be included. Additional documentation may be required if other components are being added.



The SiteSage *Energy Monitors* and *Smart Thermostats* connect wirelessly to the SiteSage *Gateway*, which in turn connects to the broadband infrastructure in the facility. This document covers the tasks of connecting the Gateway, installing the Energy Monitors, and configuring the system as a whole and the Energy Monitors and Smart Thermostats specifically. Instructions for installing the Smart Thermostats are included with the specific thermostats purchased.

## 2. Setting up the SiteSage Gateway

The core of the system is the *SiteSage Gateway*. All other SiteSage hardware components connect to the Gateway, either wired or wirelessly. The Gateway then connects to the broadband infrastructure in the facility, either via Ethernet or Wi-Fi, and provides the connection to the *SiteSage Portal*. It uploads data on a minute by minute basis and brings back new settings or commands. It is a small device (5.25" x 3.25" x 1.5") that can be mounted on the wall or placed on a table, ideally within about 30 feet of the electric panels it is connecting to. Multiple Gateways may be required, either because of distance constraints or device number constraints. (A single Gateway can connect to at most 10 electric panels).

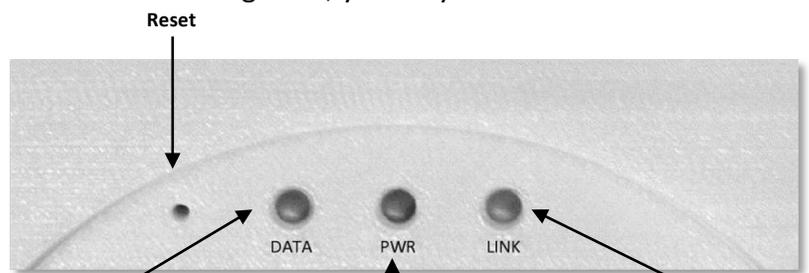
Best practice is to install the Gateway first, although that is not a requirement.

**NOTE:** The Gateway connects all of the SiteSage components to the Internet. If the Gateway gets unplugged, the SiteSage Energy Monitors, Smart Thermostats, and other sensors will no longer upload data (although they will collect and store the data – in the case of energy data for up to 20 days - and the SiteSage controls will no longer accept settings changes. *To ensure uninterrupted operation please make sure to install the Gateway in a place where it is not likely to be accidentally unplugged.* Please note that the system cannot be registered until the Gateway is connected to the Internet.

### 2.1 Installing the SiteSage Gateway

Physically installing SiteSage Gateway is extremely simple. You can hang it on the wall with the brackets provided, or place it on a table. Find a location within approximately 30 feet of the electric panel(s) in which you will be installing SiteSage Energy Monitors, and near a 120 volt power outlet. Attach the Power Supply to the Gateway and plug it in to the wall outlet. **NOTE:** If there are multiple electric panels that are not close together, you may need additional Gateways.

There are 3 LED status lights on the Gateway. When the Gateway powers on, the middle one, marked **PWR**, should show solid green, indicating that the Gateway is drawing power. The other LED's will flash 3 times,



**DATA.** Turns solid green once at least 1 SiteSage is successfully communicating

**PWR.** Stays solid green when Gateway is powered

**LINK.** Stays solid green when Gateway is connected to Internet

pause, and then go solid for about 2 seconds. If the Gateway has been configured with Wi-Fi, the LEDs should flash green. If it was configured for Ethernet, they flash red. (If you do a factory reset, as described later, the final flash will be orange). Subsequently, the LED on the left, marked **DATA**, will turn red for 2 seconds when a SiteSage Energy Monitor or Controller (described in a separate document) is trying to pair with the Gateway. SiteSage will not be able to successfully communicate until the Gateway has been connected to the Internet<sup>1</sup>.

**NOTE:** *You cannot pair a Gateway with a SiteSage Energy Monitor until it is connected to the Internet. When a Gateway is activated and connected to the Internet, any unpaired but configured SiteSage Monitors in range should find it and try to pair with it. If there are multiple Gateways, a Monitor will try to connect to the one with the best signal. (If it ever resets or loses communications it will again look for the best signal when it comes back on-line). You can force an assignment to a different Gateway (on the Settings/Channels page on the SiteSage Portal), but that is not recommended.*

## 2.2 Connecting to the Internet

The SiteSage Gateway is designed to transmit data in near-real time over the Internet to the SiteSage Servers, where data is analyzed and presented on the SiteSage Portal (described in the SiteSage User Manual, which is accessible on-line via the Support link of the SiteSage Portal. *Please see Appendix C for system network requirements.*

The Gateway connects to a network in one of 2 ways; hard-wired Ethernet or Wi-Fi. Currently the Gateway needs to be pre-configured for one or the other, although it is possible to change the configuration remotely as long as the Gateway is connected. (Future versions of the Gateway will support Ethernet and Wi-Fi simultaneously). If you have multiple Gateways, it is possible to use Ethernet with some and Wi-Fi on others. *Please note that SiteSage needs Internet access only, and should be installed outside the firewall.*

If you are using Ethernet, simply connect the Gateway's Ethernet port to an Ethernet connection using a standard Ethernet cable. (If there are no Ethernet ports near the Gateway, you can use a power line bridge). This is all you need to do unless a static IP address or proxy server is required for the facility, as described below. In that case, follow the instructions under Step 2.

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<sup>1</sup> The Gateway also has 6 ports marked A1-A3 (analog ports) and D1-D3 (digital ports). These are for connecting other sensors and devices, such as temperature sensors and water meters. Appendix D describes current support for temperature sensors.

Many corporate networks will have security settings that do not easily allow systems to be added to the network, so it may be necessary to have the system pre-provisioned, by providing the Gateway's MAC address to the corporate network support group in advance. (Please see Appendix C for more information on network provisioning).

Alternatively, the SiteSage Gateway includes a Wi-Fi radio. If Wi-Fi is being used as the connection method, follow the instructions below. (If you are not sure which connection method was specified, check the Gateway; it should have a Wi-Fi or Ethernet label).

If you need to change a Gateway from Ethernet to Wi-Fi, or vice versa, contact SiteSage Support (support@sitesage.net). As long as the Gateway can be connected to the Internet, new firmware can be downloaded to change the connection method. (When new connection firmware is downloaded you will be disconnected from the Internet and need to re-connect using the newly downloaded protocol).

Please note that using a public Wi-Fi network is not recommended. Often these systems will have certain restrictions that may make it difficult to keep SiteSage connected at all times. Also, SiteSage has no way to acknowledge acceptance of terms. Wi-Fi networks may also require pre-provisioning, as described in Appendix C.

## STEP 1 (Wi-Fi only)

When the Gateway turns on, it will create its own (ad hoc) Wi-Fi network. When the ad hoc mode is established, the LINK light will alternatively flash red/green for 5 seconds. Using a PC, Mac, iPhone, or other device that connects to Wi-Fi networks<sup>2</sup>, follow the standard process for identifying nearby networks. (Note: there does not need to be a Wi-Fi network in the facility to see the Gateway's ad hoc network).

Find the network with a name like eMonGatwy-xxxxx (these are the last 6 digits of the MAC address of the Gateway, which can be found on the Gateway label), and connect to it. If your computer displays an "unsecured network" message, click **"Connect Anyway"** and continue connecting to the Gateway. If the connection was successful, **Connected to eMonGatwy-xxxxxx** will be displayed.



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<sup>2</sup> Android no longer supports a native connection to ad hoc networks. You may be able to download a utility that will let you connect. There may also be issues with Windows 8.1 and again utilities are available.

If you were unable to connect to the Gateway, try the process again. If you still cannot find the network, do a (hard) factory reset of the Gateway (as described on Page 10) and try again.

## STEP 2 (Wi-Fi; Ethernet for Proxy Server and Static Address)

Enter the address <http://169.254.1.1/netcfg.htm> in a browser window. The page shown to the right which is part of the SiteSage Embedded Web Server, will load. Press **Configure** and the page will change to let you set your configuration parameters.

*If you are using DHCP, where an IP address is automatically selected, select **Automatically** as the configuration method. You will see a list of available wireless networks displayed in the window. Click on the facility's Wi-Fi network to select it. If the network is password protected, enter the Password. Click **Apply Network Settings** and the Gateway will be connected to the network. It may take 30 seconds or more for the **LINK** light to turn green to signify that it is connected, so please be patient.*

Home Energy **Network** Log Sensors Z-Wave Therm

You can view the status of your SiteSage Gateway's network connection.

To configure the network connection, click 'Configure'. If you have wireless networks. Simply click a wireless network to select it, and if address, select to configure 'Manually' then fill in the fields that apply.

To complete your connection (either Wireless or Ethernet) click 'Apply'.

### Network Status

Connection Type:	Wireless
Connected To:	SiteSage-116256
WiFi MAC:	001EC0116256
Configured:	Automatically
IP Address:	169.254.1.1
Subnet Mask:	255.255.0.0
Default Gateway:	169.254.1.1
DNS 1:	169.254.1.1
DNS 2:	0.0.0.0

Use Proxy Server:

The Gateway supports SSLv3 encrypted connections supporting encryption. When configuring for use with Proxy Servers please consult manual.

SSLv3 Encryption: Disabled

MiWi Channel: 15

Host: pushdev.emonitor.us

**Configure**

### Network Status

Connection Type: **Wireless**

Connected To: eMonGateway-CA57

Connect To:

- PHDnet
- PHD-1-guest
- MeasuredProgress
- guest
- Newton Photonics
- NETGEAR
- hedgehog

Rescan

Specify other network...

Configured: **Automatically**

Please enter your passphrase

OK Cancel

### Network Status

Connection Type: **Wireless**

Connected To: eMonGateway-CA57

Connect To:

- PHDnet
- PHD-1-guest
- guest
- BSWR5
- MeasuredProgress
- Newton Photonics
- NETGEAR
- NgR
- hedgehog

Rescan

Specify other network...

Configured: **Automatically**

If you need to attach via a Proxy Server, enter the server address and port on the Configuration page.

If you want to view or change the settings for any reason, or simply get back to the Embedded Web Server, you must first determine the Gateway's IP address. If you have already registered the system, log into the SiteSage Portal and go to *Settings/Channels*. You will see a link called *Gateway Assignment*. Follow that link and you will see the current IP address of the Gateway. If you have not yet registered and configured this location (but the account has already been

### Network Status

Connection Type: **Wireless**

Connected To: eMonGatwy-04CC4B

WiFi MAC: 001EC004CC4B

Connect To:

- PHDnet
- Newton Photonics
- HP ProCurve
- franchise
- NETGEAR
- NgR
- skittles

Rescan

Specify other network...

Configured: **Automatically**

Use Proxy Server:

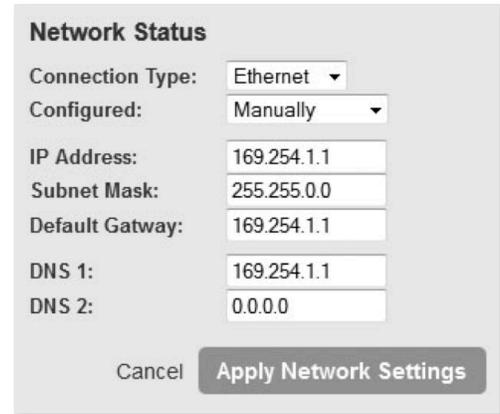
Proxy Server

Proxy Server Addr: 172.124.7.8

Proxy Server Port: 3128

established), go to [Sitesage.net/setup](http://Sitesage.net/setup), log in, and enter the Gateway's Serial # (found on the back of the Gateway), which will return the then current IP address. (Registration and Configuration is described in Section 5). At any time you can also find the IP address by looking at the router's list of DHCP entries (using the MAC address of the Gateway that is on the label).

*If you want to use a static IP address, select Manual for the configuration method. (It will default to Automatic). You will be asked for the Static IP Address, Subnet Mask, Default Gateway and DNS1 and DNS2 (optional). Then hit **Apply Network Settings**.*



Network Status	
Connection Type:	Ethernet
Configured:	Manually
IP Address:	169.254.1.1
Subnet Mask:	255.255.0.0
Default Gateway:	169.254.1.1
DNS 1:	169.254.1.1
DNS 2:	0.0.0.0
Cancel <b>Apply Network Settings</b>	

***If you have connected via Ethernet and want to set a static IP address or connect to a proxy server,*** connect your laptop to the Gateway's Ethernet port and enter the address <http://169.254.1.1> in your browser. (Make sure to disable any cellular or Wi-Fi networks on your laptop). You will see the same screens you see here, with Ethernet as the Connection type. Follow the instructions above to set a static IP address or connect to a Proxy Server. If you set a static address, you can reconnect to the Gateway at a later date by entering that address directly.

When the Gateway successfully connects to the facility network, the **LINK** light will turn and remain solid green, other than a flash of orange once per minute as data is transmitted. (If you see solid orange for about 10 seconds that means the Gateway is downloading new firmware; both the **LINK** and **DATA** lights will flash red while the firmware is being loaded). Unpaired but registered SiteSage Energy Monitors will immediately attempt to connect to the Gateway and upload data; both the **DATA** and **LINK** lights on the Gateway will show solid orange for a couple of seconds. (This will be repeated whenever data is uploaded or downloaded). When a SiteSage Energy Monitor has successfully paired with the Gateway, the **DATA** light will turn solid green. If you installed the Gateway first, as described here, the DATA light will not do anything until a SiteSage Energy Monitor unit has been installed and configured.

If there is an error in the setup process, or the network connection fails for any reason, the **LINK** light will not turn green. This may happen because you did not enter the security password correctly, or if the connection was momentarily lost. If it becomes clear that the Gateway is not connected to the internet, you will need to repeat the steps starting from STEP 1.

To do this, you will first need **to do a hard (factory) reset of the Gateway. Press *Reset*.** (Use a paper clip and pull it out quickly). The **DATA** and **LINK** LEDs will flash 5 times, and then turn solid for 2 seconds. **Press *Reset* again (quickly) while the light is solid** and the Gateway should

reset to its factory settings. The LEDs will display orange for about 2 seconds when the **factory reset** is successful.

