Monitoring
For Business-Critical Continuity

Liebert OpenComms™ EM

User Manual

Liebert

EMERSON
Network Power

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FIGURES

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1.0 INTRODUCTION

The Liebert OpenComms™ EM is a compact, half-duplex device designed to monitor temperature, humidity, water detection and contact closure and notify personnel when those conditions exceed user-defined limits.

The OpenComms EM is available in several models, which vary in size and number and types of ports. All models have sensor ports to monitor temperature, humidity, water detection and contact closure, and all models have either an external or built-in temperature/humidity sensor:

• **EM Controller**	• has **two sensor ports** • ships with **an external sensor** to detect temperature only (TMNET kit) or both temperature and humidity (THCMNET kit) • has no serial ports • takes up zero U rack space
• **EM PDU Controller**	• has **two sensor ports** • ships with **an external sensor** to detect temperature only (TMPDUNET kit) or both temperature and humidity (THCMPDUNET kit). • has **two serial ports** to monitor Liebert MP Advanced Power Strips • takes up zero U rack space
• **vEM-14 Controller**	• has **four sensor ports** • has a **built-in temperature and humidity sensor** • has **two serial ports** to monitor Liebert MP Advanced Power Strips • has **10 dry contact inputs** • takes up 1U rack space

Sensor Ports

The OpenComms EM has sensor ports capable of monitoring temperature, humidity, water detection and contact closure through sensors that may be purchased separately (see **Table 3**). The unit's auto-sensing capability can determine which type of sensor is connected, making the unit ready to plug into your operation. Default settings for alarm limits may be changed through a Web interface.

Ethernet Ports

The unit has an Ethernet port for connection to a network, which provides access to the Web interface and the capability of receiving alerts when monitored conditions reach alarm status. The OpenComms EM may also be configured to send e-mail alerts and SNMP traps over the network.

Modem Port

A modem port provides the capability of sending pager messages to notify personnel of alarm conditions in the monitored area.

Web Interface

A Web interface makes it easy to view monitoring data in tabular and graphic formats, configure the device for alarm thresholds and set up automatic e-mail and pager notifications when a level in a monitored area crosses a predefined threshold.

Serial Ports (EM PDU / vEM-14 Controllers)

EM PDU and vEM-14 controllers have two serial ports that are ideal for monitoring Liebert Managed Power (MP) Advanced Power Strips. Power, voltage, current and temperature levels can be monitored with user-configured alarm thresholds. In addition, some MP Advanced Power Strip models allow each receptacle on the power strip to be turned on or off through the Web interface.

Typical Applications

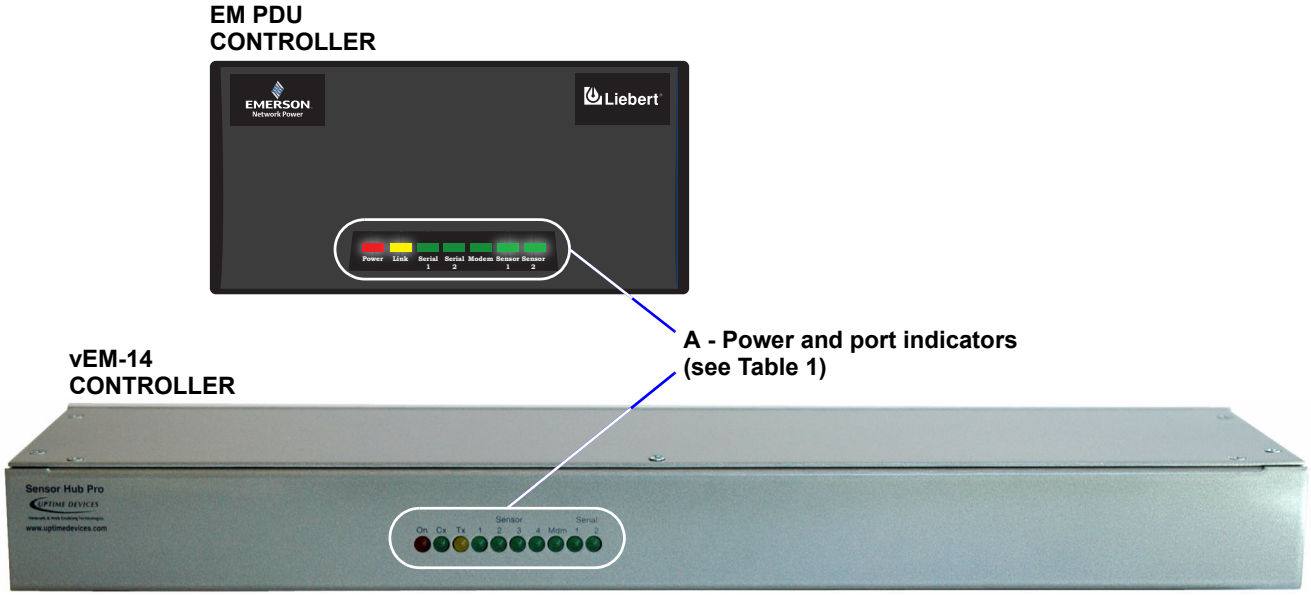
An OpenComms EM is highly useful in monitoring:

- **Enclosures**, particularly those housing electronic equipment such as servers or telephone switching equipment sensitive to temperature, humidity and power fluctuations
- **Process Areas**, such as areas where environmentally sensitive chemical reactions occur
- **A closet or an area of a room** where temperature levels are important, for example, an area that houses many servers, where you want to verify the area or closet doesn't get too hot

1.1 Overview

The OpenComms EM features indicator lights on the front, as shown in **Figure 1**.

Figure 1 Front view (EM PDU & vEM-14 controllers shown)



1.1.1 Dimensions and Mounting Overview - EM & EM PDU Controllers

- The unit is 4.75" wide, x 2.5" deep x 1.625" high (120.7 x 63.5 x 41.3mm).
- The unit may be placed on a flat surface or mounted on a wall, using mounting holes on the bottom of the unit. See **2.2.1 - Mounting the Unit on a Wall (EM / EM PDU Controllers)** for more information.

1.1.2 Dimensions and Mounting Overview - vEM-14 Controllers

- The unit is 17" wide x 5" deep x 1.75" high (431.8 x 127 x 44.5mm).
- The unit may be placed in a rack-mount or desktop orientation.

1.1.3 Connectors on Back of Unit

The back of the OpenComms EM, shown in **Figure 2**, has an input power source, sensor ports, a modem port and an Ethernet port. The EM PDU and vEM-14 controllers have serial ports, and vEM-14 controllers also have 10 dry contact inputs.

Figure 2 Rear view

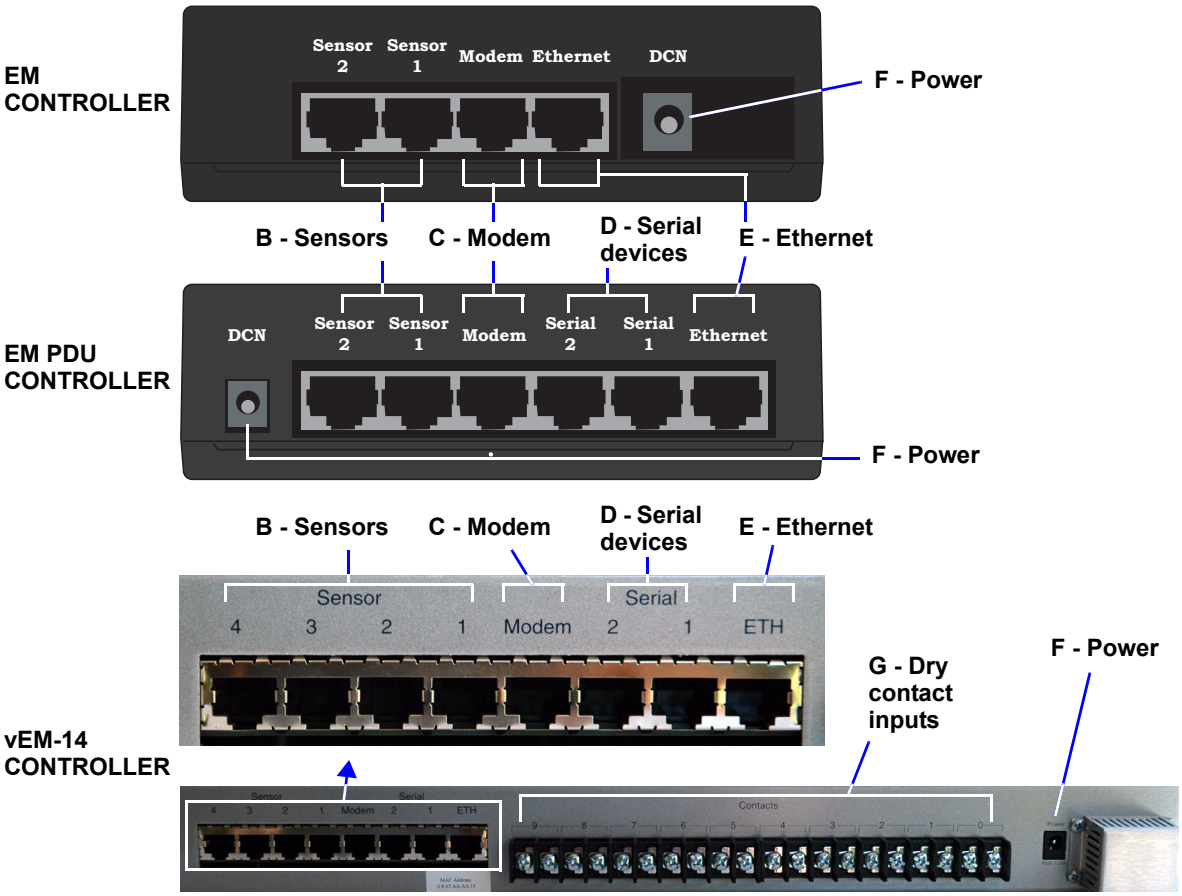


Table 1 Description of indicators and connectors

Item	Description	For more information, see:
A - Power and port indicators	Indicators on the front of the unit show the status of input power and other connections (see **Figure 1**).	1.2: Indicators
B - Sensors	Sensor ports to connect compatible sensors: • Temperature sensor (provided with TMNET & TMPDUNET kits) • Temperature & humidity combination sensor (provided with THCMNET & THCMPDUNET kits) • Humidity, water detection or dry-contact sensor (available separately)	2.3.4: Connect Sensors 5.3: Sensors Window
C - Modem	Port for connection to a modem. • Requires RJ45 cable (customer-supplied)	2.3.3: Connect to a Modem
D - Serial devices	Serial 1 and Serial 2 ports to connect serial devices (EM PDU and vEM-14 controllers). • Requires serial cable (one provided)	2.3.5: Connect Serial Devices (EM PDU/vEM-14 Controllers) 5.4: Power Window (EM PDU & vEM-14 Controllers) 5.7.4: Serial Ports
E - Ethernet	Port for connection to an Ethernet network. • Requires RJ45 cable (customer-supplied)	2.3.2: Connect to an Ethernet Network 5.7.1: Network Connectivity
F - Power	Power connection for the OpenComms EM. • Requires 9VDC	2.3.1: Connect Power to the Unit
G - Dry contact inputs	10 dry contact inputs for auxiliary devices (vEM-14 controller). • Requires Form C dry contacts	—

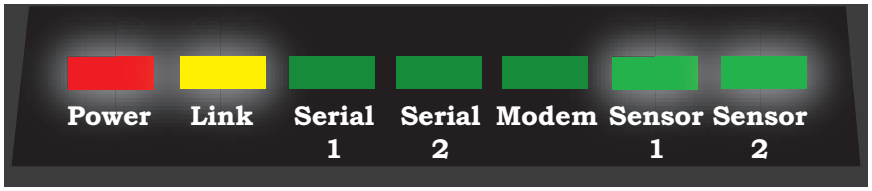
1.2 Indicators

The front of the OpenComms EM has indicators that show input power to the unit and the status of various connections, as shown in **Figure 3** and described in **Table 2**.

Figure 3 Indicators on front of unit

EM CONTROLLER

EM PDU CONTROLLER



vEM-14 CONTROLLER

Table 2 Indicators summary

Indicator Type	Indicator Label on Model:			Color	Description
	EM	EM PDU	vEM-14		
Power	Power	Power	On	Red	Power is connected and powering the OpenComms EM.
Ethernet	Link	Link	Cx/Tx	Yellow	The OpenComms EM is connected to an active network.
Sensor port	Sensor 1	Sensor 1	Sensor 1	Green	A sensor is connected to the Sensor 1 port.
	Sensor 2	Sensor 2	Sensor 2	Green	A sensor is connected to the Sensor 2 port.
	—	—	Sensor 3**	Green	A sensor is connected to the Sensor 3 port.
	—	—	Sensor 4**	Green	A sensor is connected to the Sensor 4 port.
Serial port*	—	Serial 1	Serial 1	Green	A device is connected to the Serial 1 port.
	—	Serial 2	Serial 2	Green	A device is connected to the Serial 2 port.
Modem	Activity	Modem	Mdm	Green	A modem is connected.

* EM PDU and vEM-14 controllers

** vEM-14 controllers

2.0 INSTALLATION

This section provides instructions for installing, mounting and connecting power and other cables to the OpenComms EM.

2.1 Installation Considerations

The OpenComms EM must be installed indoors where electrical service is available. The unit should be placed where it can be easily accessed for connecting the unit to a modem, a computer or a network hub and, if used, serial devices.

The unit may either be mounted on a wall or be placed on a surface, depending on the user's application and the location of equipment to be connected and monitored. Consider the length of the sensor cable and the distance to the monitored area when deciding where to place the OpenComms EM, whether you use the 1-ft. (0.3m) cable provided with the unit or the optional 15-ft. (4.6m) cable that may be purchased separately.

2.1.1 Unpacking and Preliminary Inspection

- Before unpacking the OpenComms EM, inspect the shipping carton for damage or signs of mishandling, such as gashes or holes in the carton or severely flattened corners.
- Open the shipping carton carefully. Use care to avoid puncturing the container with sharp objects that might damage the contents.
- Inspect the OpenComms EM and all included components for damage. See **Table 3** for a list of items that should be included with each model.
- If any damage from shipping or mishandling is observed, immediately file a damage claim with the shipping agency and forward a copy to:

  Liebert Corporation
  Attn: Traffic Department
  1050 Dearborn Drive
  P.O. Box 29186
  Columbus, OH 43229

Table 3 Standard and optional components shipped with OpenComms EM

STANDARD COMPONENTS (Shipped With Kits)	Kit Part Number				
	TMNET	THCMNET	TMPDUNET	THCMPDUNET	vEM-14
• EM Controller - 2 sensor ports	✔	✔	—	—	—
• EM PDU Controller - 2 sensor ports, 2 serial ports	—	—	✔	✔	—
• vEM-14 Controller - 4 sensor ports, 2 serial ports	—	—	—	—	✔
• CD with software and user manual	✔	✔	✔	✔	✔
• Power supply	✔	✔	✔	✔	✔
• Quick-start guide	✔	✔	✔	✔	✔
• Temperature sensor, 1 ft. (0.3m)	✔	—	✔	—	—
• Temperature & humidity combination sensor, 1 ft. (0.3m)	—	✔	—	✔	—
• Built-in temperature and humidity sensor	—	—	—	—	✔
• Serial cable for MP Advanced Power Strips, 5 ft. (1.5m)	—	—	✔	✔	—
OPTIONAL COMPONENTS (May be Purchased Separately)					
• Contact closure cable, 15 or 100 ft. (4.6 or 30.5m)	• Humidity sensor, 15 or 60 ft. (4.6 or 18.3m)				
• Water detection sensor, 15 or 60 ft. (4.6 or 18.3m)	• Temperature sensor, 15 or 60 ft. (4.6 or 18.3m)				
• Serial cable for MP Advanced Power Strips, 10 ft. (3m)	• Temperature & humidity combination sensor, 15 or 60 ft. (4.6 or 18.3m)				

2.2 Decide on Placement of the OpenComms EM

The unit may either be placed on a level surface or mounted on a wall, depending on the user's application and the location of equipment to be connected and monitored. vEM-14 controllers may also be mounted in a rack.

- If placing the unit on a level surface, such as a shelf or a desk, proceed to **2.3 - Make Connections**.
- For wall or rack mounting, see the appropriate section for your model:
  - **2.2.1 - Mounting the Unit on a Wall (EM / EM PDU Controllers)**

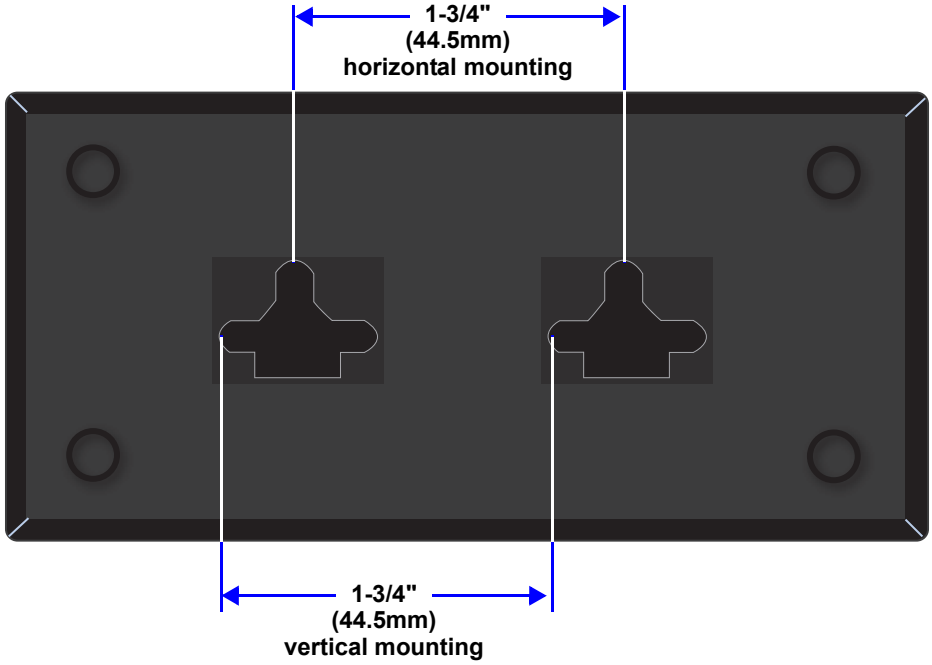
    or
  - **2.2.2 - Mounting the Unit on a Wall or in a Rack (vEM-14 Controllers)**

2.2.1 Mounting the Unit on a Wall (EM / EM PDU Controllers)

The bottom of the EM / EM PDU controller has two holes to accommodate screws to secure the unit to a wall, either horizontally or vertically. You will need a screwdriver and any screws or bolts that will fit in the slots on the bottom of the unit.

1. Mark the wall for the mounting holes 1-3/4" (44.5mm) apart (see **Figure 4**).
2. Drill holes, if required, to install the two screws that will secure the unit to the wall. Clean up the debris.
3. If the wall material is not strong enough to hold the screws securely, use wall anchors.
4. Install the two screws—the screw heads must be small enough to slip through the larger, bottom portion of the mounting slot in the OpenComms EM (see **Figure 4**). The screws must also be large enough to extend over the edges of the top of the mounting slot.
5. Tighten the screws until they will hold the OpenComms EM tightly to the wall.
6. Hang the OpenComms EM on the screws, pushing the unit down until the screws are in the smaller, upper portion of the slot.
7. Proceed to **2.3 - Make Connections**.

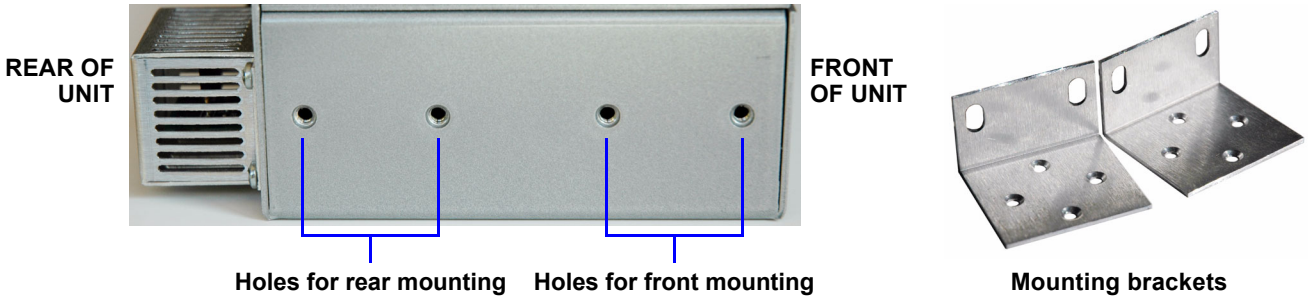
Figure 4 Mounting dimensions - EM / EM PDU Controllers



2.2.2 Mounting the Unit on a Wall or in a Rack (vEM-14 Controllers)

The vEM-14 controller may be mounted on a wall or in a rack, such as the Liebert Foundation. The unit has four holes on each side, as shown in **Figure 5**.

Figure 5 Mounting - vEM-14 Controllers



After determining where to place the unit, check to ensure that you have all the hardware required to install the unit in a rack.

Obtain the needed tools and material. You will need these items for wall or rack mounting:

- Brackets for rack mounting - 2 (provided)
- Screws to attach brackets - 4 (provided)
- Phillips screwdriver

Follow the instructions below for either **Wall Mounting** or **Rack Mounting**.

Wall Mounting

The vEM-14 controller has four holes on each side to accommodate various ways of attaching the brackets (see **Figure 5**).

The brackets can be installed facing up or down for wall mounting.

1. Mark the wall for the mounting holes 1-3/4" (44.5mm) apart (see **Figure 5**).
2. Drill holes, if required, to install the screws that will secure the unit to the wall. Clean up the debris.
3. If the wall material is not strong enough to hold the screws securely, use wall anchors.
4. Install the screws and tighten until they will hold the brackets tightly to the wall.
5. Hang the unit on the brackets.
6. Proceed to **2.3 - Make Connections**.

Rack Mounting

The vEM-14 controller has four holes on each side to accommodate various ways of attaching the brackets (see **Figure 5**). The unit may be front- or rear-mounted, and it can fit into a 19" or 23" rack.

The brackets can be installed facing forward or toward the rear for rack mounting.

1. Decide whether the unit will be front- or rear-mounted. Use the longer side of the bracket for a 19" rack; use the shorter side of the bracket for a 23" rack:
2. Attach the bracket using two screws at front of unit for front mounting. For rear mounting, use holes at rear of unit. Attach the second bracket on the other side.
3. Slide the unit into the rack and secure the brackets to the frame (mounting hardware not included).
4. Proceed to **2.3 - Make Connections**.

2.3 Make Connections

All ports are on the back of the OpenComms EM. The port placement and port labels differ for each model. Refer to **Figure 2** for your model.

2.3.1 Connect Power to the Unit

- Connect the DC power adapter to the DCN/Power port on the back of the OpenComms EM, as shown in **Figure 2**. When power is connected, the Power indicator on the front is ON (red).

2.3.2 Connect to an Ethernet Network

- Connect a straight-through CAT5 Ethernet cable from your 10 Mbit network to the Ethernet/ETH port on the back of the OpenComms EM (see **Figure 2**).
- When the unit is connected to an active network, the Link/Cx indicator on the front is ON (green).

2.3.3 Connect to a Modem

- If using a modem, connect an RJ45 cable from a modem to the Modem port on the back of the unit (see **Figure 2**). Also refer to **6.1 - Modem Setup and Pinout Guide**.
- When the unit is connected to a modem, the Activity/Modem/Mdm indicator on the front is ON (green).

2.3.4 Connect Sensors

Use a sensor—temperature, humidity, combination temperature & humidity or water detection (see **Table 3**)—or a contact closure cable (see **6.2 - Contact Closure Cable Pinout Guide**).

For a contact closure cable, the orange/white and white/orange wires must be tied together to form the common. The blue/white wire is the contact that may be defined as either Normally Open or Normally Closed.

- Connect a sensor or contact closure cable to any sensor port—for example, Sensor 1—shown in **Figure 2**. These connections may be made in any order; the ports are identical and are configured to accept and recognize all types of sensors.
- When a sensor or contact closure cable is connected properly to any sensor port, the corresponding Sensor indicator on the front is ON (green).