### **STEP 3**

When the SiteSage Gateway Internet connection is completed successfully, make sure your computer has re-connected to the facility network if you are going to be using it to register the system. If it hasn't, go back to your network connections screen to re-connect to the network.

Once the Gateway has successfully been connected to the Internet and Energy Monitor units have been installed and configured, if the **DATA** light is not solid green, it has not successfully paired with any SiteSage Energy Monitors. Try moving the Gateway closer to electric panel. If that does not work, try power cycling the SiteSage Energy Monitor, by flipping the breaker for the circuit that powers it. If that does not work, try power cycling the Gateway (which will then need to be reconnected to the Internet). If neither of these works, please contact SiteSage support.

### 3. Installing a SiteSage Energy Monitor

The *SiteSage Energy Monitor* is designed to capture data on electrical usage of potentially all the circuits inside a facility. It consists of a set of sensors, known as Current Transformers (CTs) and a set of small components, referred to as “Pods”, to which the sensors are attached. Each installation of the SiteSage Energy Monitor will have 1 *electricity Pod (ePod)*, which can accommodate up to 15 CTs and communicates wirelessly with the Gateway. It may have 1 or more *expansion Pods (xPods)*, which are needed if more than 15 circuits are monitored in a single panel. There is no physical limit to the number of electrical panels that can be monitored

The Energy Monitor is intended to be mounted inside a circuit panel, which must be a UL or equivalent listed electrical distribution box. The *ePod* is designed to monitor Mains (power coming in from the utility grid) and up to 12 branch circuits. It communicates via wireless RF radio (not Wi-Fi) to the SiteSage Gateway.

*xPods* can each monitor 10 additional circuits. Up to 3 *xPods* (which are daisy-chained together and are connected by cable to the *ePod*) can be added, allowing the system to monitor up to 45 circuits per panel, which is perhaps the most common commercial electric panel size.

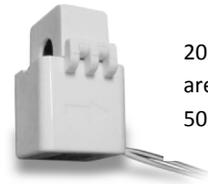
The (split core) *Current Transformers* clamp on to the breaker wires. A sensor needs to be clamped around the wire coming out of the breaker for each circuit being monitored. NOTE: Sensors are clamped around the **insulated portion** of the wire, NOT on bare wires. When the sensor is clamped securely (you should hear a click), it will generally be loose around the wire. On Main Electric Panels, two or three (in the case of 3-Phase power) sensors are used to monitor power coming in through the Mains. The remaining sensors are used to monitor individual (branch) circuits.

On the side of the *ePod* and the *xPods* are ports, or “**Channels**”, for connecting the sensors. The channels are numbered 0-14 on the *ePod* and 1-10 on each *xPod*. The sensors are provided as paired sets which connect to double channels (with the exception of a single port that can be used, along with a double port, to monitor 3-phase Mains). The sensors have red labels (for right or even) and green labels (for odd circuits) to help you keep track of which circuit has been attached to which Channel. *Please note that these markings have nothing to do with the left and right sides of the electric panels.*

The number and types of sensors depends on the system configuration. As an example, a SiteSage M-25 is delivered with:



- Six 50-Amp (black) sensors (3 pairs) for 208-Volt, 240-Volt or 480-Volt double pole or triple pole breakers.
- Sixteen 20-Amp sensors (8 pairs) used for monitoring single, 120-Volt or 277-Volt circuits, as well as double and triple pole breakers in some cases.



20A CTs  
are white;  
50A black

**For double or triple pole breakers, you must use the same size sensor on each breaker.**

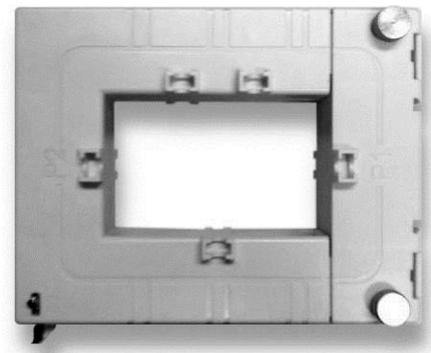
Monitoring 3-Phase Mains requires two 150-Amp spring loaded sensors (connected together), and one single 150-Amp sensor. (NOTE: As described below, at times each leg of a 3-phase circuit will have multiple wires that will each requires a sensor. Generally, installers should be provided with extra 150A sensors as part of a *Just-in-Case* kit to address situations that were not identified in advance, in order to be able to avoid a return visit).



150A CT

If you end up with more of one type of sensor than you need and not enough of another, you may use the extra 50-Amp sensors on smaller circuits and vice versa, although they may not measure as accurately. (20-Amp CTs should measure accurately for up to a 30-Amp breaker; 50-Amp CTs should provide good results for breaker sizes between 30A and 90A). For certain larger loads you may need 150-Amp rather than the smaller CTs. **As described later, it is particularly important in this case to identify the size of the sensors that you use on each circuit on your Channel Setup Worksheet.** An Authorized SiteSage Channel Partner can provide additional sensors in the sizes required.

In some cases, 150-Amp CTs may be too small for the Mains, or may not be able to be installed given the way the Mains are configured. To address these situations, 300-Amp, 600-Amp or 1,000-Amp bus-bar CTs can be ordered. In other cases, you may have multiple smaller wires feeding into each phase. In this case you can install CTs on each of 2 wires feeding the circuit. You will need to make sure the worksheet reflects this configuration, which will also need to be reflected in the channel configuration portion of the registration process.



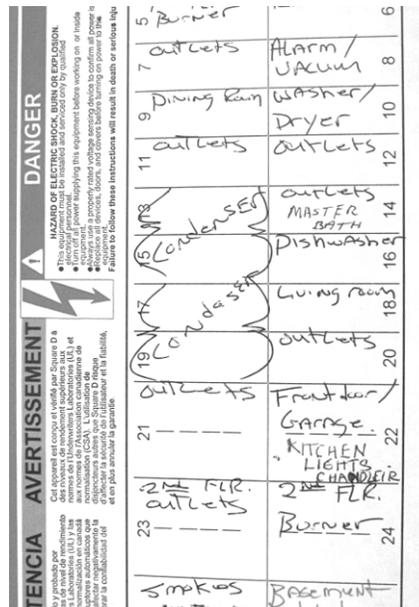
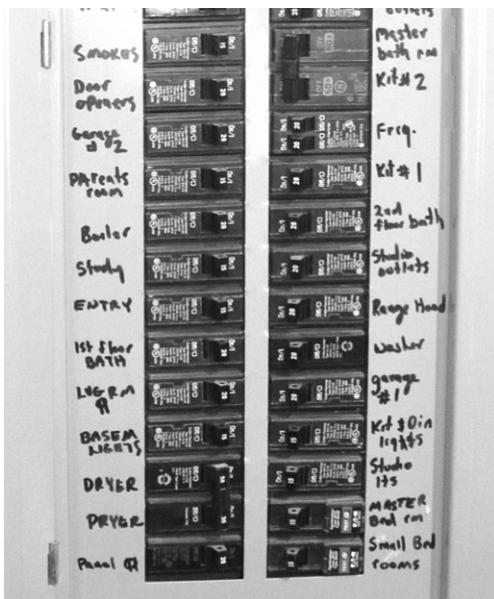
Optional Bus-Bar CT

Some commercial facilities have complex electrical installations with an Electrical Distribution Center and multiple Main Panels. There are too many possible permutations of installation configurations to describe here, but the basic installation process will generally be the same.

### 3.1 Channel Setup Worksheet

It is extremely important to accurately record which circuits are connected to which SiteSage Channels, using the Channel Setup Worksheet included with each SiteSage Monitor unit.

(Note: there are usually labels associated with most if not all of the breakers, either on the inside door of the panel or on the breakers themselves, but in some cases, labels will be incorrect or missing. Since it is extremely important to know what is on the circuits being monitored, before physically installing the SiteSage components it is suggested that the labels on each circuit breaker be verified if at all possible. (Once SiteSage is installed and configured it is possible to use the system to help identify miss-labeled circuits)).



The **Channel Setup Worksheet** should be filled out by the installer as the sensors are being attached.

The form is divided into two sections. The upper section asks for general information; specifically the following:

- Location address
- Serial # of the Energy Monitor (ePod) being installed, along with the Serial # of the Gateway you are connecting it to. (The first 5 digits will be pre-filled)
- A description of the Circuit Panel to which the Energy Monitor is attached (e.g. “Main Panel”)

**SiteSage Energy Monitor: Channel Setup Worksheet**

Page 1 of 2

Installation Address: 1 BRIDGE ST, NEWTON, MA

Monitored Panel: MAIN PANEL  
(Descriptive name, e.g.: Kitchen Panel)

Energy Monitor Serial # (ePod): EM2A1 123456 13 F7

Gateway Serial #: EG1A1 50763 1034

Monitor Powered by Breaker #: 21

Computed Mains?

If you can't connect CTs to the Mains, SiteSage will estimate Mains by summing branch circuits.

Phase: 3  Wye  Delta  Single

Voltage:  208  480  240  120

- Whether the electrical service is 3-Phase “Wye” configuration, 3-Phase “Delta” configuration<sup>3</sup>, or single phase. For 3 Phase please indicate whether it is 480V, 208V or 240V service
- The number of the breaker used to power the Energy Monitor ePod
- An indication of whether SiteSage should “compute” the Main Power by adding all branch circuits, which should only be checked when the Mains cannot be measured. (This only needs to be checked once per location; not for every electric panel).

The next section has information on the breakers and circuits, as well as the Channels that they are connected to. Page 1 allows you to enter information on up to 25 circuits. If you are installing a SiteSage M-45 unit, you enter the remaining information on Page 2. In this section of the Worksheet, please:

- Record the Breaker Number as it appears on the electrical panel<sup>4</sup>
- Enter the rated size of the circuit breaker, measured in amps
- Indicate if 2 wires are being monitored on this individual breaker, with 2 CTs
- Check if it is a single, double pole or triple pole breaker
- Enter the Circuit Label as it appears on the panel - or as most appropriate. (If there are multiple labels that are the same, such as RTU or Walk-in Freezer, add some

<sup>3</sup> 3-Phase Delta configurations generally have no neutral wires and have a different voltage than the Wye (Y) configuration, which is much more common in smaller facilities. Because the voltages can vary across the phases, SiteSage may be slightly less accurate in a Delta configuration. **It is not recommended to install SiteSage with Delta High Leg B or Corner Grounded configurations.**

<sup>4</sup> Please make sure you correctly link the circuit with the Channel you connect the CT to. Generally, double and triple pole breakers should connect to neighboring Channels, but if you need to connect them to Channels that are not adjacent, make sure you reflect that on the Worksheet; you might want to draw a line that connects those channels. Similarly, if you need to use 2 channels for a single phase of a 3-phase breaker (i.e. putting CTs on 2 wires for each pole), make sure the Worksheet shows that breaker number twice with the same label.

differentiation, even if it is as simple as RTU1, RTU2 etc. The system will automatically append different numbers if you do not)

Breaker				Breaker Config.			Circuit Label	SiteSage Sensors and Channels			
#	Size (A)	Wires	2	1	2	3		CT/Sensor Size Check box or specify Other	Monitor Channel	#	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAINS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0 Best used for Mains
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAINS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 Best used for Mains
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAINS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2 Best used for Mains
<input checked="" type="checkbox"/>	30	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ROOFTOP UNIT 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
<input checked="" type="checkbox"/>	30	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ROOFTOP UNIT 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	50	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ROOFTOP UNIT 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
<input checked="" type="checkbox"/>	70	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ROOFTOP UNIT 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6
<input checked="" type="checkbox"/>	90	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ROOFTOP UNIT 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7
<input checked="" type="checkbox"/>	110	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ROOFTOP UNIT 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8
<input checked="" type="checkbox"/>	130	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OUTDOOR LIGHTS 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9

Note: Green CTs on odd channels; Red on even

- Check the size of the sensor you used on the circuit. As described earlier, generally place 20-Amp sensors on 120-Volt or 277-Volt single pole circuits and 50-Amp sensors on 240-Volt or 480-Volt double pole circuits, but this may not always be the case given the size of the breaker, or possible given your supply of sensors. In the case of any circuit, if you used a CT larger than 20, 50, or 150-Amps, indicate the size of the CT you installed.

There is also a “Notes” field on the second page to identify anything unusual.

**Please note that the Worksheet is organized by SiteSage Energy Monitor Channel number,** starting with Channel 0. If you attach sensors to circuits in order, starting with the Mains (which are best connected to Channels 0, 1, and 2) and continuing with circuits 1 then 3 etc., it should be very straightforward to enter the information. (For panels with odd circuit numbers on the left and even on the right, it makes sense to work down the left side of the panel first and then go to the right side). If you cannot or do not follow this order, please be very careful that you list the correct circuit that you connect to each Channel.

There are multiple copies of the Worksheet included, in case you make a mistake or want to generate a neater copy. **If you are not the person who will be entering this information online during the registration and configuration process, please make sure the information is neat and legible to someone else.** Once the Worksheet is used for the Configuration part of registration, a copy should be kept by the Authorized SiteSage Channel Partner for support

purposes. **We cannot overemphasize the importance of this Worksheet;** unless it is accurate, SiteSage will be unable to deliver its full benefit.

**NOTE:** Best practice is to plan out the circuit-to-channel mapping before installing the SiteSage Monitor components, and fill out all or portions of the Worksheets in advance. In some cases this may have been done by Powerhouse Dynamics or a SiteSage Authorized Channel Partner. *It is also best practice to put the supplied labels on the sensors, identifying what channel they have been attached to, as well as on the wires near the channel connectors on SiteSage ePods and xPods.* This will make it much easier if there is ever a need to change connections or replace a component.