2.3.5 Connect Serial Devices (EM PDU/vEM-14 Controllers)

Use the serial cable provided with EM PDU controllers (available separately for vEM-14 controllers), or see **6.3 - Serial Cable Pinout Guide (EM PDU & vEM-14 Controllers)**.

- Connect the six-wire end of the serial cable into the RS232 port of an MP Advanced power strip.
- Connect the other end (eight-wire) of the serial cable to either serial port (Serial 1 or Serial 2) of the OpenComms EM, shown in **Figure 2**.
- When a cable is connected properly to either port, the corresponding Serial 1 or Serial 2 indicator on the front is ON (green).

3.0 ASSIGN AN IP ADDRESS

After connecting the OpenComms EM device to your network, the next step is to identify the device to the network by assigning an IP address.

Consult Your Network Administrator

Consult your network administrator to obtain an IP address that is appropriate for your network, as well as a subnet mask and default gateway address. When your device is assigned a new IP address, it is saved in the Electrically Erasable Programmable Read-Only Memory (EEPROM), meaning the unit will retain its IP address even after power is recycled.

Select a Method

There are three methods of assigning the IP address, as listed in **Table 4**, depending on your network's method of assigning IP address (static or dynamic) and your computer's operating system (OS). The IPSET.exe program is included on the CD that came with your unit.

Select a method and refer to **Table 4** to determine which instructions to follow.

Table 4 Methods of assigning IP addresses

Method	Recommended for:	Follow instructions in:
IPSET.exe program	Network that uses static IP addresses; computer with Windows operating system (shipped with unit)	**3.1 - Use IPSET.exe to Assign an IP Address**
ARP command	Network that uses static IP addresses; computer with Windows or other operating system	**3.2 - Use ARP to Assign an IP Address**
DHCP	Network that uses Dynamic Host Configuration Protocol (DHCP), where IP addresses are assigned dynamically	**3.3 - Use DHCP to Assign an IP Address**

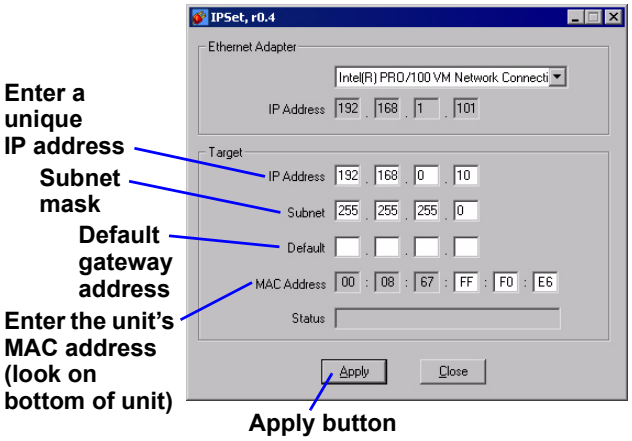
3.1 Use IPSET.exe to Assign an IP Address

If your network uses static IP addresses and your computer has a Windows operating system, you may use the **IPSET.exe** program included on the CD that came with your unit.

NOTE
These steps must be done on the same network segment where the OpenComms EM is connected.

To do this:

1. Insert the OpenComms EM CD in the CD drive.
2. Click on the **Start** button, then on **Run**.
3. In the Run window, click on **Browse** to locate the file **IPSET.exe** on the CD, highlight the file name and click **Open**.
4. In the Run window, click **OK**. The IPSet window opens, as shown at right.
5. In the IP address box in the Target area, enter the IP address for your unit.
   Note: The IP address must be unique on the network—not assigned to any other device.



6. Enter the Subnet Mask of your network in the Subnet box. (Depending on your IP address, some or all of the Subnet Mask might be entered automatically after you enter the IP address.)
7. Enter the default gateway address in the Default box.
8. In the MAC address box, enter the MAC address of your device.
   Note: The MAC address is found on a sticker on the bottom of the device.
9. Click on the **Apply** button. If the device identification is successful, the message "Successfully set IP address" appears in the Status box. (If not, the message "No response from target" appears in the Status box.)
10. Click on the **Close** button and proceed to **4.0 - Web Interface Overview**.

3.2 Use ARP to Assign an IP Address

This method may be preferable if you are not using a Microsoft host.

NOTE
These steps must be done on the same network segment where the OpenComms EM is connected.

To use the ARP command:

1. Open a command prompt. In Windows, one way to do this is:
   - Click on the **Start** button, then on **Run**.
   - In the Run window, enter **cmd** in the Open box, then click **OK**.
2. At the command prompt (C:\>), enter:
   arp -s *[IP address] [MAC address]*
   where:
   - *[IP address]* is the IP address you are assigning—for example, 192.168.1.20
     Note: The IP address must be unique on the network—not assigned to any other device.
   - *[MAC address]* is the device's MAC address—for example, 00-08-67-FF-ED-BB.
     Note: The MAC address is found on a sticker on the bottom of the device.

   For example:
   arp -s 192.168.1.20 00-08-67-FF-ED-BB
3. To verify the device can be recognized, enter the following at the command prompt (C:\>):
   ping *[IP address]*
   where:
   [IP address] is the same IP address entered in **Step 2**.
   For example:
   ping 192.168.1.20
   If the IP address was successfully assigned, the display will show replies from the device and statistics. If not, the message **Request timed out** appears, and statistics for packets received is 0 (zero).
4. Exit from the command prompt and proceed to the next section.

3.3 Use DHCP to Assign an IP Address

NOTE
Use this method if your network uses DHCP, or Dynamic Host Configuration Protocol.

If the IP address acquisition on the device is set to DHCP—for details about the IP Address Acquisition box, see **5.7.1 - Network Connectivity**—the device will put out a request to a DHCP server to be assigned an IP address. This request is a broadcast message that is sent to all nodes on the network and, if necessary, is forwarded by routers to a DHCP server. The DHCP server responds by sending the device a new IP address and a lease period.

You must have a DHCP server to use this type of IP address assignment. Many routers have built-in DHCP servers. See your DHCP server's manual for more information on how the server assigns IP addresses and lease periods.

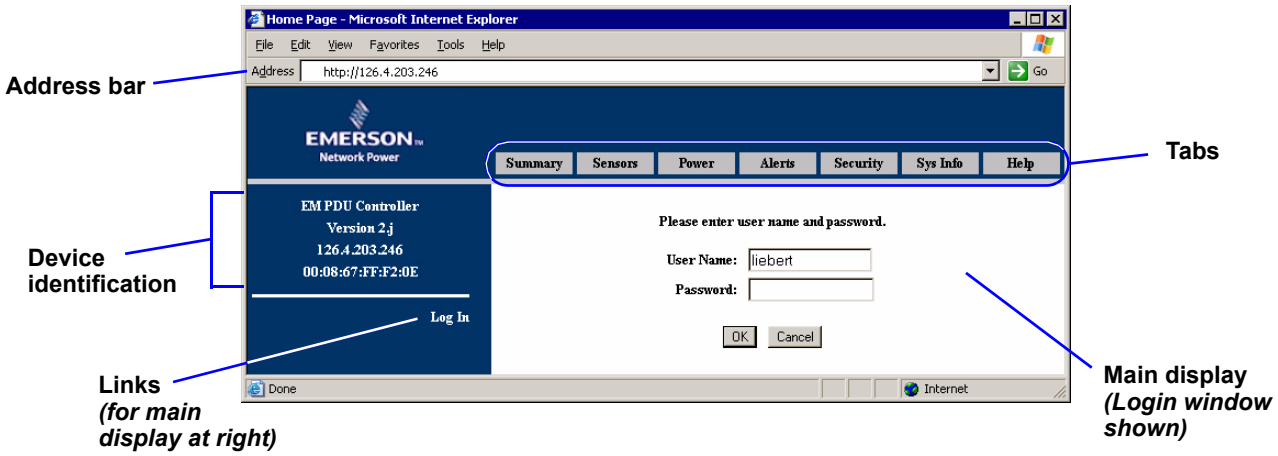
4.0 WEB INTERFACE OVERVIEW

This section provides a quick look at the OpenComms EM Web interface and the viewing and configuration functions accessible through tabs at the top of the window.

For step-by-step instructions on using the Web interface, proceed to **5.0 - Getting Started With the Web Interface**.

4.1 Main Parts of the Web Interface

The Web interface gives you access to all the features of the OpenComms EM device. You may use any Internet browser to access the Web interface. The browser shown below is just one example.



The main parts of the window are:

- **Address bar** - enter the IP address or hostname of the OpenComms EM device and press Enter (or click **Go**) to access the Web interface. In the example shown above, the IP address is 126.4.203.246.
- **Tabs** - click on any tab to change the window shown in the Main display.
- **Main display** - this area varies according to the tab selected. The example above shows the Login window that appears when you first open the Web interface and log in.
- **Links** - click on additional options to change the information that appears in the Main display on the right side of the window, depending on the tab selected. If no additional options are available, a description of the Main display appears in this area.
- **Device identification**, at left below the logo, displays information about the unit:
  - The OpenComms EM model—for example, EM Controller or EM PDU Controller.
  - The firmware version currently installed on the unit—for example, Version 2.0. For instructions on updating the firmware, see **7.0 - Downloading Firmware Updates**.
  - The IP address assigned to the unit—for example, 126.4.203.246—entered during setup. For information on setting up or changing the IP address, see **3.0 - Assign an IP Address** and **5.7.1 - Network Connectivity**.
  - The unit's MAC address (factory-configured)—for example, 00:08:67:FF:F0:E6. This number is a unique identifier for your device. The MAC address is also found on a sticker on the bottom of the unit.

4.2 Tabs

The tabs at the top right of the Web interface window provide access to all the functions of the OpenComms EM device. **Table 5** summarizes these functions and where to find more information.

Table 5 Summary of tab functions

Tab	Display	Additional Links	Description	For details, see:
Summary	Summary window	—	View current value & status of all connected devices	**5.2 - View Summary Data**
Sensors	Sensors window	Data	View all data for connected devices	**5.3.1 - Configure Sensors**
		Names	Change names of connected devices	**5.3.2 - Create or Change Sensor Names**
		Graph	Display data in graph format	**5.3.3 - View Sensor Graphs**
Power (EM PDU & vEM-14 controllers)	Power window	—	View and set up MP Advanced Power Strips	**5.4 - Power Window (EM PDU & vEM-14 Controllers)**
Alerts	Alerts window	Email	Activate and configure automatic e-mail alerts	**5.5.1 - E-Mail Setup**
		Modem	Activate and configure automatic pager alerts	**5.5.2 - Modem Setup**
		SNMP Traps	Activate and configure automatic SNMP trap alerts	**5.5.3 - SNMP Trap Alerts Setup**
Security	Security window	—	Change password to Web interface; set up additional users, type of access, timeout after inactivity	**5.6 - Security Window**
Sys Info	Sys Info window	Network Connectivity	Configure network settings	**5.7.1 - Network Connectivity**
		SNMP Information	Configure unit for SNMP	**5.7.2 - SNMP Information**
		Data Presentation	Change time intervals for updating sensor data, Web page refresh; change temperature units (°F / °C)	**5.7.3 - Data Presentation**
		Serial Ports (not used)	View or change settings for serial ports 1 and 2	**5.7.4 - Serial Ports**

4.3 Color-Coded Status

The Web interface uses color coding to indicate the status of sensors connected to the unit, as shown in **Table 6**, to help you quickly identify sensors that require attention.

In EM PDU and vEM-14 controllers, the same color scheme is used for MP Advanced Power Strips connected to the unit.

These colors are used to display the sensor's name, the current reading and the status of the sensor; the colors are also used in line graphs to indicate alarm thresholds.

Table 6 Color coding used in Web interface

Display Color			Meaning
Sensor Name	**Status & Current Value**	**Graph Line Color**	
Red	Red	Red	Critical state (High Critical, Low Critical, Critical)
Yellow	Yellow	Yellow	Warning state (High Warning, Low Warning)
Green	Green	—	Normal
Gray	Black	—	Not present (not connected to unit)

4.4 Thresholds in the Web Interface

The OpenComms EM collects data from connected sensors at regular intervals. When a reading crosses a user-defined threshold:

- The sensor's status changes.
- Alerts are sent—if the unit is configured for e-mail, pager or SNMP trap alerts.

4.4.1 Temperature/Humidity Sensor Thresholds

Temperature and humidity sensors have four thresholds: High Critical, High Warning, Low Warning and Low Critical. The **Normal** range is determined by these limits. **Table 7** shows examples of limits for these types of sensors. Each level is color-coded in the Web interface for easy identification.

Table 7 Examples of sensor limits - temperature and humidity sensors

Limit	Examples of Limits		Text Display Color		Graph Line Color
	Temperature (°F)	Humidity (% RH)	Sensor Name	Status & Current Value	
High Critical	85	55	Red	Red	Red
High Warning	75	50	Yellow	Yellow	Yellow
Low Warning	65	30	Yellow	Yellow	Yellow
Low Critical	60	25	Red	Red	Red
Other conditions					
Normal	66°F to 74°F	31% to 49%	Green	Green	—
Not Present	(sensor is not connected)		Gray	Black	—

Using the examples of temperature sensor limits in **Table 7**, the following is a typical scenario:

- The temperature of a monitored area rises to 90°F. The status changes at two points:
  - The status changes to **High Warning** when the temperature reaches 75°F. The name of the sensor, the current reading and the status are displayed in yellow text in the Web interface.
  - As the temperature continues to rise, the status changes to **High Critical** at 85°F (displayed in red text).
  - At each change in status, the unit sends alerts if it is configured to do so.
- When the temperature falls to 74°F, the status changes to **Normal** (displayed in green text) and a return-to-normal alert is sent if the unit is configured to send alerts.
- When a sensor is disconnected from the unit, its status changes to **Not Present** (black text) and the sensor's name appears in gray text.

4.4.2 Dry-Contact Sensor Thresholds

A dry-contact sensor has only two states: **Normal** and **Critical**, as shown in **Table 8**. The user defines Normal as either Normally Open or Normally Closed and the OpenComms EM designates the opposite state as Critical.

Table 8 Examples of sensor limits - temperature and humidity sensors

Limit	Example of User-Defined State	Text Display Color		Graph Line Color
		Sensor Name	Status & Current Value	
Critical	Closed	Red	Red	Red
Other conditions				
Normal	Normally Open	Green	Green	—
Not Present	(sensor is not connected)	Gray	Black	—

Using the examples for a dry-contact sensor in **Table 8**, the following is a typical scenario:

- The sensor's normal state is defined as **Normally Open**.
- When the contact closes, the sensor's status changes to **Critical** (displayed in red text). The unit sends alerts, if it is configured to do so.
- When the state changes again (the contact opens), the sensor's status changes to **Normal** (displayed in green text) and a return-to-normal alert is sent if the unit is configured to send alerts.

4.4.3 MP Advanced Power Strip Thresholds

When using the OpenComms EM to monitor MP Advanced Power Strips, you may set thresholds that will trigger alerts for power, voltage, current and temperature sensors in each power strip.

Each sensor has four thresholds: High Critical, High Warning, Low Warning and Low Critical. The **Normal** range is determined by these limits. **Table 9** shows examples of limits for these types of sensors. Each level is color-coded in the Web interface for easy identification.

Table 9 Examples of sensor limits - MP Advanced power strip sensors

Limit	Examples of Limits				Text Display Color		Graph Line Color
	Power (Watts)	Voltage (VAC)	Current (Amps)	Temperature (°F)	Serial Port Name	Status & Current Value	
High Critical	2400	132	20	85	Red	Red	Red
High Warning	1900	126	16	75	Yellow	Yellow	Yellow
Low Warning	1000	114	8	65	Yellow	Yellow	Yellow
Low Critical	500	108	4	60	Red	Red	Red
Other conditions							
Normal	1 to 6999	115 to 125	0.1 to 19.9	66°F to 74°F	Green	Green	—
Not Present	(sensor is not connected)				Gray	Black	—

Using the examples of temperature sensor limits in **Table 7**, the following is a typical scenario:

- The temperature of a monitored area rises to 90°F. The status changes at two points:
  - The status changes to **High Warning** when the temperature reaches 75°F. The serial port name, current reading and status are displayed in yellow text in the Web interface.
  - As the temperature continues to rise, the status changes to **High Critical** at 85°F (displayed in red text).
  - At each change in status, the unit sends alerts if it is configured to do so.
- When the temperature falls to 74°F, the status changes to **Normal** (displayed in green text) and a return-to-normal alert is sent if the unit is configured to send alerts.
- When the serial cable is disconnected from the unit, the status changes to **Not Present** (black text) and the serial port's name appears in gray text.

4.5 Sensor Names and Status

The Web interface displays four items about sensors in all windows available through the Summary, Sensors and Power tabs, as shown in **Table 10**.

The sensor's **Name** is an optional user-defined description; the **Description** is created at the factory and cannot be changed. The **Status** and **Current Value** reflect the most recent sensor reading and are color-coded for easy identification. Status is determined by the thresholds that may be configured by the user.

Table 10 Sensor information - name and status

Item	Description	For more information:
Name (optional)	A user-defined sensor name, if one has been assigned.	See **5.3.2 - Create or Change Sensor Names**
Description	The factory-assigned name, describing the type of sensor and the port where it is connected—for example, **Temperature Sensor 1** applies to any temperature sensor connected to the Sensor 1 port.	— (cannot be changed)
Status	Color-coded text that categorizes the current sensor reading: • **Green: Normal** (within limits or normal state) • **Yellow: High Warning** or **Low Warning** • **Red: High Critical**, **Low Critical** or **Critical** • **Black: Not Present** (not connected to the unit)	See **5.3.1 - Configure Sensors**, **Step 4**, to set up sensor's high and low limits or normal state of sensor.
Current Value	Color-coded text that shows the current sensor reading—for example, the temperature or humidity in a monitored area or the state of a dry-contact device. Colors correspond to the **Status** colors described above.	See **5.7.3 - Data Presentation** to change the data sampling interval.

NOTE

*The sensor is sampled at regular intervals (see **5.7.3 - Data Presentation** to change the interval). At any time, click the **Refresh** button to obtain the current sensor reading.*

4.6 Buttons

The following buttons appear throughout the Web interface:

Table 11 Buttons in the Web interface

Button	Function
Apply	Saves any configuration settings that have been changed.
Close	Closes the current window and returns to the previous window.
Graph	Displays a graph of data gathered by connected sensors and/or MP Advanced Power Strips.
Log Out	Logs the current user out of the Web interface. **Note:** If you close the browser without logging out, you will still be logged in to the Web interface.
Refresh	Updates the current window with the most recent monitoring data.
Reset	Restores all configuration settings in the current window to the previous values, discarding any changes that have been made.
Test	Sends a test e-mail or pager alert, allowing you to confirm e-mail and modem configuration settings.

5.0 GETTING STARTED WITH THE WEB INTERFACE

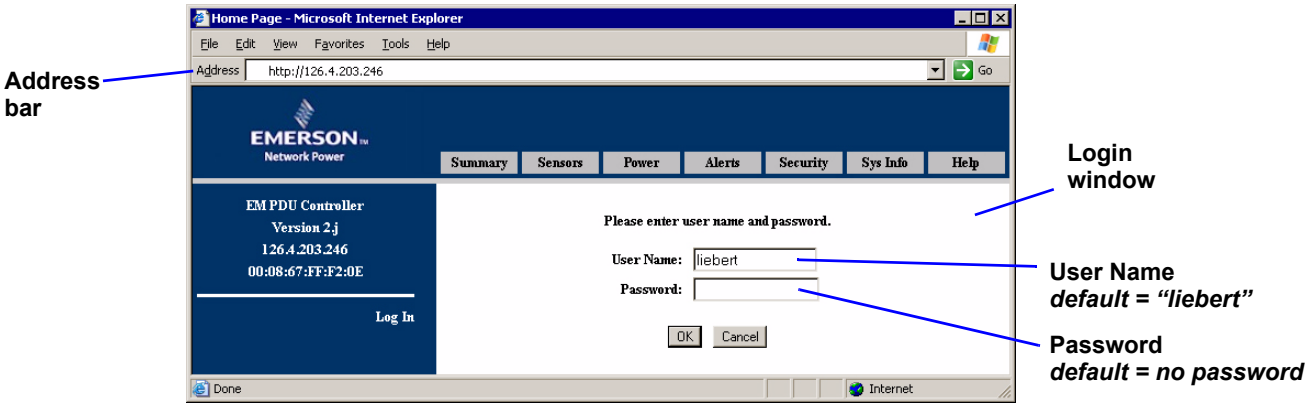
Once the unit is properly installed, you can view its Web interface using an Internet browser. This section provides step-by-step instructions on how to open the Web interface, log in, view monitoring data and view or change configuration settings for the OpenComms EM.

5.1 Open the Web Interface and Log In

You must log in each time you open the Web interface. To allow you to log in the first time, the unit is set up with a default User Name, **liebert**, with no password.

To open the Web interface and log in:

- Open an Internet browser, such as Microsoft Internet Explorer. (One way to do this in Windows is to click on the **Start** button, then on **Programs** and finally on the browser program, for example, **Internet Explorer**.)
- Enter the unit's IP address or hostname into the browser's address bar—for example, 126.4.203.246—and press the Enter key. The Login window appears on the right side of the window, as shown below.

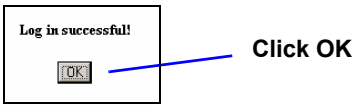


- Enter the appropriate user account name in the User Name box; user names are case-sensitive. The default user name is **liebert** (all lowercase). For instructions on creating user accounts, see **5.6 - Security Window**.
- Leave the Password box blank (the default **liebert** user account has no password).

NOTE

*Liebert recommends creating a password for the default **liebert** user account to prevent unauthorized users from changing configuration settings. For details, see **5.6.1 - Create a Password for the Default Liebert Account (Administrators Only)**.*

- Click **OK**. If an error message appears, try entering the user name again. Remember that is case-sensitive.
- If the login is successful, the following message appears. Click **OK**.



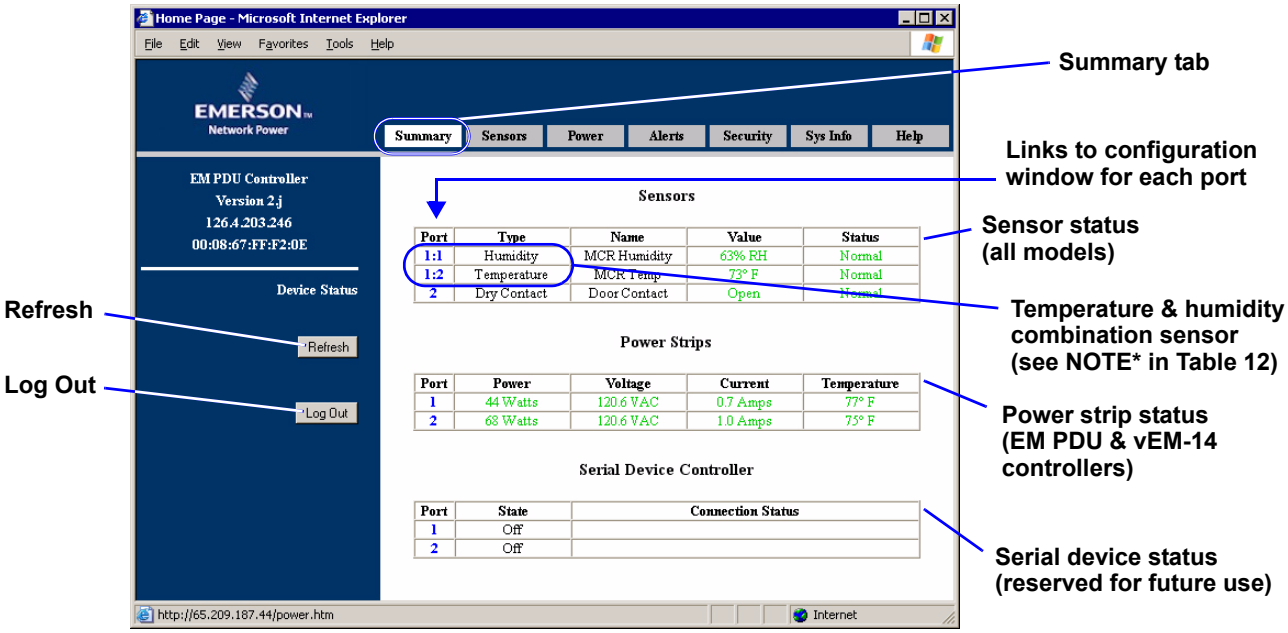
- To begin using the Web interface, proceed to **5.2 - View Summary Data**.