## 3.2 Installing the SiteSage Energy Monitor Components

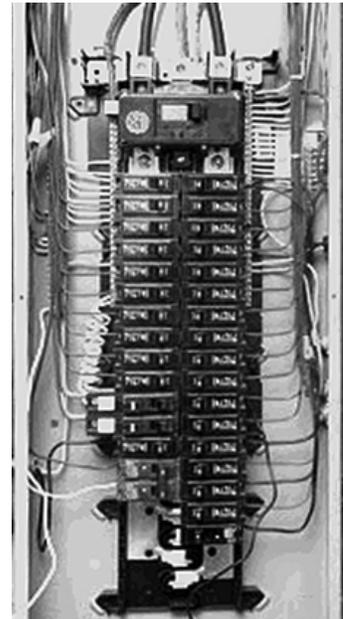
The following steps involve opening the circuit breaker panel and installing the sensors. It is extremely dangerous for an untrained person to attempt this installation since high voltage is always present in the panel. Injury or death could result from improper usage.

### 3.2.1 Preparing the Electrical Panel



**WARNING** – only a licensed electrician should undertake this and all subsequent installation steps, based on local codes.

1. Turn off power to the panel you are installing
2. Remove the cover from breaker panel.
3. Decide where you will mount the SiteSage ePod and xPods. Typically there will be room at the bottom or sides of the panel; make sure you can install with the Channels facing out, so that you can connect the sensors.



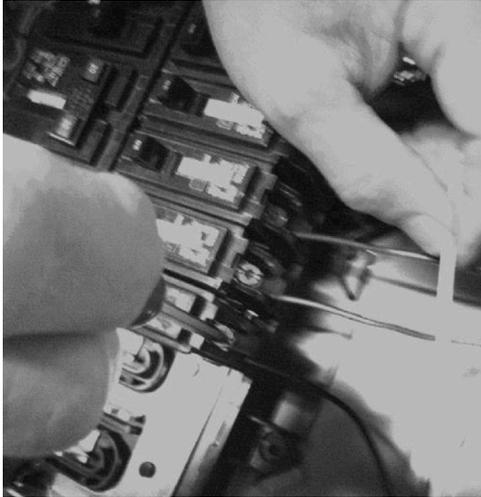
### 3.2.2 Connecting the Power Cable

SiteSage is designed to be powered by a 15A or 20A breaker. It will probably be easier to install the Power Cable before you connect all of the sensors. However, **do not** power up the Energy Monitor ePod until all of the xPods have been fully installed and connected.

The Power Cable has black and white wires. Find an unused breaker, loosen the screw slightly, slip the *black* wire under the washer that sits under the screw, and then tighten the screw so

the wire is held firmly. The *white* wire needs to be attached to the Neutral Bar. Find an empty screw, loosen it, slide the white wire underneath, and tighten the screw.

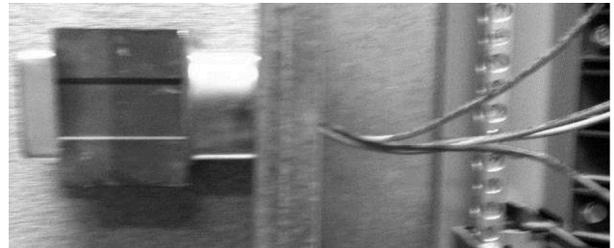
NOTE: In many locations, the Electrical Code does not allow doubling up on a breaker or the Neutral Bar.



### Dealing with 480-Volt Power

The SiteSage Energy Monitor runs off 120-Volt power. If the electric panel in which you are installing SiteSage has 480-Volt power, you need a small transformer (available from an Authorized SiteSage Channel Partner), which converts 277V to 120V.

The transformer is mounted outside the circuit panel. Use a knockout hole or drill a hole in the panel to bring the 4 wires into the Panel. Attach the (orange) wire labelled 120V to the black wire of the ePod Power cable, and use a wire nut to cover and tighten the connection.

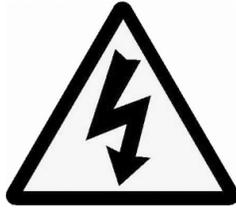


Insert the wire labelled 277V (yellow and orange) into a selected breaker.

Finally, attach the two yellow wires labelled Common and the white wire of SiteSage power cable to the Neutral Bar.

### 3.2.3 Sensor (CT) Installation

Unpack and unwind all of the sensor wires.



### Installing Sensors on the Mains



If the electrical service is single phase, you will be installing 2 sensors on the Mains; if it is 3-Phase, use 3 sensors.

If you are able to use the 150-Amp sensors, open the first of the twin spring-loaded sensors by firmly pressing the lever on the side, and place the open jaws around the insulated area of one of the incoming power lines, above where it connects to the panel. **NOTE: In the case of 3-Phase power, best practice is to install all sensors facing the same direction.** Most of the CTs have arrows; the

150-Amp sensors, however, do not. In this case, the label plays the role of an arrow, and should face **away** from the breaker panel. Thus, for example, if the 150A CTs are installed on breakers coming into the panel from above, as in the example to the left, the label should be visible at the top. If the sensors are attached to the left of the panel, the labels should be on the right; if installed to the right of the panel, they should be to the right.

**WARNING – even with the main breaker “off” these lines will still have power to them and electrocution could result from touching the electrified areas. Make sure to avoid the mounting screws as shown on the picture below.**

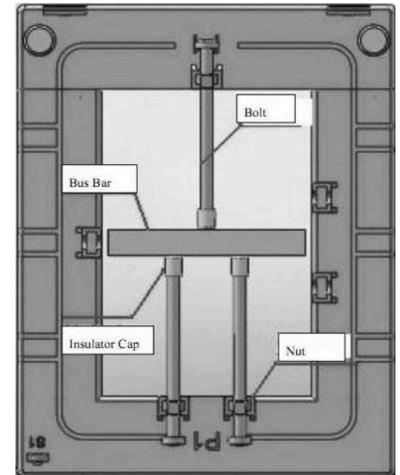


Once the jaws are around the power wire, simply let go of the lever and the sensor “ring” will close around the wire. It’s normal for the sensor to slide down the wire and rest close to the mounting screws.

Repeat this step for installing the second 150-Amp sensor around the second incoming power line. For 3-Phase power, take the individual 150-Amp CT and attach it to the 3rd incoming power line, as shown above.

It is best to connect these sensors to the SiteSage ePod now (as described below), but you can wait until you have installed all of the branch circuits as long as you have set up a way to identify which circuit is connected to which Channel. It is best to use the supplied labels. Place the one showing the Channel it is attached to on the sensor itself, and the one showing the 2 Channel pairs on the wire near the double Channels.

If you need the larger CTs, they attach a bit differently. There are large screws you can easily remove by hand; pull the CT apart, place around the circuit or on the bus-bar, and then close and reattach the screws. The illustration to the right shows the installation on a bus bar. These CTs have arrows.



**NOTE:** You can monitor more than one set of Mains on a single panel, or Mains coming out of a distribution panel going to multiple panels. You can obtain additional CTs of any supported size to accommodate additional Mains. To ensure that these CTs face the right direction in the case of 3-Phase power, connect the provided Black Wire to the terminal of the CT marked S1 terminal. Connect the White Wire to the S2 terminal. *With these CTs, the side marked P1 should face the breaker panel.*

### **Installing Branch Circuit Sensors**

With the main breaker still “off”, start installing the smaller sensors on each of the branch circuits to be monitored. *Please pay close attention to when to use a 50-Amp or 20-Amp sensor, as described below.* Start with the 12 circuits that will be attached to the SiteSage ePod. When you have attached the sensors to the circuits and associated Channels, you can begin installing the sensors that will be attached to the xPod(s).

***For 3-Phase panels, install these sensors with the arrows facing the breakers.*** For simplicity, for sensors installed on the left side of a panel, the closing clasp should be on top. For sensors installed on the right hand side of a panel, the closing clasp should be in back.

### **120V Circuits**

Many of the circuit breakers in the panel will be single pole 120-Volt breakers – or 277-Volt breakers in the case of 480-Volt panels. Use one 20A sensor for each of these.

### **208V/480v circuits**

Generally, use 50A sensors on double pole 208V or 480V breakers – but make sure to use the same size for both poles.

1	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
3	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
5	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
7	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ROOFTOP UNIT 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

On the Worksheet, please enter **both** circuit (breaker) numbers for a 208 or 480-Volt circuit, on sequential rows.

For 3-Phase circuits, use 3 sensors (or 6 if you need to put sensors on 2 wires for each phase); you can use 20A, 50A or 150A on each pole, depending upon the size of the breaker. You must use the same size CT on each pole.

To install these sensors:

1. Open the sensor, squeezing the top (round part) and bottom of the sensor together to relieve pressure on the latch, and then use your fingernail to disengage the latch. Do not use a screwdriver or try to pry the latch open, since that could break the latch. Once the pressure is relieved on the sensor it should be easy to open.
2. Place the open clamp around the insulated wire coming into the circuit breaker.
3. Close the sensor by pressing on the locking tab; you should hear a distinctive click; this will confirm that the sensor is properly closed.



Double pole circuit (208V, 480V)

- Use two 50-Amp sensors



Single pole circuit (120V, 277V)

- Use one 20-Amp sensor



Try to orient the sensors so that their cables are out of the way as much as possible, and so that the sensor wires are pointing to the sides of the panel.

The sensors may need to be staggered – alternating one closer to the breaker and one farther away – in order to fit neatly in the breaker panel. This will often be the case when installing sensors in narrow breaker panels.

Fill out the Channel Setup Worksheet as you install each sensor.

**NOTE: The best practice to follow to avoid later configuration problems is to install sensors in an ordered and sequential manner.** For example, with downward facing Mains, attach the left most wire to Channel 0, the middle wire to Channel 1, and the right hand wire to Channel 2. Then, for the most common panel type, start working your way down the left breaker column, attaching breaker 1 to Channel 3, breaker 3 to Channel 4, breaker 5 to channel 5, etc. (skipping any breakers not being monitored). When you are finished with the left column continue with the top of the right column (which generally starts with breaker 2), and work your way down.

### 3.2.4 Optional PV Solar/Wind Turbine (or Other Generating Device) Monitoring

If the associated Software License includes renewables monitoring, SiteSage can also be used to measure the power produced from an electricity-generating unit, such as a solar PV system or a wind turbine. Any type of power generation brought into the electrical panel can be monitored. (For non-renewable energy sources, such as a back-up generator, you do not need to purchase the renewables license).

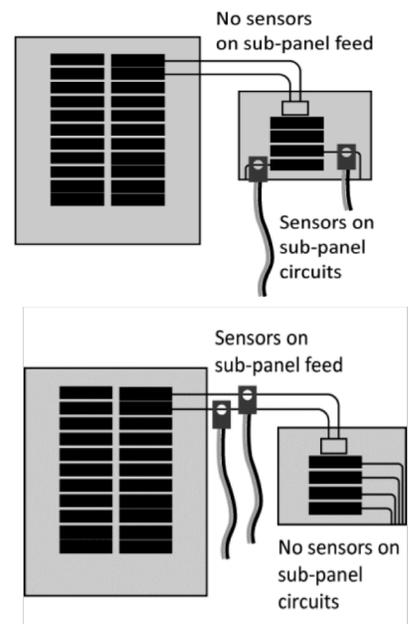
These power-generating units are generally installed on double or triple breakers.

### 3.2.5 Installing a SiteSage Monitor in a Sub-Panel

If you are installing SiteSage Units at a Main Panel and one or more sub-panels, the installation process is identical for each, *except that* sub-panels will have no power inputs from the electrical grid, but only from a Main Panel.

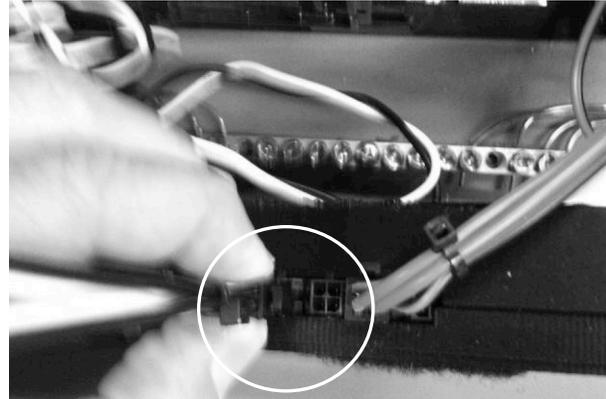
**There is no need to attach sensors to the feed from the Main Panel to a sub-panel if the Main Panel is being monitored.** If sub-panels are being monitored, do not put sensors on the Main Panel circuits that feed the sub-panels. This would result in double counting.

If you are *not* separately monitoring a sub-panel, then it *does* make sense to monitor the circuits on the Main Panel feeding the sub-panel (see Figure to right), with 2 sensors.



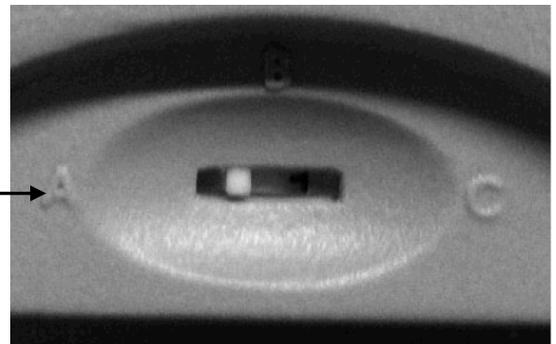
### 3.2.6 Connecting the Sensors to the ePod

As each set of 2 linked sensors (or single 150A or larger sensor) is installed, connect the pair to the appropriately numbered Channel port on the SiteSage ePod. The sensor wire plug will lock in to a double Channel port that is marked as a pair of Channels. Check that the Channel port connections match what is written on the Channel Setup Worksheet. You can only install the sensors such that the one with a green label goes into an odd (left) numbered Channel and the one with the red label (red for right) goes into an even (right) Channel in a pair. (Again, the left and right Channel designations have nothing to do with the left and right columns in the electric panel). A sensor wire plug is shown above. *It is best practice to add a label* to each sensor wire that corresponds to the numbered Channel port on the SiteSage ePod and xPods. This way if there is a need to replace a component, it is easy to figure out where the sensors should plug in.