5.2 View Summary Data

The Summary window provides a quick look at the current status of all connected devices, as shown below. This window also has a **Log Out** button to exit the Web interface.

To access the Summary window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Summary** tab at the top of the Web interface. This window also appears after you log in to the Web interface.



Types of Information

The Summary window shows the status of sensors connected to the unit and displays up to three categories of data, depending on the model, as shown in **Table 12**. Each port number in the window is a link that goes to a configuration window for that port.

Table 12 Summary window

Port type	Description	Click on a port number to:
Sensors	Shows the status of sensors connected to the unit—port number, type of sensor, user-defined name (see **5.3.2 - Create or Change Sensor Names**), current sensor reading and status relative to thresholds. * **NOTE (for THCMNET & THCMPDUNET kits only):** The temperature & humidity combination sensor (provided with these kits) appears as two separate sensors on a shared port. In the example above, the sensor is on Port 1, displayed as **1:1** and **1:2**.	• Change threshold settings for any sensor (see **5.3.1 - Configure Sensors**)
Power Strips *(EM PDU & vEM-14 Controllers)*	Shows the status of MP Advanced Power Strips connected to the unit, including the port number and current readings for power, voltage, current and temperature sensors.	• Turn receptacles on or off (see **5.4.1 - Control Receptacles**) • Set thresholds (see **5.4.2 - Configure Thresholds**)
Serial Device Controller *(not used)*	Reserved for future use.	• View settings of the serial port (see **5.7.4 - Serial Ports**)

Update the Information

- Click the **Refresh** button at any time to update the data displayed in the right side of the Summary window. Data is sampled at regular intervals (see **5.7.3 - Data Presentation** to change the sampling interval).

Exit the Web Interface

- To exit the Web interface, click on the **Log Out** button. The opening Login window appears, allowing you either to log in again or to close the Internet browser and exit the program.

5.3 Sensors Window

The Sensors tab provides access to sensor-related data and settings, including:

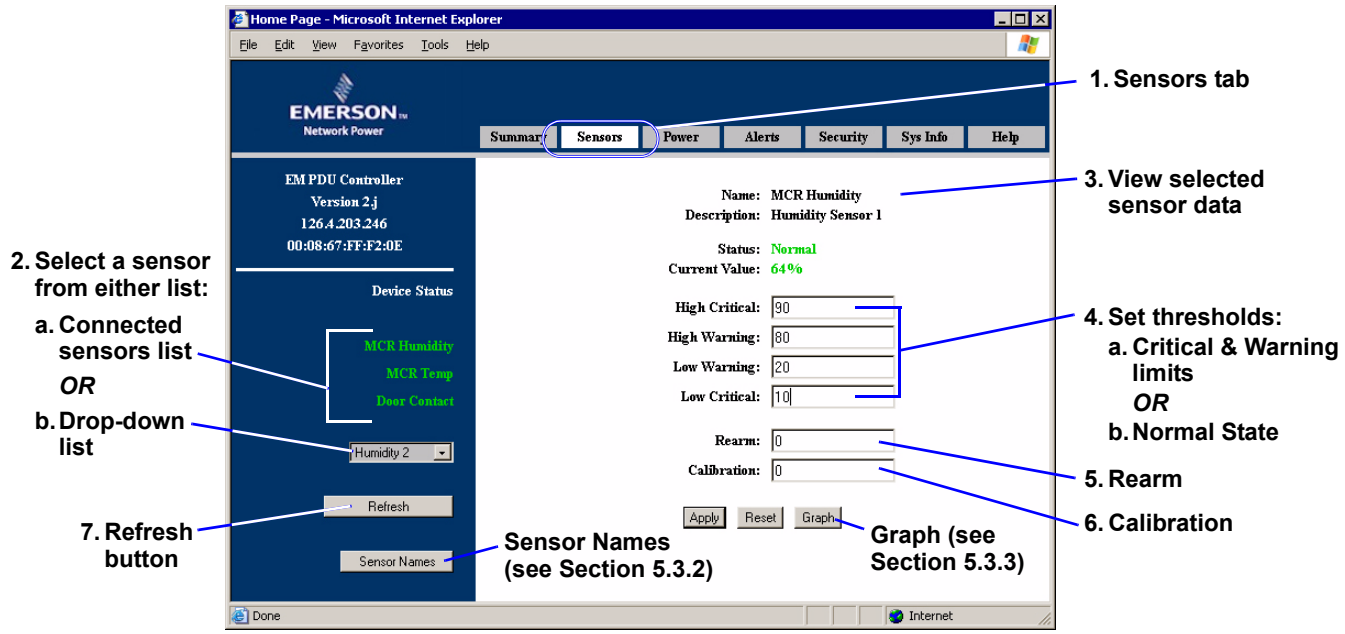
- Setting thresholds that will trigger alerts for each sensor (see **5.3.1 - Configure Sensors**)
- Creating display names for any sensor (see **5.3.2 - Create or Change Sensor Names**)
- Viewing graphs of sensor readings and thresholds (see **5.3.3 - View Sensor Graphs**)

5.3.1 Configure Sensors

The Sensor Data window allows you to set the high and low limits that will trigger alarms for any sensor. You also may specify rearm and calibration values for some sensors.

To access the Sensor Data window, log in (see **5.1 - Open the Web Interface and Log In**) and:

1. Click on the **Sensors** tab at the top of the Web interface, as shown below.



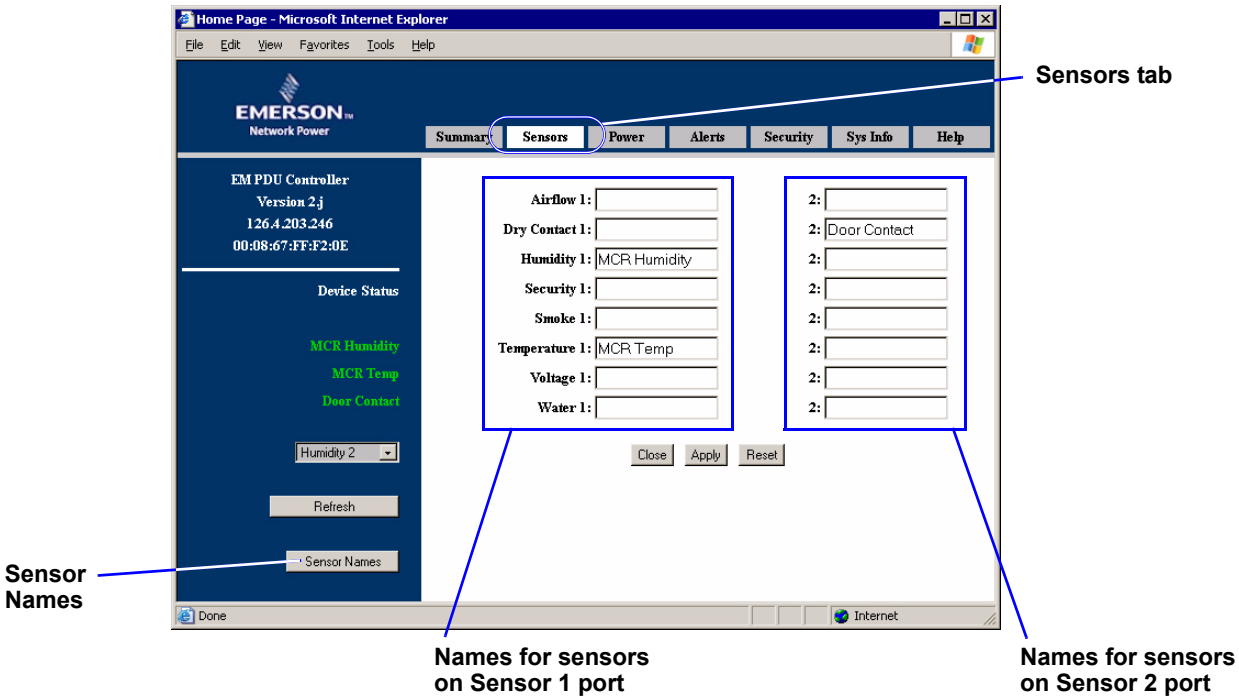
2. Select a sensor from either of the two lists on the left side of the window:
   a. To configure a sensor that is connected to the unit, click on a link in the **connected sensors list**. This list displays only sensors that are connected to the Sensor ports.
   b. To configure sensors that are not connected to the unit, click on the Down arrow to the right of the **drop-down list** and select a name from the list. This list includes all sensors the unit can recognize, allowing you to configure sensors even when they are not connected.
3. The right side of the window displays identifying information for the selected sensor, along with color-coded text showing its most recent status and current reading. See **Table 10** for details.
4. Set the sensor's thresholds that will trigger alerts, as described in **4.4 - Thresholds in the Web Interface**. Depending on the type of sensor:
   a. For a temperature or humidity sensor, use the Critical and Warning text boxes to set high and low thresholds.
   b. For a dry-contact sensor, click in the Normal State box and select **Normally Open** or **Normally Closed** to define the sensor's normal state.
5. If the sensor has a **Rearm** box, you may enter a value to define how much the sensor's reading must change beyond the threshold in either direction before its state is changed. This feature prevents the unit from generating excessive alerts if a sensor's value repeatedly moves slightly above or below a threshold.
6. If the sensor has a **Calibration** box, you may enter a value to be added to the sensor reading to create an adjusted reading. For example, if you set the Calibration to -2 for a temperature sensor, a reading of 85°F will be adjusted to 83°F. Valid entries are integers ranging from -10 to 10.
7. At any time, click on the **Refresh** button to update the sensor's Status and Current Value.
8. Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

5.3.2 Create or Change Sensor Names

The Sensor Names feature allows you to create a name to help identify a sensor. This name is displayed throughout the Web interface and in notifications sent by pager or e-mail.

To access the Sensor Names window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Sensors** tab at the top of the Web interface, as shown below.



- Click on the **Sensor Names** button on the left side of the window. The right side of the window displays text boxes where you may enter names for sensors that will be connected to the sensor ports.

  Each type of sensor has a text box with numbers corresponding to the Sensor 1 and Sensor 2 ports on the back of the unit—also Sensor 3 and Sensor 4 for the vEM-14 controller. For example, **Temperature 1** corresponds to any temperature sensor connected to the Sensor 1 port. The following table shows which text boxes correspond to each type of sensor available from Liebert (also see **Table 3**).

For these Liebert sensors:	Use these text boxes:	
	Port 1	Port 2
• Contact closure sensor	Dry Contact 1	Dry Contact 2
• Temperature & Humidity combination sensor • Humidity sensor	Humidity 1	Humidity 2
• Temperature & Humidity combination sensor • Temperature sensor	Temperature 1	Temperature 2

  If you have a temperature and humidity combination sensor, you may enter a name for each type of sensor in the appropriate port box. For example, if you want to connect the combination sensor into the Sensor 2 port, enter a name for the humidity sensor in the **Humidity 2** box and for the temperature sensor in the **Temperature 2** box.
- For each sensor that you wish to name, click in the appropriate text box and enter a name. The name cannot exceed 12 characters in length. (To rename a sensor, select all characters and enter a new name.)
- To delete a name, select all characters and press the Delete key.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)
- Click the **Close** button to exit the Sensor Names window and return to the Sensor Data window.

5.3.3 View Sensor Graphs

The OpenComms EM sensor data may be viewed in graphic format, along with the sensor's upper and lower alarm limits, as described in **5.3.1 - Configure Sensors**.