### 3.2.7 Connecting the Sensors to an xPod

Before connecting any Sensors to an xPod, make sure the xPod switch is set correctly. *The switch is needed to be able to distinguish between xPods when there is more than one.* xPods should arrive with the switch set to the A position. That is the correct position for the first xPod you install. (There are no xPods required for a SiteSage M-15). If a second xPod is installed, set the switch to the B position; the third should be set to C.



**Do not** use the same switch position for multiple xPods.

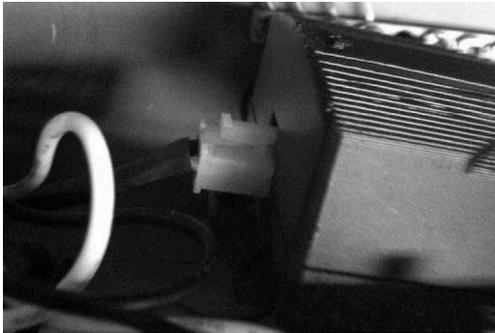
The process for connecting the sensors to the Channels on the xPod is identical to the process for connecting to the SiteSage ePod.

### 3.2.8 Connecting an xPod to the ePod and Mounting Them

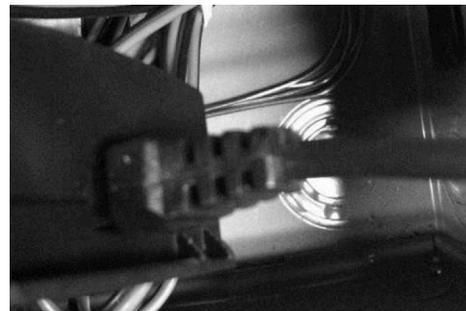
The xPod has a cable coming out of one side. Connect the cable of the first xPod you install, with the switch set to A, directly to the ePod. If you are installing 2 or more xPods, daisy-chain them together, using the same cable.

Once you have connected all of the sensors, you can either leave the ePod and any xPods un-tethered, or mount them inside the panel. You can use the tie wires provided and tie the Pods to fixed spots in the panel, or use Velcro and attach to an inside surface of the panel.

**Before mounting the ePod**, connect the other end of the Power Cable to it, as shown below. **Make sure** that the cable is tightly connected at both ends.

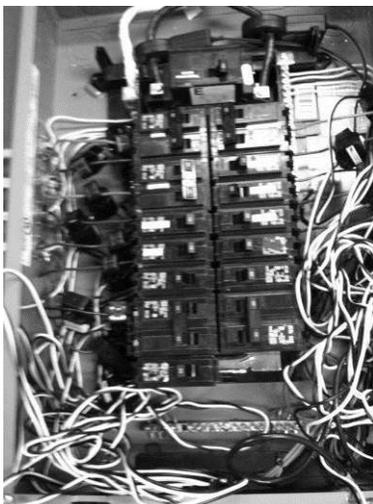


Power Cable attached to ePod



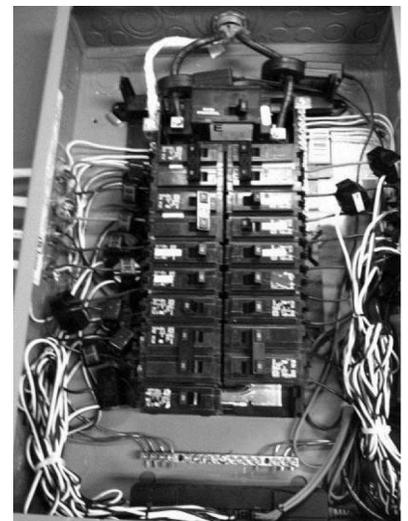
xPod attached to ePod

**IMPORTANT:** There is a serial number on the bottom of the SiteSage ePod. You should have recorded this number on the Setup Worksheet, and it is needed to register and configure the unit, so please make sure it has been recorded before you mount the ePod and close the panel.



### 3.2.9 Organizing the Sensor Wires

After all the sensors are installed at the breakers and the wires are connected to the Energy Monitor ePod and xPods, the set of loose wires (up to 45) may look messy. Organize the loose sensor wires on the left and right side of the inside of the breaker panel, using six or eight of the included wire ties to prevent movement and allow the cover to be affixed.



When you are finished, carefully cut the excess part of the wire ties with a wire cutter or strong scissors.

You can now close the circuit panel and turn the Main power back on.

### **3.3 Installation of Other Sensors**

The installation of other sensors is addressed in the Appendices of this Installation Guide.

## 4. Installing SiteSage Smart Thermostats

SiteSage currently supports two different smart thermostats, using 2 different communications protocols: Mi-Wi and Z-Wave®. These thermostats ship with installation instructions. In this Section we cover the process of connecting the most commonly installed thermostat, which uses Mi-Wi; connecting the Z-Wave® thermostat is covered in Appendix B.

### Connecting to a Mi-Wi Thermostat

Once the installer has finished installing a Mi-Wi thermostat it can be turned on to control the HVAC system locally. It is now ready to be connected to the Mi-Wi network in order to have it integrated with SiteSage. Please do not try to establish the temperature settings on the thermostat itself; doing it through SiteSage is significantly simpler – and the SiteSage temperature settings will override any settings established on the thermostat. (All *mechanical* settings *should* be set on the thermostat).

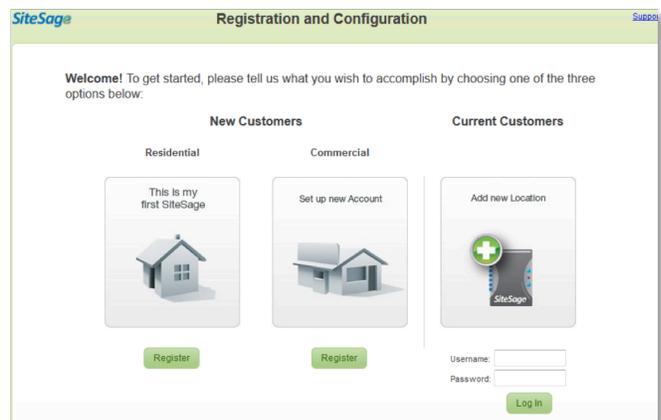
Once the location is created in SiteSage and the Gateway is registered, the Gateway will automatically discover new Mi-Wi thermostats. See the Configuring Smart Thermostats section of this manual for more details.

## 5. Registering and Configuring SiteSage

The next step in the process is Registration and Configuration, which is performed online. This can be completed by the installer or by someone else, and is also described in the *SiteSage User Manual*. Please note that until Registration and Configuration is complete, no data will be stored and the SiteSage Portal cannot be accessed.

To begin the Registration and Configuration process, go to: <http://Sitesage.net/setup>

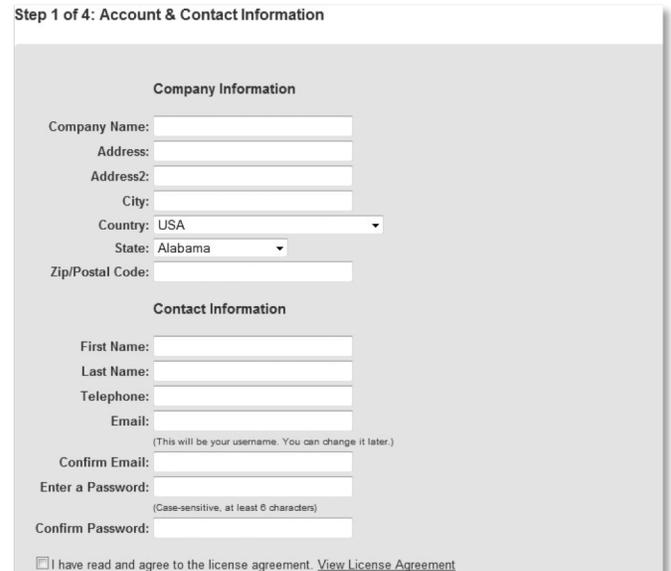
For the purpose of this manual, we are going to assume a Commercial customer, since most 3-phase electrical systems are in commercial facilities. The process is very similar for Residential customers, although the pages are slightly different.



If this is the first SiteSage installation for this account, click **Register**, under Commercial. If SiteSage is registered in at least one location and you are adding a system at *another* location, log in under **All Returning Customers** with the user name and password already established for the account. If you are adding SiteSage components to a location that already has SiteSage installed and registered, there is no need to go to Setup. Just log in to the SiteSage Portal; the new components will be found and you will be directed to a Wizard for configuration.

## Account and Location Registration

The process begins with setting up the Account.



Step 1 of 4: Account & Contact Information

**Company Information**

Company Name:

Address:

Address2:

City:

Country: USA

State: Alabama

Zip/Postal Code:

**Contact Information**

First Name:

Last Name:

Telephone:

Email:

(This will be your username. You can change it later.)

Confirm Email:

Enter a Password:

(Case-sensitive, at least 6 characters)

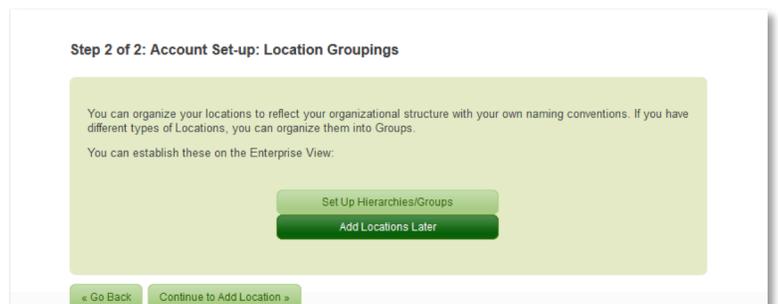
Confirm Password:

I have read and agree to the license agreement. [View License Agreement](#)

## Step 1: Account and Contact Information

Enter basic information about the company as well as your contact information. (All fields are required). If this is an existing account registering SiteSage at a new location, the account information will already be filled out.

As part of setting up the Account, you can also setup an organizational structure here; for example if the company is organized into regions and sub-regions (using whatever terminology the company uses for these groupings). You can also group



Step 2 of 2: Account Set-up: Location Groupings

You can organize your locations to reflect your organizational structure with your own naming conventions. If you have different types of Locations, you can organize them into Groups.

You can establish these on the Enterprise View.

locations on a non-geographic basis; for example, if you have multiple brands or very different operating hours. Then, as you set up a new location, you can allocate the location to these groupings. If you do not want to set the structure up now, this can also be done later in the Enterprise View of the SiteSage Portal.

## Step 2: Location-Related Information

The first part of this step involves provisioning the Gateways installed at the location, and confirming the software license.

Enter the number of Gateways that you will be provisioning at this location. Then, enter the middle 6 (you can skip leading 0's) and last 4 digits of the Serial # for each Gateway. You can find these numbers on a label on the Gateways. (Once you enter the Serial #, the Gateway's IP address will be returned; you can use this to return to the Embedded Web Server used for network configuration if necessary). Finally, enter the 25 digit License Key provided by the Authorized SiteSage Channel Partner. The License Key identifies what services have been licensed, including whether this is a Residential or Commercial customer, the maximum number of circuits to be monitored and controlled, and whether this location will be monitoring renewable generation sources or gas or water. *If you have not been provided a License Key, please contact the Authorized SiteSage Channel Partner. You will not be able to register SiteSage without a valid License Key.*

**NOTE:** If you see a “Not Valid” notice after you press Continue, it means you have entered a non-valid Device ID. Please re-check the numbers you entered and try again. In the unlikely event the number is still not valid, and you’re sure you have entered it correctly, please contact Powerhouse Dynamics or the Authorized SiteSage Channel Partner.

Once you have entered the License Key, click **Continue** and you will be taken to a page that confirms the services that have been licensed. If this is not consistent with your expectations, double check the number you entered and, if it is correct but does not show what you expected,

please contact your Authorized SiteSage Channel Partner.

Press Continue and you will be asked fill out some information about the facility in which SiteSage is being installed. This includes providing a name that can be used to refer to the location (e.g. Center St. Store). Enter the address (if it is the same as the corporate address you can copy that over), as well as some information about the function and size of the building, which is helpful for analysis purposes. Please also enter the hours of operation of the location for each day. (If you created an organizational structure, you will be asked to which grouping(s) this facility belongs).

### Step 3: Utility Rates

Next, confirm the electric utility company for the facility. SiteSage has a database that identifies the utility based on zip code, but some zip codes are served by more than one utility, so you may need to choose one from the list. If SiteSage cannot locate your utility, use the state list to select it.

The SiteSage database also maintains average commercial rates for every utility. You can accept that rate or, if you feel it does not accurately reflect the charges at this facility either calculate it from a recent bill or enter a rate directly.

There is also a section where you can enter a Demand Rate. Demand Rates, which are based on the peak energy usage during a month, are very common for commercial utility customers.

SiteSage can help better manage Demand Rates, so please make sure to enter the requested information if this facility is on a Demand Rate. Also, indicate if you know whether this location is assessed a Power Factor penalty charge for low Power Factor.

Step 3 of 4: Utility Rate

**Utility**

Based on your zip code, there is only one electric utility serving your area; if that is not correct, please select one from the state list.

Select Utility from  02458 area  Massachusetts: NSTAR Electric Company

**Utility Rate**

Use Utility rate average

The average commercial rate for your electric utility is shown below. If you think this does not accurately reflect yours, you can estimate your rate from your latest bill or enter it directly.

Estimate electricity rate from my latest bill.

Bill Total / kWh Used

\$ /   Calculate

Enter electricity rate directly.

Basic Electricity Rate: \$ 0.1551 /kWh

**Demand Charge**

Are you billed a Demand Charge?  Yes  No

What is the Demand meter interval?  15 minutes  30 minutes

What is your Demand rate?