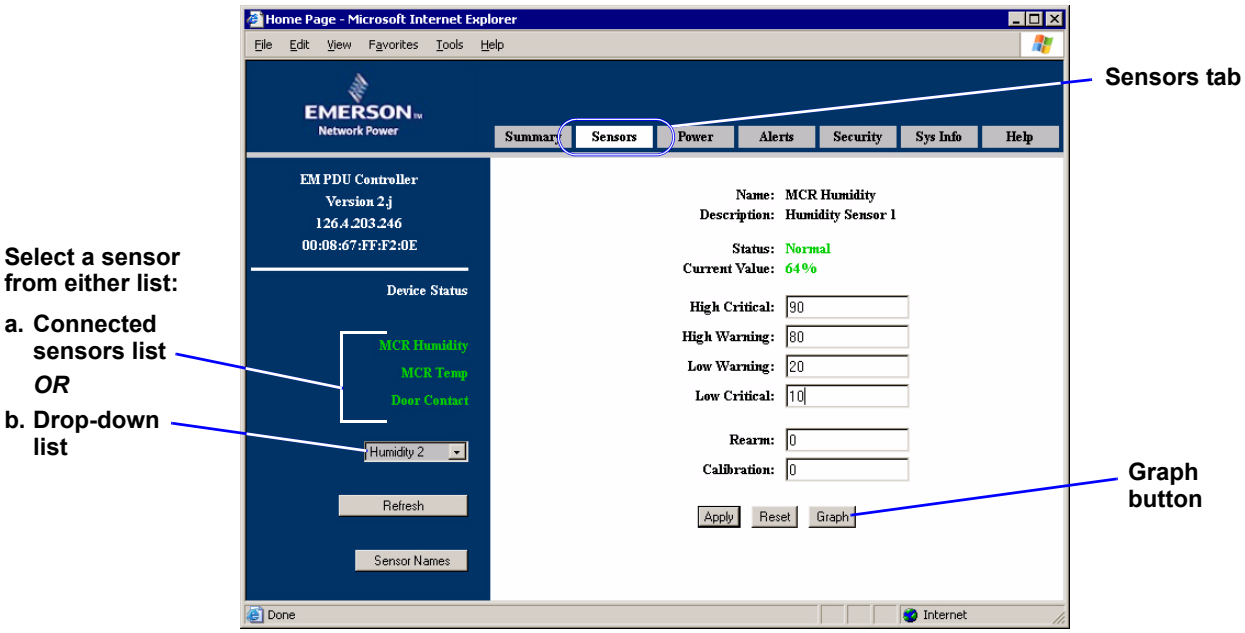
The OpenComms EM stores up to 1,440 data samples for each sensor. Sensor data samples can be stored at intervals of 1 minute, 5 minutes, 10 minutes or 15 minutes. (To change the data sample rate, see **5.7.3 - Data Presentation**.)

These sample rates correspond to 24 hours of data samples collected at 1-minute intervals, 5 days for 5-minute intervals, 10 days for 10-minute intervals and 15 days for 15-minute intervals.

Sensor data samples are lost when the sensor is disconnected from a port or when the unit is shut down or loses power. You can use SNMP to sample sensor data at a different rate or to store larger amounts of data. (To activate SNMP traps, see **5.5.3 - SNMP Trap Alerts Setup**. To set up SNMP properties, see **5.7.2 - SNMP Information**.)

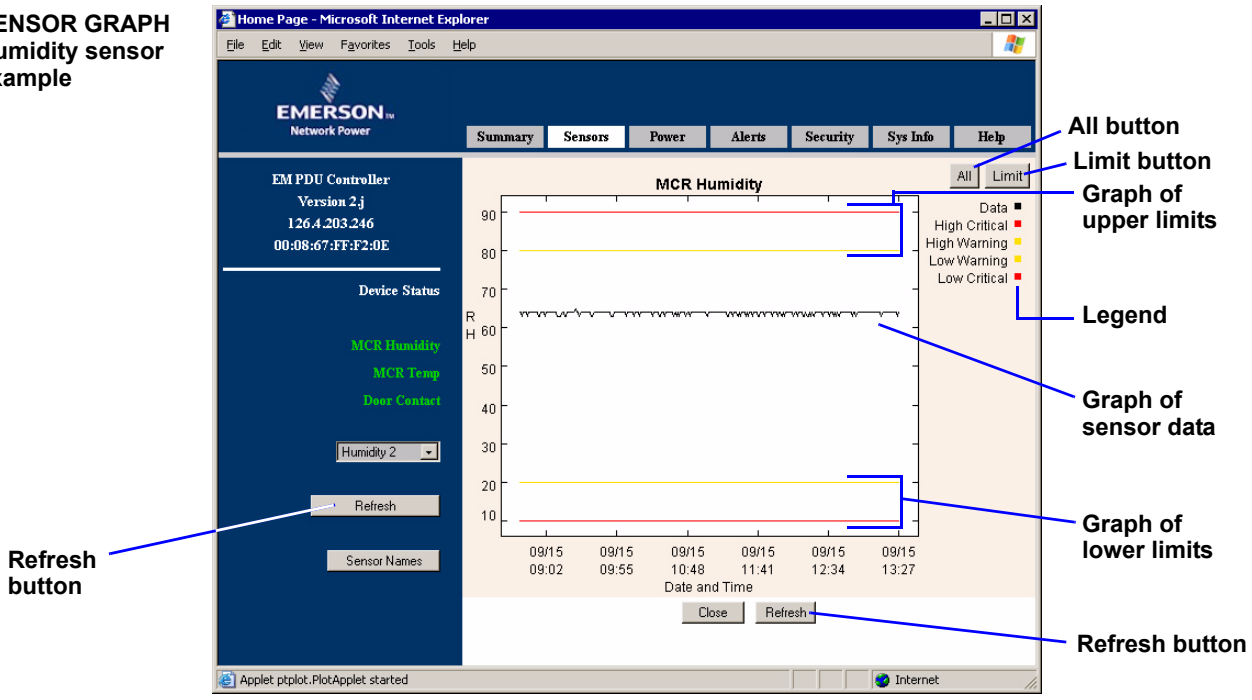
To access the Sensor Graphs window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Sensors** tab at the top of the Web interface, as shown below.



- Choose a sensor from either of two lists on the left side of the window, as shown above:
  a. Click on a link in the **connected sensors list**, or
  b. Click on the Down arrow to the right of the **drop-down list** and select a name from the list.
- On the right side of the window, click on the **Graph** button, as shown above. The right side of the window shows a graph of current sensor data, upper and lower limits, as in the example in **Figure 6**.

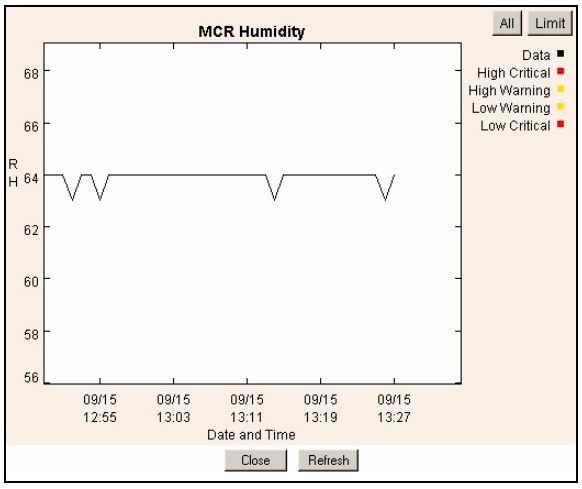
Figure 6 Sensor graph - humidity sensor example



The line graph shows the selected sensor's readings (black) chronologically from left to right—the most current reading is on the far right—as well as Warning (yellow) and Critical (red) limits.

- Use the **All** or **Limit** button to change the scale of the y-axis on the graph, as follows:
  - Click **Limit** to use the High and Low Critical values to determine the upper and lower boundaries of the graph. In the example above, the y-axis extends from 10% to 90%, which are the Low Critical and High Critical values for Humidity Sensor 2.
  - Click **All** to include the sensor data readings to determine the upper and lower limits of the graph. In the example above, if a data reading were 95%, the y-axis scale would extend from 10% to 95% to include that reading. (If all sensor data readings fall within the High and Low Critical limits, the **All** and **Limit** buttons display the same scale extending from the Low Critical value to the High Critical value.)
- Use click-and-drag to zoom in or out:
  - To zoom in on an area of the graph, click and drag the mouse **downward** to draw a box around the area. The maximum zoom level shows 10 units on the y-axis (degrees or percentage points, for example) and six data samples on the x-axis.
  - To zoom out, click and drag the mouse in an **upward** direction. (Or click on **All** or **Limit** to restore the graph to full view.)
- Click the **Refresh** button to update the graph with the most recent sensor reading. The sensor is sampled at regular intervals. See **5.7.3 - Data Presentation** to change this interval.
- Click the **Close** button to exit the Sensor Graphs window and return to the Sensor Data window.

ZOOM IN FEATURE - Humidity sensor example



5.4 Power Window (EM PDU & vEM-14 Controllers)

The **Power** tab provides access to MP Advanced Power Strips connected to the OpenComms EM, including:

- Turning receptacles on or off—all at once, individually or in pairs (see **5.4.1 - Control Receptacles**)
- Setting thresholds that will trigger alerts (see **5.4.2 - Configure Thresholds**)
- Viewing graphs of power strip data (see **5.4.3 - View Power Strip Graphs**)
- Creating display names for any power strip (see **5.4.4 - Create or Change Port Names**)

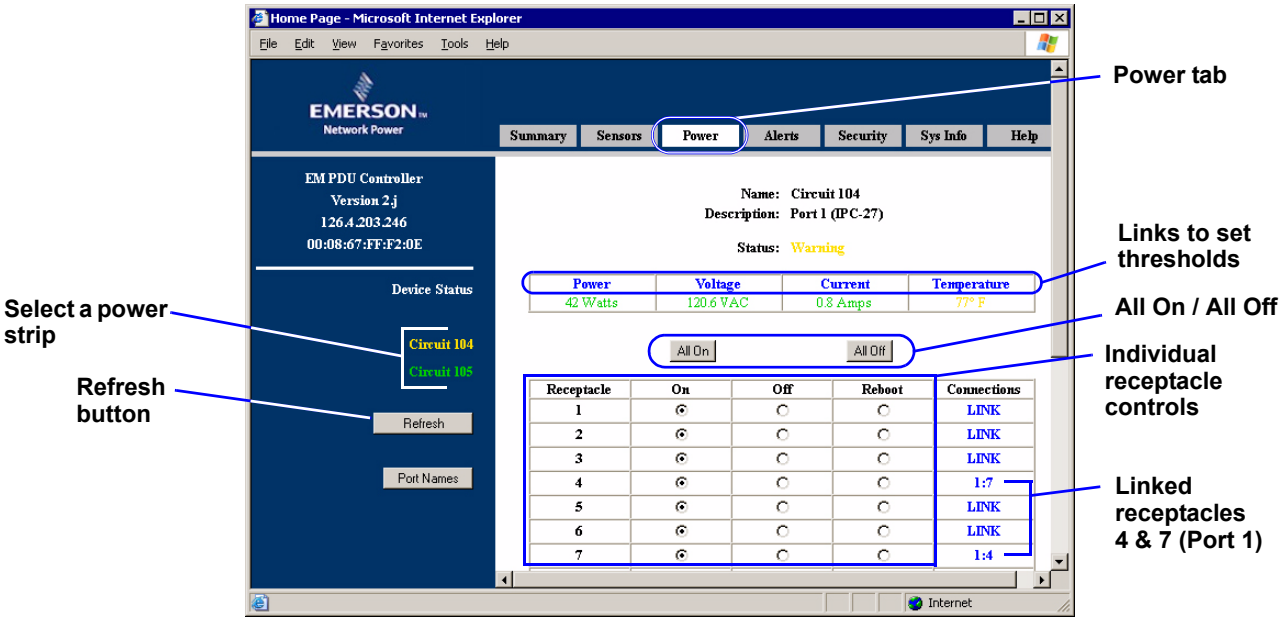
5.4.1 Control Receptacles

The Power Data window allows you to turn power strip receptacles on or off through the Web interface—all at once or individually. You may also link two receptacles so they may be turned on or off or rebooted at the same time.

To access the Power Data window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Power** tab at the top of the Web interface, as shown below.

Figure 7 Power tab



- Select a port from the left side of the window by clicking on the name of the port. The right side of the window shows the selected power strip, its status and current readings.

Control All Receptacles With One Button

- Two buttons below the readings allow you to control all receptacles at once:
  - Click the **All On** button to turn on all receptacles in the power strip.
  - Click the **All Off** button to turn all receptacles off.