Single Rate: \$ 10 /kW

Tiered Rate: \$ /kW up to /kW;  
\$ /kW if above

A Note on Utility Rates: The SiteSage database reports average commercial rates for each utility. This works extremely well in getting a sense of the costs of different pieces of equipment in the facility. However, the cost estimates generated by SiteSage do not reflect actual utility rate calculations, which can be complex for some commercial facilities. In addition, SiteSage's measuring period will not be the same as the billing period reflected on utility bills, so trying to compare them is not recommended.

At this point you are given the option to finish the registration session or continue with system configuration. If you end the session now, you will be able to come back and complete configuration at a later point.

#### Step 4: Energy Monitor Channel Configuration

SiteSage needs to be configured so that the system knows what is being monitored on each SiteSage Energy Monitor **Channel**. This is a critical step in ensuring that SiteSage delivers true value. Enter information from the completed Channel Setup Worksheet(s), described earlier.

To start this process, you will see a list of SiteSage Energy Monitors that the Gateways have identified. To make sure that only panels expected are being monitored, please enter the missing 6 digits of the SiteSage Monitor serial numbers. This number appears on the back of the SiteSage Energy Monitor ePod, and should have been entered onto the Channel Setup Worksheet. Enter a descriptive name for the electric panel, such as Main Panel, Kitchen Panel, etc. (This should also appear on the Setup Worksheet, and you can change it at any time).

MAC Address	Channels	Energy Monitor Serial #	Panel Type	Name The Electric Panel <small>(e.g., Main Panel)</small>
3C:09:CD:05:01:AD	15	EM2A1 <input type="text"/> 01AD	<input checked="" type="radio"/> Main <input type="radio"/> Sub Panel	<input type="text" value="Main panel"/>

I cannot connect sensors to my Main Breakers; please compute Main power by adding all circuits.

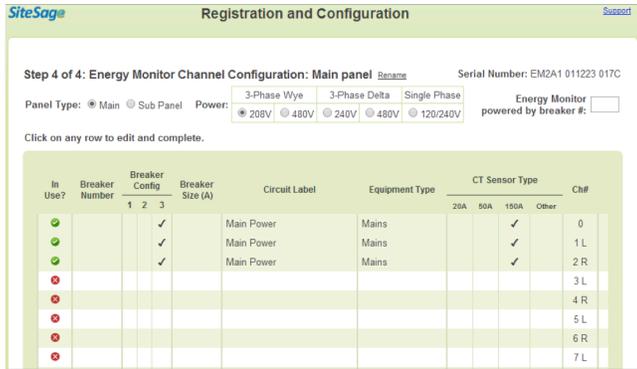
If a SiteSage Energy Monitor you expected to see has not been listed, it is possible that the Gateway has been located too far from that unit. Try moving the Gateway and see if that helps. If you have multiple SiteSage Monitor units located far apart (say on different floors), you might need to add another Gateway. You can complete Configuration for any Site Sage Energy Monitors that have been found now. (If you add a Gateway later you *do not* need to come back to Registration. You will then be able to go to the Channels Configuration tab in Settings on the SiteSage Portal and click on *Gateway Assignment*, and then *Add a Gateway*. You can then enter the Gateway serial number, much as you did earlier. If it finds a new SiteSage Monitor you will then be able to configure it).

If the Computed Mains box has been checked on one of the Worksheets because the installer was unable to install sensors on the Mains, please check the box on this page. This will tell SiteSage to sum the branch circuits to estimate the facility totals.

When you hit **Continue** you will be taken to a page where you can capture the information from the Channel Setup Worksheet the installer filled out. Make sure you enter the number of the Breaker that is powering the SiteSage ePod, since that will be needed if there is ever a need to power cycle the unit.

The electric service will default to 3-Phase 208V, since that is the most common configuration in small commercial facilities. If that is not what you have, you can re-set to either 3-Phase Wye 480V, 3-Phase Delta 240V or 480V, or Single Phase 120V. The page will change slightly if you switch to Single Phase. (**NOTE:** This is a critically important setting for the purpose of calculations, so please make sure to select the correct electricity service before continuing).

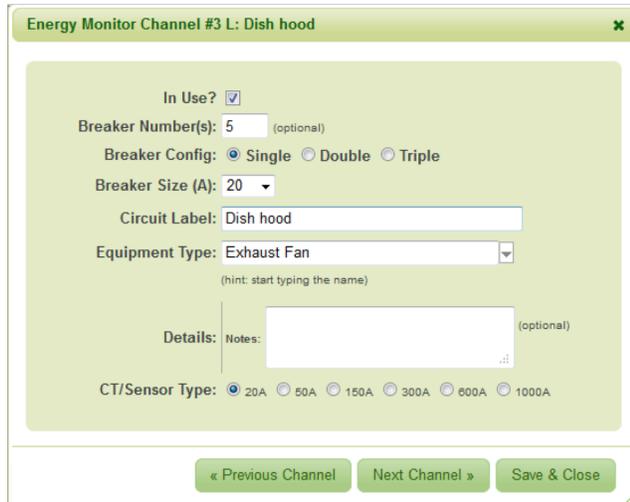
For a 3-Phase Main panel, the Mains should have been connected to Channels 0-2. Make



sure that the correct CT size has been selected. (You can connect Mains to other channels as well). Then, click on the row for Channel 3 and it will bring up a data entry form where you can quickly enter the necessary information for that Channel. Set the Channel to **In Use** to begin to enter data on the form.

For other than Mains, please enter the **Breaker Number**, which will appear on the Worksheet, and select the **Breaker Size** in amps, from a pull down list. Next indicate the **Breaker Configuration**: e.g. whether it is a single, double or triple pole breaker.<sup>5</sup> Enter the **Circuit Label** that appears on the Worksheet, or feel free to modify it.

You need to enter some additional information that is **not** on the



<sup>5</sup> The system will default to assume that you have connected 3 CTs to a triple pole breaker (and 2 to a double pole breaker), and that the channels you used are sequential. If 6 CTs were used because of wire size, select Double Wire. If you needed to install on channels that were not sequential, please select Non Sequential Channels and identify the 2 (or 5) additional channels you used. Once you move to the next channel, the form will re-order the rows (keeping the channel numbers the same) so that the 3 channels for a single triple pole circuit are on successive rows.

Worksheet about equipment on each circuit. Most importantly, you will be asked to enter the major **Equipment Type** on each circuit. In many cases the equipment type is obvious from the circuit label. In other cases, for example, if the label says “Kitchen Appliances”, you might need to make a judgement call about the primary equipment. (You can type in the Equipment Type box, but it will only recognize items included in the pull down list. The same is true for other fields). **This field is extremely important to complete accurately**, since most analyses are driven by Equipment Type.

You can enter some optional **Details** about a piece of equipment, which may include make, model, and year installed, or just text.

This information will appear on the Circuits page view, and may help SiteSage analyze equipment usage.

Based on Breaker Size and Equipment Type, the system will automatically make an assumption about the **CT/Sensor** configuration. **Change this if it does not match the Worksheet.**

You can find a description of each field by holding your mouse over the heading on any column on the page.

Step 4 of 4: Energy Monitor Channel Configuration: Main Panel Rename Serial Number: EM2A1 015397 0E49

Panel Type:  Main  Sub Panel Power:  208V  480V  240V  480V  120/240V  Energy Monitor powered by breaker #:

Click on any row to edit and complete.

In Use?	Breaker Number	Breaker Config			Breaker Size (A)	Circuit Label	Equipment Type	CT Sensor Type				Ch#
		1	2	3				20A	50A	150A	Other	
<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		Main Power	Mains		<input checked="" type="checkbox"/>			0
<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		Main Power	Mains		<input checked="" type="checkbox"/>			1
<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		Main Power	Mains		<input checked="" type="checkbox"/>			2
<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/>			30	Rooftop Unit 1	Rooftop (Package) Unit with Heating - Electric	<input checked="" type="checkbox"/>				3
<input checked="" type="checkbox"/>	3	<input checked="" type="checkbox"/>			30	Rooftop Unit 1	Rooftop (Package) Unit with Heating - Electric	<input checked="" type="checkbox"/>				4
<input checked="" type="checkbox"/>	5	<input checked="" type="checkbox"/>			30	Rooftop Unit 2	Rooftop (Package) Unit with Heating - Electric	<input checked="" type="checkbox"/>				5
<input checked="" type="checkbox"/>	7	<input checked="" type="checkbox"/>			30	Rooftop Unit 2	Rooftop (Package) Unit with Heating - Electric	<input checked="" type="checkbox"/>				6
<input checked="" type="checkbox"/>	9	<input checked="" type="checkbox"/>			30	Rooftop Unit 3	Rooftop (Package) Unit with Heating - Electric	<input checked="" type="checkbox"/>				7

Once you have entered all of the information about a Channel, press **Next Channel** to go to the next one, and so on until you have entered all of the information on the Worksheet. (If you hit **Save**, the data will be saved and the data entry box will close; you will need to click on another row to begin entering data again). Note that you can edit any Channel data already entered by clicking on the associated row.

**NOTE:** If there were empty circuit breakers slots in the circuit panel and a Channel was skipped during the installation, please make sure you do not enter any information for the skipped Channel, and make sure the **In Use** box is not checked.

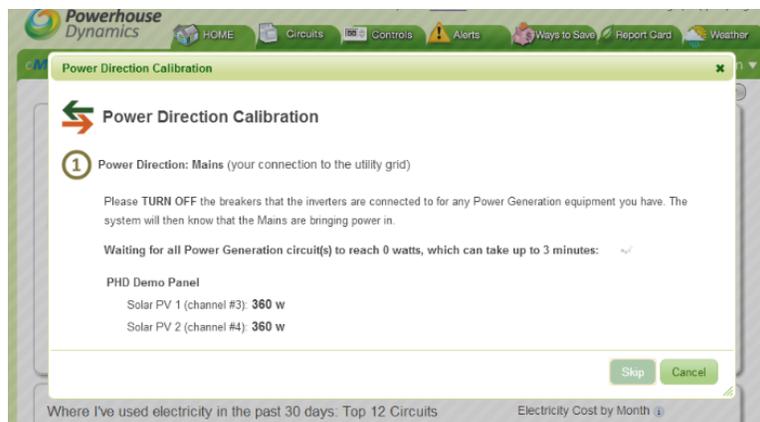
If you are configuring Channels for more than one SiteSage Energy Monitor, when you complete this page for the first unit and hit **Continue** you will get a new empty form to complete for the next unit. If for some reason you cannot finish channel configuration in one session, you will be able to complete registration as soon as you have configured one SiteSage Monitor, and then later log onto SiteSage Portal (Settings/Channels) to configure additional SiteSage Energy Monitor units.

Once you have filled out the configuration for each unit that has been installed,

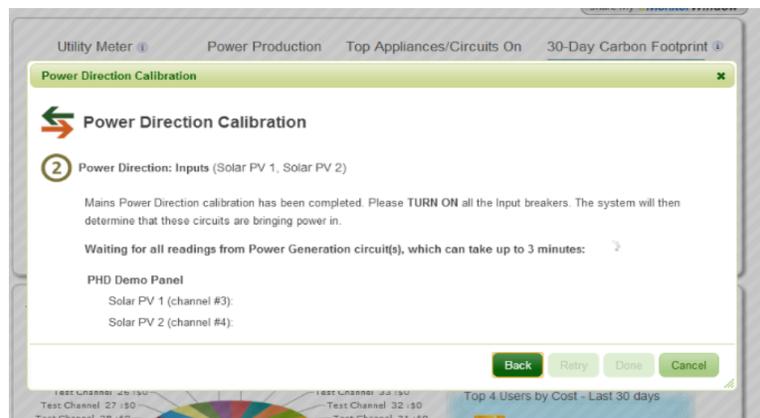
## click **Finish**, and you're ready to use the Energy Monitor! Unless.....

*If the Software License provides support for renewable energy* and have configured a power source, such as PV or Wind, you will be prompted to do one last step, which involves verifying the direction of all power inputs, including the Mains. (If your production is greater than your usage, you can actually be shipping power back into the utility grid - or net metering).

There is a 2-step process to Power Direction Calibration. First, turn off the breaker the Power Inputs are coming into (typically one or more inverters). In that way, SiteSage can be confident that Main power is incoming.



Once the system verifies the direction of the Mains you will be prompted to turn the Power Input breakers back on so that their direction can be calibrated.



The system will then confirm when calibration has been completed. If for any reason the system has not determined the correct power direction – for example if you are calibrating PV at night when it is not generating any power, press the “Flip” button and it will adjust.

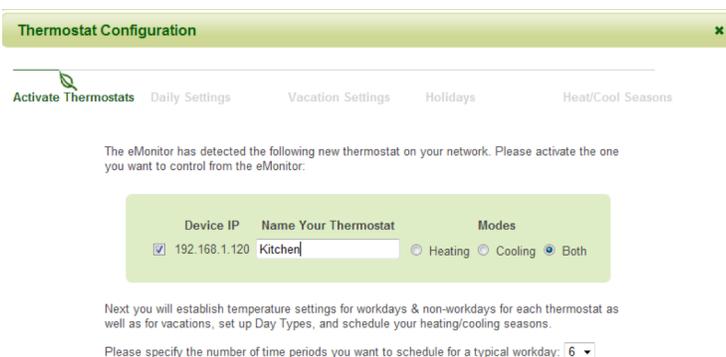
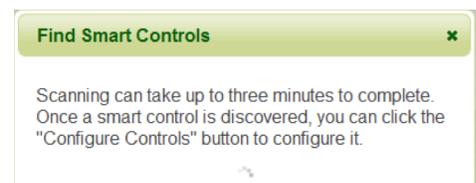


And, now you have fully completed configuration of the Energy Monitor and can move on to other components like thermostats.

## Step 5: Configuring a Smart Thermostat

Please note that the configuration process is the same for both Mi-Wi and Z-Wave thermostats.