Control Individual Receptacles

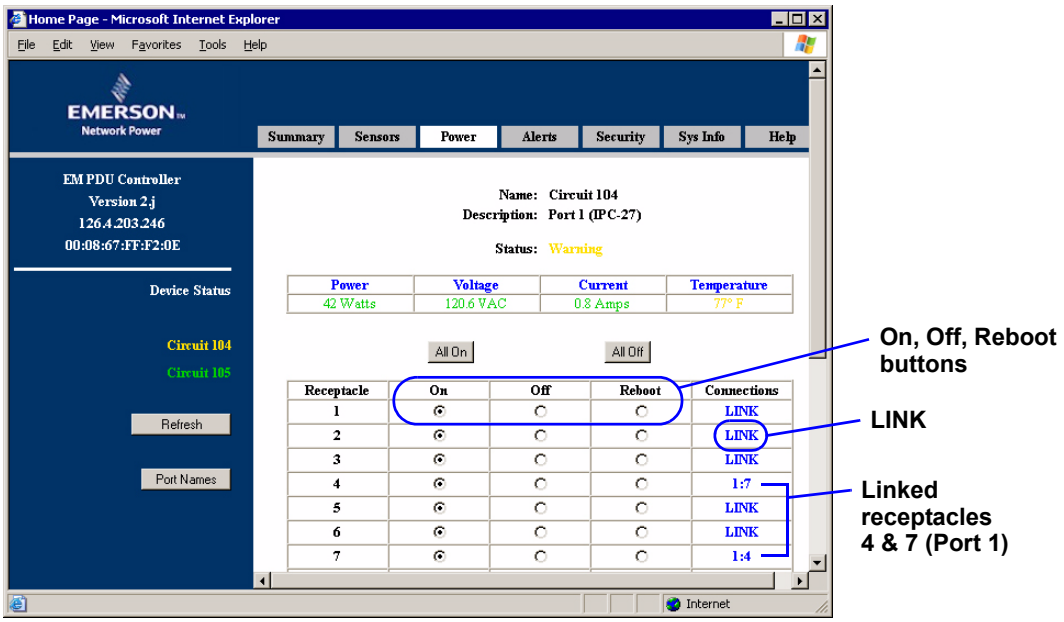
- The receptacle controls at the bottom of the window allow you to turn individual receptacles on or off, reboot them and link the controls of two receptacles.
  - Click the **On** button to turn a receptacle on.
  - Click the **Off** button to turn it off.
  - Click **Reboot** to turn a receptacle off for ten seconds and then back on—the receptacle must be on before you can reboot.

Link the Controls of Two Receptacles

Two receptacles may be linked for simultaneous control. The receptacles may be on the same power strip or on two different power strips. When two receptacles are linked, the Connections column displays the link as **x:y**, where **x** is the OpenComms EM serial port number (1 or 2) and **y** is the number of the linked receptacle. In the example below, receptacles 4 and 7 on serial port 1 are linked, shown in the Connections column as 1:7 and 1:4.

Once linked, both receptacles will be turned on, off or rebooted at the same time when you click on the **On**, **Off** or **Reboot** button for either receptacle in the Power Data window, shown below.

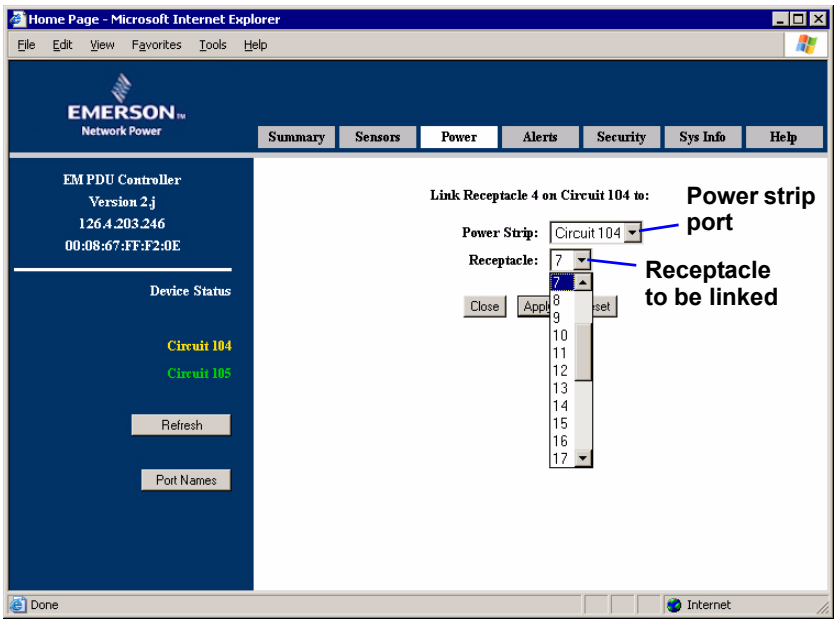
Figure 8 Linking receptacles



To link two receptacles:

- In the right side of the Power Data window, click on **LINK** in the Connections column for either receptacle, as shown in **Figure 8**.
- The right side of the window displays the selected receptacle—Receptacle 4 on Port 1 in the example at right. Click on the down arrow of the Power Strip list box and select the serial port.
- Click on the Receptacle box and select the number of the receptacle to be linked.
- Click **Apply** to accept the changes. (Or click Reset to cancel.)

Figure 9 Link window

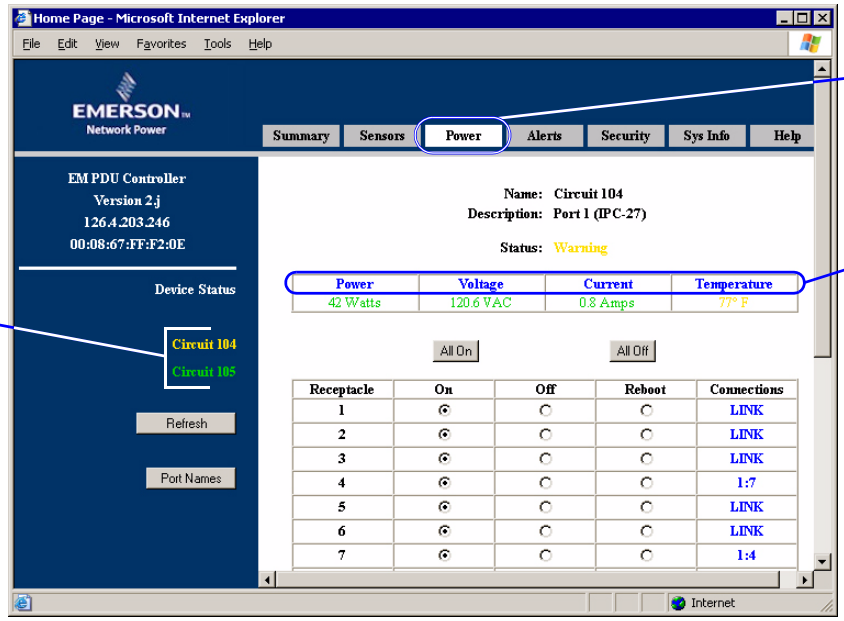


To break the link:

- In the right side of the Power Data window, click on the **x:y** entry in the Connections column for a receptacle—for example, click on **1:7** for Receptacle 4 in **Figure 8**.
- In the link window (**Figure 9**), click on the down arrow of the Power Strip list box and select **None**.
- Click **Apply** to accept the changes. (Or click Reset to cancel.)

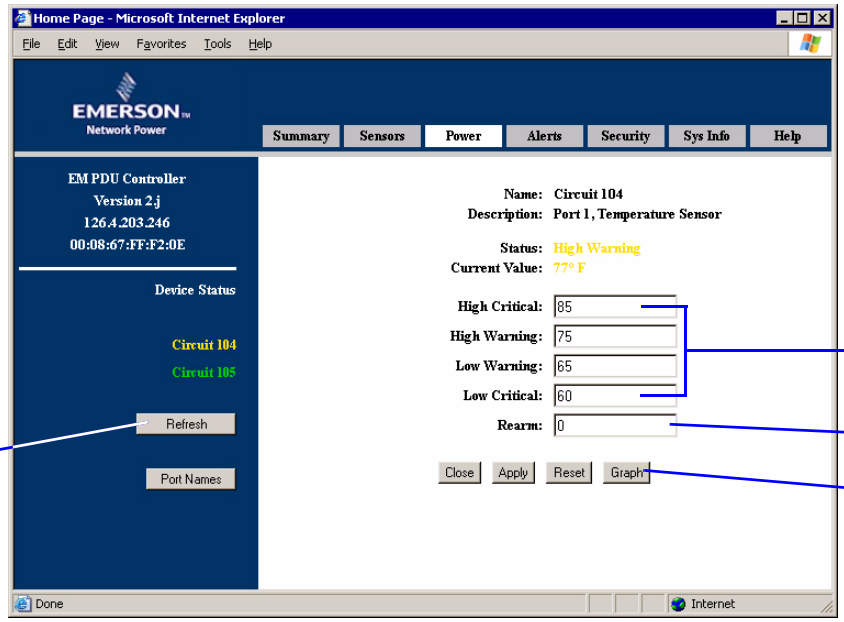
5.4.2 Configure Thresholds

You may set thresholds that will trigger alerts for power, voltage, current and temperature sensors in each power strip.



To do this:

- In the left side of the Power Data window, shown above, select a power strip (Port 1 or 2).
- Click on one of the blue links—**Power**, **Voltage**, **Current** or **Temperature**—in the right side of the window. This opens a configuration window, as shown below.



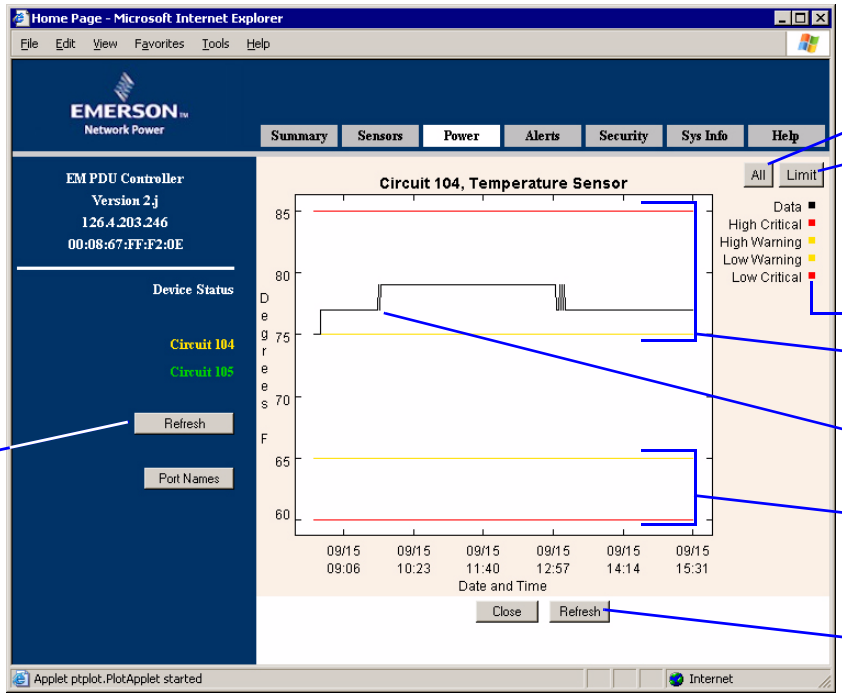
- Use the Critical and Warning text boxes to set thresholds that will trigger alerts (see **4.4.3 - MP Advanced Power Strip Thresholds** for more information).
- In the **Rearm** box, you may enter a value to define how much the sensor's reading must change beyond the threshold in either direction before its state is changed. This feature prevents the unit from generating excessive alerts if a sensor's value repeatedly moves slightly above or below a threshold.
- At any time, click on the **Refresh** button to update the sensor's Status and Current Value.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)
- From this window, you may click on the Graph button, shown above, to view line graphs of power strip data, as described in the next section, **5.4.3 - View Power Strip Graphs**.

5.4.3 View Power Strip Graphs

Power strip data may be viewed in graphic format, similar to those of sensor data. To access the Power Strip Graphs window (see **5.4.1 - Control Receptacles** for more details):

- Click on the **Power** tab at the top of the Web interface.
- Select a port from the left side of the window by clicking on the name of the port.
- In the right side of the Power Data window, click on one of the blue links—**Power**, **Voltage**, **Current** or **Temperature**.
- On the right side of the window, click on the **Graph** button. The right side of the window shows a graph of current sensor data, upper and lower limits, as in the following example.

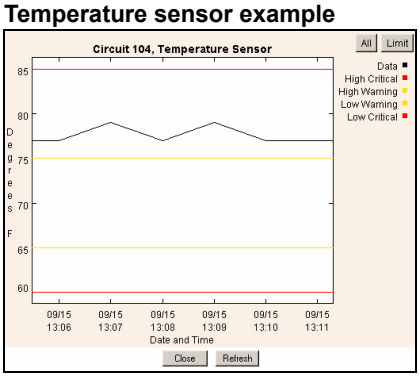
POWER STRIP DATA GRAPH Temperature sensor example



The line graph shows the selected sensor's readings (black) chronologically from left to right—the most current reading is on the far right—as well as Warning (yellow) and Critical (red) limits.