Once you have gotten one or more Smart Thermostat connected, log into SiteSage Portal, you should see a pop-up indicating new Smart Thermostats have been found; if not, and if using Z-Wave thermostats, go to **Settings/Smart Controls** and click *Add Z-Wave Controls*. A dialog will pop-up telling you the system is scanning for smart controls. If it finds a Smart Thermostat it will identify it. You can then hit *Configure Controls*, which will pop-up a page like the one below, which is the start of a Wizard that will let you quickly configure the Thermostat. (SiteSage will keep scanning for thermostats even if you close the dialog and go to another page. If it finds one, the Wizard will pop-up as soon as you go to the Home page).



**NOTE: if Enterprise level controls have been set up for this account you will be able to pull down pre-established settings, or *Templates* (including possibly a Default Template specifically set for this facility) and not need to go through the Wizard. In addition, there is a**

generic default template that can be applied at this point as well; it is always possible to come back and update thermostat settings at a later point.

Select the thermostat(s) you want to configure, give them a name (e.g. Kitchen), indicate whether they are used for Heating, Cooling, or Both, select the number of time periods that you want to be able to program (4, 6, or 8) and press Continue. If you have selected more than one thermostat, the Wizard will take you through each one sequentially.

You will first establish the *daily temperature settings* for each Smart Thermostat.

- The SiteSage *Smart Thermostat* lets you create different settings for different days of the week and also create a setting for days you are closed.

The screenshot shows the 'Thermostat Configuration' window for a device named 'Kitchen'. The 'Daily Settings' tab is active. Below the navigation tabs, it says 'Next you will establish temperature settings for workdays & non-workdays:'. The main area displays a bar chart titled 'Default Tuesday Cooling Settings' with a temperature scale from 40°F to 90°F. The chart shows temperature settings for 12 time periods (12a to 11p). To the right of the chart is a list of time periods with their corresponding temperatures and icons:

Time Period	Temperature
Closed	82°F
Pre-open	78°F
Breakfast	74°F
Lunch	74°F
Dinner	74°F
Clean-up	78°F

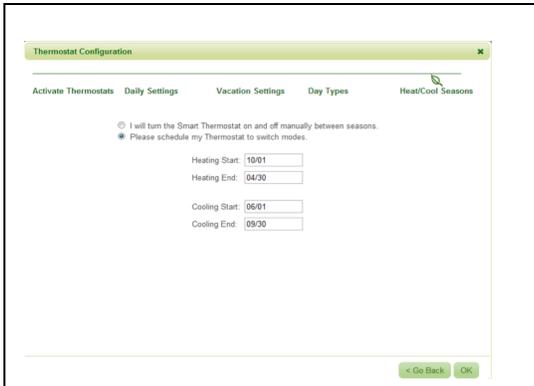
Annotations in the image include:

- An arrow pointing to the 'Copy Settings From' button with the text: 'You can copy the settings from one day to another & not have to re-enter them'.
- An arrow pointing to the 'Lunch' period name with the text: 'Click on any of the period names and you will see a field where you can enter your own names'.

- SiteSage uses a unique, graphical interface to make it simple to adjust temperature settings. *Just grab the edge of a colored bar by clicking on it and drag it horizontally to change the Time Period - or vertically to change the temperature. It's that simple!*
- To name the periods, place the mouse over the name on the right hand side of the page; this creates a box you can use to edit the text. Whatever you select will be used from now on.
- The Wizard will walk you through each day. You can copy the settings from any previous day.
- The Wizard addresses both Heating and Cooling Settings, if you have both, which work exactly the same way, EXCEPT that the default settings are vastly different.

If you have more than 1 thermostat and want them set exactly the same, SiteSage will let you “clone” the previous settings so that you do not have to enter them again.

Once you have created the Heating and Cooling settings for Work Days, you are next asked to establish settings for days the facility is closed, which would include holidays. For these days, a single temperature setting for Heat and one for Cool is all you need.



The screenshot shows a web browser window titled "Thermostat Configuration". The interface has a navigation bar with tabs: "Activate Thermostats", "Daily Settings", "Vacation Settings", "Day Types", and "Heat/Cool Seasons". The "Heat/Cool Seasons" tab is selected. Below the navigation bar, there are two radio buttons: "I will turn the Smart Thermostat on and off manually between seasons." (which is selected) and "Please schedule my Thermostat to switch modes." Below the radio buttons, there are four input fields: "Heating Start" with the value "10/01", "Heating End" with the value "04/30", "Cooling Start" with the value "06/01", and "Cooling End" with the value "09/30". At the bottom right of the window, there are two buttons: "Go Back" and "OK".

Finally, you can either tell SiteSage that you want to manually change from Heating to Cooling Season, or schedule it to happen on specific date or automatically switch.

### Setting up Additional Thermostats

Once you have already set up a Thermostat, if you install another one at a later time, a Mi-Wi thermostat will be automatically discovered by the Gateway. If using a Z-Wave thermostat, please go to the **Settings/Smart Control** tab and click *Add Z-Wave Controls* in the top right hand corner to find the new Thermostat.

### Enterprise Level Controls

Control Templates can be created in the Enterprise View to be pulled down to when a thermostat is added (or pushed down at other times). This is described in the *SiteSage User Manual* which can be found at <http://docs.sitesage.net> or via the Support link on the SiteSage Portal.

## **Appendix A: Frequently Asked Questions**

### **What if there are not enough sensors to monitor all circuits in a panel?**

Unless you want to upgrade the SiteSage Monitor to a larger configuration with more sensors or add another SiteSage monitoring unit in another electric panel, your best choice is to select the circuits to monitor, based on what you expect to be the major power users, or circuits with the most important equipment. You can upgrade or add additional units at any time.

### **Does it matter which way I orient the CT sensors?**

For single phase power it does not, but for 3-phase it is best practice to orient them the same. In that case, all of the sensors should be installed with the arrows pointing towards the breakers. (In the case of 150-amp CTS, there is no arrow, but there is a label; assume the arrow faces left to right on the label). This is actually fairly straightforward, since it implies that all of the sensors on 1 side of the panel should line up the same way. In the case of 20 and 50-A CTs, this would mean the clasp should be on top and showing on the left side of the panel, and underneath and not showing on the right side.

### **What if I cannot fit all the sensor wires in a circuit panel?**

If most of the wires fit, we suggest you prioritize circuits and only monitor the number of circuits that fit. (You may decide you need a SiteSage monitoring unit that supports fewer circuits).

**What if the Main wires are too big for, have much higher amperage, or cannot accommodate the 150A sensors?** Check with your Authorized SiteSage Channel Partner about getting 300A, 600A or 1,000A sensors. (NOTE: the 300A and 600A sensors are the same size; the 1,000A sensors are slightly larger). If there is no way to monitor the Mains but you can monitor all branch circuits, selecting the Computed Main option during registration will tell the system to add up all branch circuits to compute total power.

### **What if there are too many 50-Amp sensors and not enough 20-Amp sensors?**

You may use the 50-Amp sensors on circuits with smaller amp ratings – and vice versa – as long as you indicate the actual sensor size used on the circuit. There will be some loss of accuracy, but generally 20A CTs will work fine on breakers up to 30A, and 50A sensors will work well on breakers from 30A-90A. Speak to your Authorized SiteSage Channel Partner about getting additional sensors of the size you are missing.

### **Does SiteSage support 1,000-Amp electrical service?**

Yes. SiteSage can support 1,000-amp, as well as larger, electrical services.

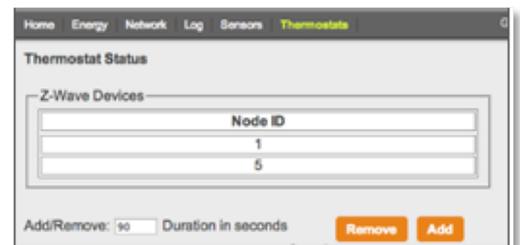
## Appendix B: Provisioning a Z-Wave® Smart Thermostat

### Getting a Z-Wave Thermostat on the local Z-Wave Network

Once the installer has finished installing a Z-Wave thermostat it can be turned on to control the HVAC system locally. It is now ready to be connected to the Z-Wave network in order to have it integrated with SiteSage. Please do not try to establish the temperature settings on the thermostat itself; doing it through SiteSage is significantly simpler – and the SiteSage temperature settings will override any settings established on the thermostat. (All *mechanical* settings *should* be set on the thermostat).

### STEP 1: get the SiteSage Gateway into “inclusion” mode:

- a. Reset the Gateway. It will go through its normal reset cycle; the LINK and DATA lights will flash 5 times (green if Wi-Fi, red if Ethernet) and then turn solid for 3 seconds. If there is a Z-Wave radio, after 2 seconds these lights will blink orange very rapidly for 4 seconds. If you hit Reset again while the lights are blinking orange, the Gateway will go through another reset cycle, but this time the rapid blinking will be green. This indicates that the Gateway has been placed into *Inclusion* mode for 3 minutes to enable you to enroll the smart thermostats. The lights will continue to flash green throughout the inclusion period.
- b. Alternatively, if SiteSage has already been registered at this location, you can accomplish the same thing by going to <https://sitesage.net>, clicking on Settings/Smart Controls, and pressing Add Z-Wave Control near the top of the page. Wait until the LINK and DATA lights flash green which will indicate that the Gateway is in inclusion mode.
- c. You can also put the Gateway into inclusion mode via the embedded web server Z-Wave tab. (Press Configure, then 4Add). If the Gateway is not yet on-line, open a browser and enter <http://169.254.1.1>. (If you have a Wi-Fi Gateway it creates an ad hoc Wi-Fi network; if you have an Ethernet Gateway you can connect directly to the network port on your computer). If your Gateway is on-line, you can find the current IP address by going to [sitesage.net/connect](https://sitesage.net/connect) and entering the middle 4 digits of the Gateway serial number.



### STEP 2: enroll (or “include”) the thermostat in the Z-Wave network:

- a. Press the MENU button on the smart thermostat



- b. Press the NEXT button to advance to the Z-Wave menu
- c. Press SELECT
- d. Press YES to enroll in the network

**STEP 3: verify that the thermostat has been enrolled in the network:**

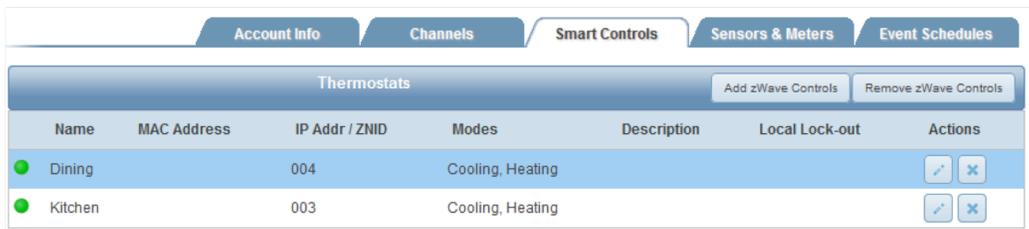
- a. Press MENU on the main thermostat screen
- b. Press the NEXT Button to advance to the About screen and press the Select Button
- c. Press the NEXT Button to advance through the menu options to Node ID
  - If the number listed there is anything other than “00”, the thermostat has been successfully enrolled
  - If the number listed there is “00”, the thermostat has NOT been successfully enrolled. In this case, repeat Step 2 and verify again.
- e. Press the DONE button twice when finished to go back to the Home screen

The thermostat needs to be in communications range with the Gateway in order to be included in the network. If enrollment has failed, try moving the Gateway closer to the thermostat. Once the thermostat has been enrolled you can move it back. After they are enrolled, the thermostats can talk to each other, so as long as one of them is in range of the Gateway (and the thermostats are in range of each other) they can reach the Gateway. Make sure to enroll the thermostat closest to the Gateway first. If you are unable to include that thermostat, you may need a Z-Wave range extender/repeater. This is a simple device that plugs into an outlet; please consult with an Authorized SiteSage Channel Partner about getting a repeater. Locate it between the Gateway and the closest thermostat. You will need to put the Gateway back into Include range to include this device. In this case, just press the button on the range extender, and a light will flash to show that the unit has been included. In some cases you may need to install an additional Gateway to connect with a thermostat beyond the Z-Wave range extender range.

Once a thermostat has been paired with a Gateway (or, more precisely, the snap-in Z-Wave radio module), it will stay paired. **If there is a need to change out the Gateway’s Z-Wave radio**

**module, you will first need to EXCLUDE the thermostat from the network.** This is a similar procedure to the one for Inclusion. (Note that you can use any Gateway to exclude a thermostat; it does not need to be the one you included it with. Further, if you need to change out a Gateway only but can use the same radio, there is no need for this process).

- a. **First you need to put the SiteSage Gateway into Exclusion mode.** The easiest way to do this is by going to the Facility View on the SiteSage Portal and then going to Settings/Smart Controls and pressing Remove Z-Wave Control. Wait until the LINK and DATA lights flash red to indicate Exclusion mode; the Gateway will stay in Exclusion mode for 3 minutes. You can also do this in the embedded web server – pressing the Remove button on the Thermostat tab.



- b. **If you do not have access to a computer,** you can use the Reset function on the Gateway. For this you need to put the Gateway back into Inclusion mode, exactly as outlined above. When the DATA and LINK lights are blinking green rapidly for 4 seconds, press Reset again (this will be 3 third time hitting Reset in this process). This time when the Gateway comes out of the Reset process the lights will blink Red rapidly, indicating that the Gateway is in Exclusion mode. It will stay in Exclusion mode for 3 minutes.
- c. **Next Exclude the thermostat from the network.** Go to the thermostat menu as you did before, and press NEXT to get to the Z-Wave menu, but this time you want to EXCLUDE the thermostat. Once that is done you can include the thermostat with a new Gateway.

## Appendix C: SiteSage Networking Requirements

SiteSage Energy Monitor units that are installed inside electrical panels in a facility communicate via a wireless radio to the SiteSage Gateway. The radios have a range of at least 30 feet and do not require line of sight. The Gateway needs to be connected to a facility network in order to access the Internet to upload data to the SiteSage cloud-based servers. Depending upon the location of the electrical panels, it is conceivable that there will need to be more than one Gateway installed.

The SiteSage Gateway is a “headless” device which can be connected through hardwired Ethernet or Wi-Fi (B or G only). It only requires Port 80 to be open, and only makes *outgoing* HTTP requests to the SiteSage servers. There is no way to communicate with the Gateway from the Internet, other than through the responses to the HTTP request.

**Ethernet Connection** (the clear preference is to use Ethernet wherever possible in order to maximize reliability).

Normally, the SiteSage Gateway requires DHCP in order to connect to the network. If DHCP is not used in the facility, a static IP address can be provisioned, but the Gateway must first be attached to the network using DHCP. If a DHCP server is not available in the facility, it is possible to provision the system on another network that has DHCP and then move it to the destination network. The system can connect to an HTTP proxy server; to configure for a proxy server we will need to know the IP address or URL and port number.

If a static IP address is required, we will need to know, in advance, the following information:

- IP Address
- Network Mask
- Gateway IP Address
- DNS Server IP Address
- DNS Server2 IP Address (Optional)

If MAC level filtering is enabled on the network we can provide the Ethernet MAC address in advance, if required. If there is a restriction to a specific port, we will need to know which port on the switch to attach to. (In the event that the Gateway is not connecting directly to the switch, we will need to coordinate on the installation).

### **Wi-Fi Connection**

If Wi-Fi is required, the preference is a secured connection. The Gateway needs to be connected to a network that is up 24 X 7 and does not limit users’ connection time. Because the system is headless, there is no way to accept terms or respond to a prompt. If the standard public network in the facility has any such restrictions that can be overridden, the Wi-Fi MAC address can be provided in advance to allow the system to be pre-provisioned.

The system supports both WEP and WPA security. In a Wi-Fi configuration, the following information is required:

- SSID (Name and whether or not it is broadcast)
- Encryption Type (WEP/WPA/WPA2/etc.)
- Encryption Key/Pass Phrase **(NOTE: if these are regularly changed, please provide notification in advance of the new key, along with the planned date and time of change, on an ongoing basis).**

The system can also support a static IP address on a Wi-Fi network; in this case the system can be provisioned locally even where no DHCP server is available. The same information as requested above for an Ethernet connection is required. If a proxy service is used, the IP address or URL and port number must be provided.

NOTE: The optional Wi-Fi smart thermostat does not have an Ethernet option. *Peer-to-peer access must be enabled for SiteSage to be able to connect to the Wi-Fi thermostat.* If the Gateway is sharing a public Wi-Fi network, where peer-to-peer access is not advisable, please set up a separate SSID for SiteSage Gateway. The SiteSage Z-Wave thermostat connects directly to the Gateway and requires no access to the facility network.

For each facility in which SiteSage will be installed, please answer the questions on the following page in order to facilitate the network installation process.

## SiteSage Networking Questionnaire

Company: \_\_\_\_\_ Facility Name/Location: \_\_\_\_\_

Preferred Network Connection: Ethernet \_\_\_ Wi-Fi \_\_\_

If Wi-Fi: SSID \_\_\_\_\_ Broadcast? Yes \_\_\_ No \_\_\_

Encryption Type \_\_\_\_\_

Pass Phrase \_\_\_\_\_

Do you regularly change the Password? Yes \_\_\_ No \_\_\_

Peer to Peer Access Enabled? Yes \_\_\_ No \_\_\_

Do you have a DHCP Server Available? Yes \_\_\_ No \_\_\_

Static IP Address Required? Yes \_\_\_ No \_\_\_

If so: IP Address \_\_\_\_\_

Network Mask \_\_\_\_\_

Gateway IP Address \_\_\_\_\_

DNS Server IP Address \_\_\_\_\_

DNS Server2 IP Address \_\_\_\_\_ (optional)

If a Proxy Server is used: IP Address/URL \_\_\_\_\_ Port #: \_\_\_\_\_

Do we need to provide the MAC address(es) in advance of installation? Yes \_\_\_ No \_\_\_

Do you apply content filtering on your network? If so, we need to provide you with content samples so that you can configure such that our data will not be caught in the filter. Yes \_\_\_ No \_\_\_

### IT Support Contact Information:

Name: \_\_\_\_\_

Phone: \_\_\_\_\_

e-Mail Address: \_\_\_\_\_

## Appendix D: Installing Temperature Sensors

SiteSage supports temperature monitoring. It currently utilizes the 1-Wire protocol for bringing wired sensor data into the system. (Wireless sensors will be supported in a future release). These sensors can be installed inside refrigeration units, in various parts of an HVAC or Make-up-Air unit, and at other locations where temperature readings are important, or be used to monitor air temperature. Each 1-Wire run should include no more than 10 sensors.

### Specifications

Waterproof  
.5 degree C resolution  
Temperature range: -55 \*C ~ +125 \*C  
No external components: single-bus interface  
Labels with sensor IDs provided to simplify provisioning

Output leads: red (GND), yellow (DATA)

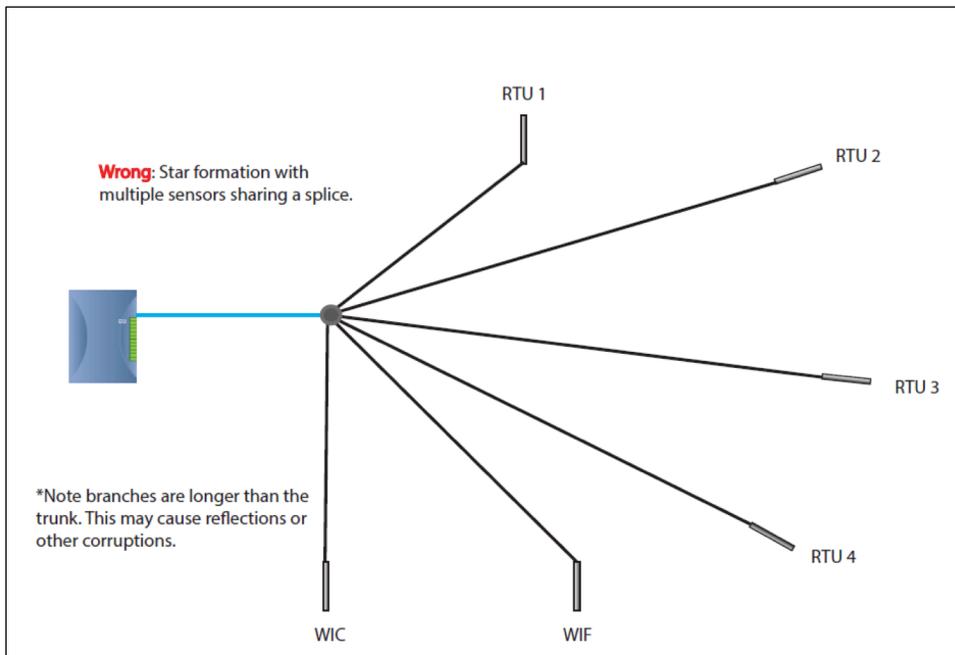
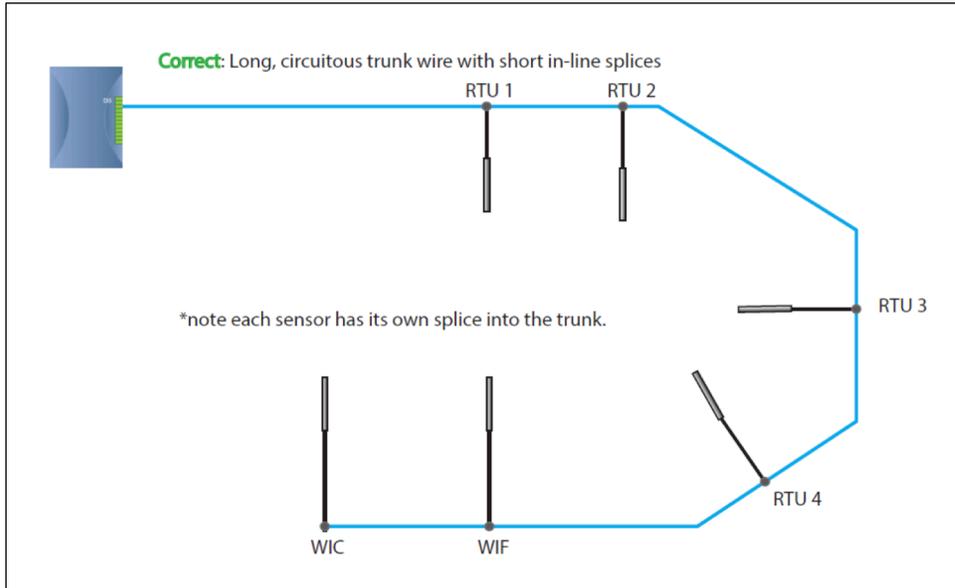


### Installation

The sensors can be installed by anyone licensed to do low voltage wiring. Wires from different sensors can be spliced together, so it is not necessary to have a full wire run for each individual sensor. This sensor does not require any external power (other than the Gateway or Sensor Module). The wire should be connected to Port D3 on the Gateway; the DATA wire goes into D3+ and the GND goes into D3-. If the SiteSage Sensor Module (sPod) is used, the DATA wire goes into "W" and the combined GND goes into "- (GND)."

For best results, solid, shielded 18-2 thermostat wire should be used for the trunk line. All sensor to trunk line splices must be made tight enough to withstand future pulling and stresses on the trunk line.

## Stringing together Temp Sensors in a 1-Wire Network

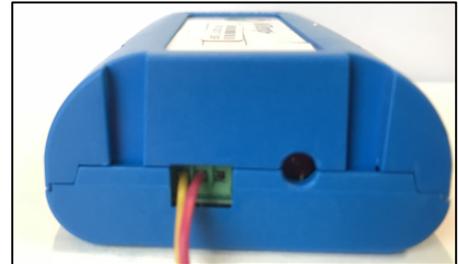


## Installation using WiTemp+

The WiTemp+ sensor includes an onboard temperatures sensor that can be used to measure temperatures ranging from -55°C to +125°C (-67°F to +257°F). To install the Wi-Temp+ using the onboard sensor, simply open the top of the sensor and insert the batteries (included). The WiTemp+ can be mounted using a variety of techniques including zip ties through the side slots, screws using the screw holes, Velcro tape or magnetic tape. In all cases it is best to orient the WiTemp+ vertically (and also mount the Gateway vertically).



The WiTemp+ also supports the installation of a single 1-Wire temperatures sensor. This is accomplished by wiring the data wire to the port on the left and the common wire to middle port on the WiTemp+.



The WiTemp+ also supports the installation of a single contact closure sensor or pulse output device. This is accomplished by wiring the data wire to the port on the right and the common wire to middle port on the WiTemp+.

ONLY ONE ADDITIONAL SENSOR CAN BE ADDED TO THE WiTemp+, either a single 1-wire sensor OR a contact closure sensor OR a pulse output.

## Provisioning and Configuration

The temperature sensor comes with a label, a matching label on the bag, and a spare label you can paste onto the Sensor Installation Worksheet.

As you install the sensors, please fill out the Sensor Installation Worksheet to identify what sensors you have installed and where you have installed them. Follow the instructions on the bottom of the Worksheet. NOTE: since SiteSage will be supporting multiple sensor types, there is a field for Type. At this point only Temperature sensors are being supported. Sensors can be tied to specific pieces of equipment (circuits) but can also be placed in other locations. Multiple sensors can be tied to a single circuit, and a single sensor can be tied to multiple circuits if necessary. (Sensor data will be associated with each associated circuit).

Once a sensor or set of sensors have been attached to the Gateway, the sensors will self-identify. The next time a user logs into SiteSage, the system will prompt them to complete a Wizard where the sensors can be configured by entering in the information filled out on the Worksheet.

## Appendix E: SiteSage Hardware Technical Specifications

SiteSage Gateway	SiteSage Energy Monitor
<p><b>Connections</b></p> <ul style="list-style-type: none"> <li>1 x 10/100 RJ-45 Ethernet Port</li> <li>1 x High Speed RJ11 or RS485 Serial Port</li> <li>3 Analog Inputs – wire pair - +/- 2V; 3 Digital Input/Outputs</li> <li>USNAP 2.0 Modular Connector</li> </ul> <p><b>Communication Protocols</b></p> <ul style="list-style-type: none"> <li>TCP-IP via Ethernet (802.3) 10/100base-T</li> <li>Wi-Fi (802.11/b/g/n); MiWi Wireless (802.15.4) 2.4GHz</li> <li>Local via High Speed Serial Port</li> <li>Z-Wave<sup>®</sup> mesh networking (optional USNAP module)</li> </ul> <p><b>Power Requirements</b></p> <ul style="list-style-type: none"> <li>120VAC Power, 60 Hz</li> </ul> <p><b>Environmental Specifications</b></p> <ul style="list-style-type: none"> <li>L x H X W: 5.25" x 3.25" X 1.5"; Weight = 6 oz.</li> <li>Operating Temperature -10° C to + 60° or 14° F to 140° F</li> <li>Humidity 5% to 95%, non-condensing</li> </ul> <p><b>Wired Protocols Directly Supported</b></p> <ul style="list-style-type: none"> <li>1-Wire; Modbus; Pulse Counter</li> </ul>	<p><b>Connections</b></p> <ul style="list-style-type: none"> <li>15 CT sensor Ports</li> <li>Six Pin expansion module (xPod) connector (up to 3)</li> <li>Each xPod: 10 CT sensor Ports</li> <li>Modular Power Connector (120V AC) <ul style="list-style-type: none"> <li>o 120V/15A breaker or optional stepdown transformer (277V)</li> </ul> </li> </ul> <p><b>Communication Protocols</b></p> <ul style="list-style-type: none"> <li>MiWi Wireless (802.15.4) 2.4GHz connection to SiteSage Gateway</li> <li>RS485 link protocol to expansion module (xPod)</li> </ul> <p><b>Power Requirements</b></p> <ul style="list-style-type: none"> <li>120VAC, 60 Hz, 2.5W</li> </ul> <p><b>Environmental Specifications</b></p> <ul style="list-style-type: none"> <li>L x H X W: 7" x 2.5" X 1.875"; Weight = 4 oz.</li> <li>xPod: L x H X W: 3.75" x 1.875" X .875"; Weight = 2 oz.</li> <li>Operating Temperature -10° C to + 60° C (14° F to 140° F)</li> <li>Humidity 5% to 95%, non-condensing</li> </ul> <p><b>CT Sizes Currently Supported</b></p> <ul style="list-style-type: none"> <li>20A; 50A; 150A; 300A; 600A; 1,000A</li> </ul>
<p>SiteSage Controller</p> <p><b>Connections</b></p> <ul style="list-style-type: none"> <li>Up to 8 control zones</li> <li>32A 3-phase contactors; 120v-300MA coil rating (80A avail.)</li> <li>1 timed emergency override switch port</li> </ul> <p><b>Communication Protocol</b></p> <ul style="list-style-type: none"> <li>MiWi Wireless (802.15.4) 2.4GHz connection to SiteSage Gateway</li> </ul> <p><b>Power Requirements</b></p> <ul style="list-style-type: none"> <li>120V AC, 50/60 Hz 1.5W</li> </ul> <p><b>Environmental Specifications</b></p> <ul style="list-style-type: none"> <li>Control Panel W x H x D: 14" x 15.5" x 8"; Weight 17 lb.</li> <li>Contactors (4) panel: W x H x D: 8.5" x 11.5" x 5.5"; Weight 8 lbs.</li> <li>Operating Temperature -10° C to + 60° C (14° F to 140° F)</li> <li>Humidity 5% to 95%, 95% non-condensing</li> </ul>	<p>SiteSage T-624 Smart Thermostat</p> <ul style="list-style-type: none"> <li>Made by Trane</li> <li>Communications - Z-Wave</li> <li>Display - 4.3" Black &amp; White, backlit</li> <li>Programmable - 7 day, 8 periods/day</li> <li>Power - 24 Vac from HVAC system</li> <li>Heat/Cool Stages - 4/2</li> <li>Temp Sensors - Indoor/Outdoor</li> <li>Auxiliary and Compressor Heat Lockouts</li> <li>Built In Humidity Sensor &amp; RH Display</li> <li>Enhanced Dehumidification Mode/Overcooling/Manual Control</li> <li>Smart Continuous Fan</li> <li>Dimensions: 3.5 H x 5.8 W x 1.0 D .5 lbs.</li> </ul>

## Warnings



**Water and Moisture** – Do not use or install the hardware near water – for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool and the like.

Do not place the hardware on an unstable cart, stand, tripod, bracket, or table. Any mounting of the product should follow the manufacturer's instructions.

**Power Sources** – This product should be operated only from the type of power source indicated on the marking label or in this Installation Guide. If you are not sure of the type of power supply in your facility, consult your authorized SiteSage Channel Partner.

**Grounding or Polarization** – This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

**Power-Cord Protection** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

**Lightning** – For added protection for this product during a lightning storm, unplug it from the wall outlet. This will prevent damage to the product due to lightning surges.

**Overloading** – Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

**Object and Liquid Entry** – Never push objects of any kind into this product through openings (if any) as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

**Servicing** – Refer all servicing to qualified service personnel.

**Damage Requiring Service** – Refer servicing to qualified service personnel under the following conditions:

- If liquid has been spilled, or objects have fallen into the product.
- If the product has been exposed to rain or water.
- If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive (and expensive) work by a qualified technician to restore the product to its normal operation.
- If the product has been dropped or damaged in any way.

**Replacement Parts** – When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer. Unauthorized substitutions may result in fire, electric shock, or other hazards and voiding of warranties.

**Safety Check** – Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

**Heat** – The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products that produce heat.

## **Federal Communications Commission (FCC)**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are design to provide reasonable protection against harmful interference in an installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, please check with your Authorized SiteSage Channel Partner or a qualified technician.

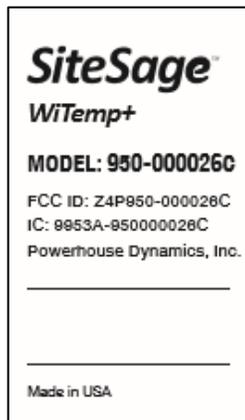
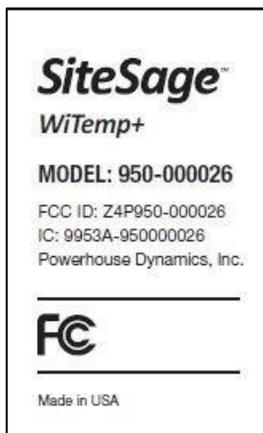
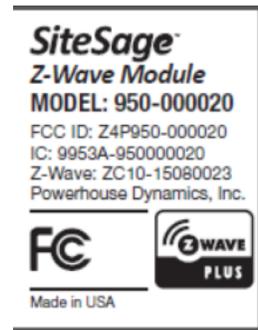
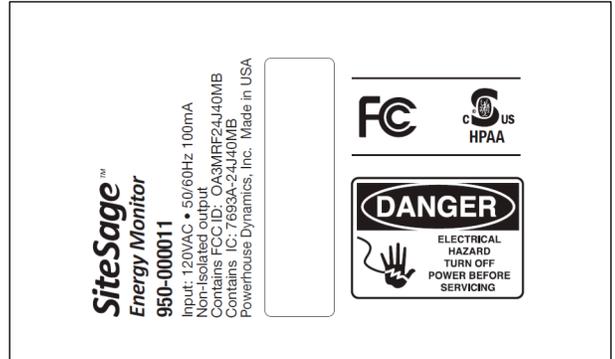
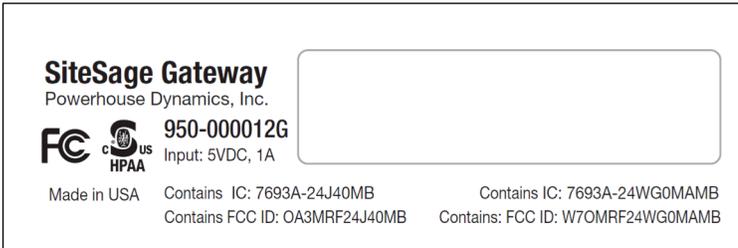
## **Declaration of Conformity**

SiteSage complies with part 15 of the FCC rules. Operation is subject to the following conditions:

- The devices may not cause harmful interference, and
- The devices must accept any interference received, including interference that may cause undesired operation.

## Declaration of Conformity:

### FCC Class B approval



### Z-Wave Radio

FCC ID: Z4P-950-000018

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.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

IC ID: 9953A-950000018

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

## **WiTemp+ Radio**

FCC ID: Z4P-950-000026

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.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

IC ID: 9953A-950000026

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

## **FCC Caution**

Shielded interconnect cables and a shielded AC power cable must be employed with this equipment to ensure compliance with the pertinent RF emission limits governing the device.

Any changes or modifications not expressly approved by Powerhouse Dynamics could void your authority to operate the equipment.

Do not co-locate or use with other devices that contain antennas.

## **Power Safety**

**Only use the supplied power cords.**

**Do not place anything on the power cord. Place the Power Cord where it will not be in the way of foot traffic.**

## **FCC Radiation Exposure Statement**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. Do not maintain equipment within 20cm of your body.

## **Federal Communications Commission (FCC)**

Cet équipement a été testé et trouvé conforme aux normes d'un appareil numérique de Classe A, conformément à la partie 15 des Règles FCC. Les normes sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation. Cet équipement génère, utilise et peut émettre de l'énergie de fréquence radio et, s'il n'est pas installé conformément aux instructions, peut causer des interférences nuisibles aux communications radio. Toutefois, il n'y a aucune garantie que des interférences ne se produiront pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou télévision, ce qui peut être déterminé en éteignant puis en rallumant l'appareil, veuillez vérifier avec un partenaire autorisé de SiteSage ou un technicien qualifié.

## **Déclaration de Conformité**

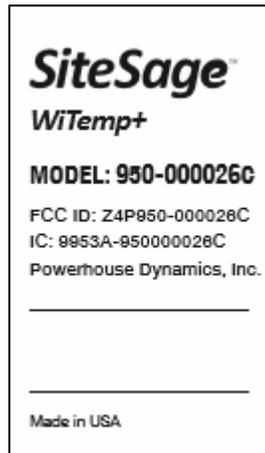
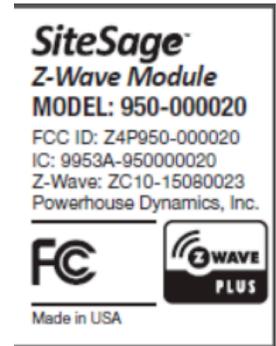
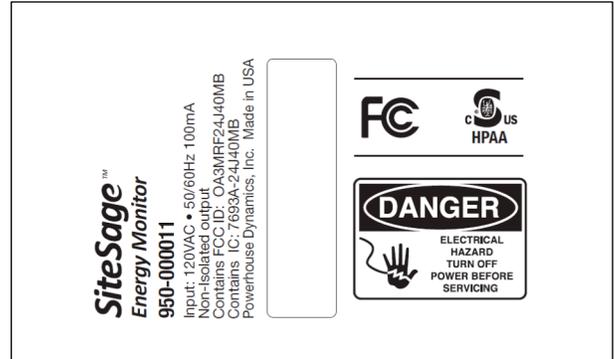
SiteSage est conforme à la partie 15 des règles FCC. Son fonctionnement est soumis aux conditions suivantes:

- Les périphériques ne peuvent pas provoquer d'interférences nuisibles, et

- Les appareils doivent accepter toute interférence reçue, y compris des interférences pouvant provoquer un fonctionnement indésirable.

## Déclaration de conformité:

### FCC Classe B approbation



### Z-Wave Radio d'émission

FCC ID: Z4P-950-000018

Cet appareil est conforme à la partie 15 des Règles FCC. Son fonctionnement est soumis aux deux conditions

suivantes : (1) Cet appareil ne doit pas provoquer d'interférences nuisibles, et (2) cet appareil doit accepter toute interférence reçue, y compris des interférences pouvant provoquer un fonctionnement indésirable.

Attention: Les changements ou modifications non approuvés expressément par la partie responsable de la conformité pourrait annuler l'autorité de l'utilisateur à faire fonctionner l'équipement.

VEUILLEZ NOTER: Cet équipement a été testé et trouvé conforme aux normes pour un appareil numérique de Classe B, conformément à la partie 15 des Règles FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Cet équipement génère, utilise et peut émettre de l'énergie de fréquence radio et, s'il n'est pas installé et utilisé conformément aux instructions, il peut causer des interférences nuisibles aux communications radio. Toutefois, il n'y a aucune garantie que des interférences ne se produiront pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou télévision, ce qui peut être déterminé en allumant et en éteignant l'équipement, l'utilisateur est encouragé à essayer de corriger les interférences en prenant une ou plusieurs des mesures suivantes:

- Réorienter ou déplacer l'antenne de réception.
- Augmenter la séparation entre l'équipement et le récepteur.
- Branchez l'équipement à une prise sur un circuit différent de celui sur lequel le récepteur est connecté.
- Consulter le revendeur ou un technicien radio/TV expérimenté pour obtenir de l'aide.

IC ID: 9953A-950000018

Cet appareil est conforme aux normes Industrie Canada exemptes de licence RSRT. Son fonctionnement est soumis aux deux conditions suivantes:

- (1) Cet appareil ne doit pas provoquer d'interférences, et
- (2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable.

### Avertissement de la FCC

Des câbles isolés d'interconnexion et d'alimentation CA doivent être employés avec cet équipement afin d'en assurer la conformité aux normes des émissions RF régissant le périphérique.

Les changements ou modifications non approuvés expressément par Powerhouse Dynamics peuvent entraîner l'annulation de votre autorisation à utiliser cet équipement.

Ne pas co-planter ou utiliser avec d'autres appareils qui contiennent les antennes  
Sécurité de l'alimentation électrique

**Utilisez uniquement des cordons d'alimentation fournis.**

**Ne placez rien sur le cordon d'alimentation.**

**Placez le cordon d'alimentation en dehors du passage.**

**Déclaration FCC Sur L'exposition aux Radiations**

Cet équipement est conforme aux normes FCC d'exposition en matière de radiations définies pour un environnement non contrôlé. Ne pas maintenir le matériel à moins de 20 cm de votre corps.

## Warranty

Powerhouse Dynamics warrants SiteSage hardware against defects in materials and workmanship for a period of two (2) years from the date of installation. (SiteSage accessories, provided by 3<sup>rd</sup> parties, such as thermostats, are warranted for 1 year from purchase as per the manufacturer warranty). During the warranty period Powerhouse Dynamics will repair or replace any defective product at no charge. The defective product must be returned to Powerhouse Dynamics and properly packed before shipping unless arrangements are made for advance replacement. Powerhouse Dynamics is not responsible for removal or reinstallation after the first 30 days.

This Warranty does not cover damage from accident, misuse or abuse, incorrect installation, installation at environmental conditions outside the specifications, lack of reasonable care, non-approved repair services, or the fixing of any attachment that did not come with the product or is not specifically authorized by Powerhouse Dynamics. This Warranty is invalidated if the unit is transferred from its original owner to another location.

THE FOREGOING EXPRESS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES WILL POWERHOUSE DYNAMICS BE RESPONSIBLE FOR ANY INDIRECT, CONSEQUENTIAL, SPECIAL OR INCIDENTAL DAMAGES, OR PROPERTY LOSS OR INJURY.