- Use the **All** or **Limit** button to change the scale of the y-axis on the graph, as follows:
  - Click **Limit** to use the High and Low Critical values to determine the upper and lower boundaries of the graph. In the example above, the y-axis extends from 60° to 85°, which are the Low Critical and High Critical values for the Port 1 Temperature Sensor.
  - Click **All** to include the sensor data readings to determine the upper and lower limits of the graph. In the example above, if a data reading were 95°, the y-axis scale would extend from 60° to 95° to include that reading. (If all sensor data readings fall within the High and Low Critical limits, the **All** and **Limit** buttons display the same scale extending from the Low Critical value to the High Critical value.)
- Use click-and-drag to zoom in or out:
  - To zoom in on an area of the graph, click and drag the mouse **downward** to draw a box around the area. The maximum zoom level shows 10 units on the y-axis (degrees, for example) and six data samples on the x-axis.
  - To zoom out, click and drag the mouse in an **upward** direction. (Or click on **All** or **Limit** to restore the graph to full view.)
- Click the **Refresh** button to update the graph with the most recent sensor reading. The sensor is sampled at regular intervals. See **5.7.3 - Data Presentation** to change this interval.
- Click **Close** to exit the graph window and return to the Power Configuration window.

ZOOM IN FEATURE - Temperature sensor example

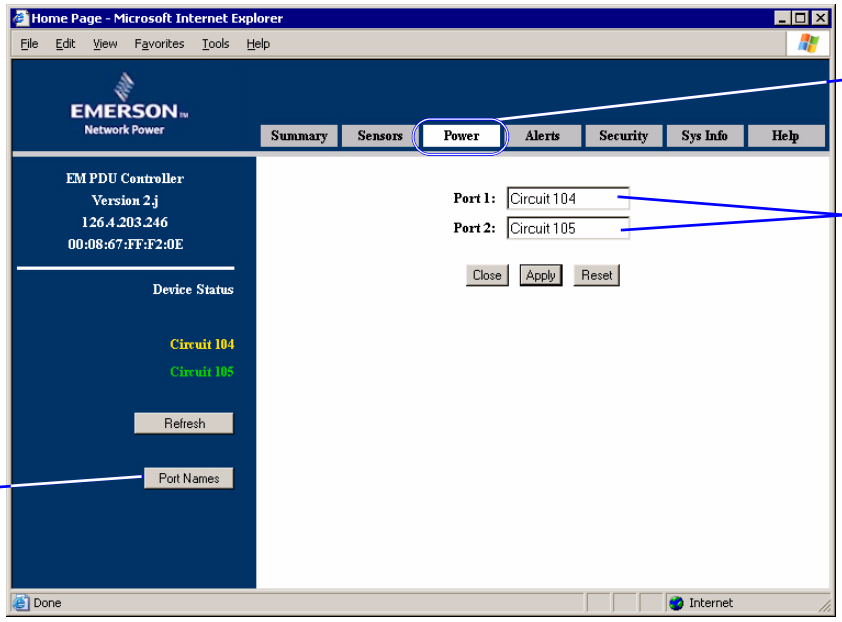


5.4.4 Create or Change Port Names

The Port Names feature allows you to create a name to help identify a serial port. This name is displayed throughout the Web interface and in notifications sent by pager or e-mail.

To access the Port Names window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Power** tab at the top of the Web interface, as shown below.



- Click on the **Port Names** button on the left side of the window. The right side of the window has text boxes for the two serial ports, **Port 1** and **Port 2**, that correspond to the Serial 1 and Serial 2 ports on the back of the unit. For example, **Port 1** corresponds to any serial device connected to the Serial 1 port.
- Click in the appropriate text box and enter a name. The name cannot exceed 12 characters in length. (To rename a port, select all characters and enter a new name.)
- To delete a name, select all characters and press the Delete key.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)
- Click the **Close** button to exit the Port Names window and return to the Power Data window.

5.5 Alerts Window

The OpenComms EM may be configured to send alerts by e-mail or dial pagers to notify personnel when a sensor reading crosses a threshold, either entering a warning or critical state or returning to normal status. See **4.4 - Thresholds in the Web Interface** for more information.

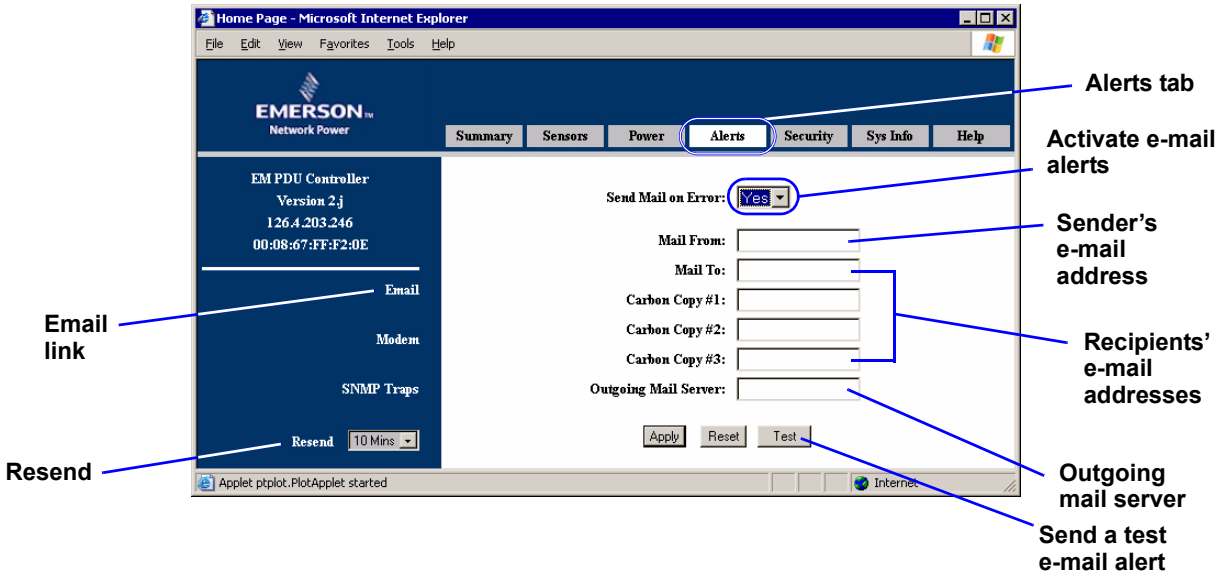
The **Alerts** tab provides access to three types of alerts:

- E-mail messages (see **5.5.1 - E-Mail Setup**)
- Pager messages (see **5.5.2 - Modem Setup**)
- SNMP traps (see **5.5.3 - SNMP Trap Alerts Setup**)

5.5.1 E-Mail Setup

To generate automatic e-mail alerts when a sensor reading crosses a threshold, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Alerts** tab at the top of the Web interface, as shown below.



- Click on the **Email** link on the left side of the window. The right side of the window displays setup information for e-mail alerts, as shown above.
- The Send Mail on Error box allows you to enable or disable e-mail alerts. Click on the Down arrow to the right of the box and select **Yes** to activate or **No** to de-activate e-mail alerts.
- Enter e-mail addresses for the sender and up to four recipients:
  - Mail From - Enter the e-mail address of the sender.
  - Mail To - Enter the e-mail address of the person who should receive the alert.
  - Carbon Copy #1- #3 (optional) - Enter up to three e-mail addresses of additional recipients.
- In the Outgoing Mail Server box, enter the sender's outgoing mail server, using either an IP address or a fully qualified name. Using a fully qualified name requires that DNS be properly configured. If needed, contact your e-mail service provider.
- The Resend box, on the left side of the window, allows you to specify whether the unit will continue to send alerts at certain intervals as long as the monitored area is in a warning or critical state. Click on the Down arrow to the right of the Resend box and select **Never** or a time interval: 15 or 30 seconds, 1, 5, 10, 15 or 30 minutes or 1 hour.

  Note: The unit will stop sending e-mail alerts as soon as it detects a normal state.
- Click the **Test** button to send a test e-mail message.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

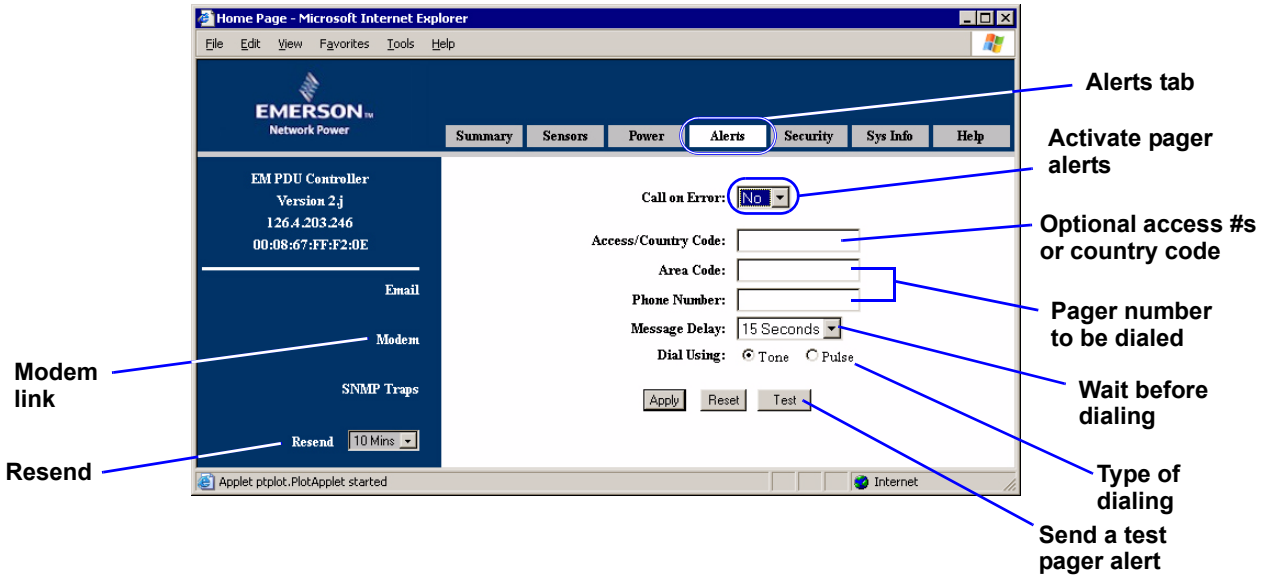
5.5.2 Modem Setup

The OpenComms EM may be configured to send a numeric message to a pager.

Note: The unit requires an external modem to send pager alerts. The modem port is set at 9600 baud, no parity, 8 data bits and 1 stop bit. For details on connecting the unit to a modem, see **6.1 - Modem Setup and Pinout Guide** and **2.3.3 - Connect to a Modem**.

To generate automatic pager alerts when a sensor reading crosses a threshold, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Alerts** tab at the top of the Web interface, as shown below.



- Click on the **Modem** link on the left side of the window. The right side of the window displays setup information for pager alerts, as shown above.
- The Call on Error box allows you to enable or disable pager alerts. Click on the Down arrow to the right of the box and select **Yes** to activate or **No** to de-activate pager alerts.
- If needed, enter numbers in the Access/Country Code box as follows:
  - Enter any numbers needed to access an outside line—for example, 9—where the call is being placed.
  - If dialing from outside the U.S., enter the country code of the location where the call is being placed.
- Enter numbers to be dialed to reach the pager:
  - Area Code - Enter the area code of the pager to be dialed.
  - Phone Number - Enter the pager phone number (the number may be entered with or without spaces or hyphens).
- The Message Delay box allows you to specify the amount of time to wait after a connection is established before dialing begins. Click on the Down arrow to the right of the box and select from the list: 5, 10, 15, 20 or 30 seconds.
- Click on one of the Dial Using buttons—**Tone** or **Pulse**—to indicate the type of connection where the call is being placed.
- The Resend box, on the left side of the window, allows you to specify whether the unit will continue to dial the pager at certain intervals as long as the monitored area is in a warning or critical state. Click on the Down arrow to the right of the Resend box and select **Never** or a time interval: 15 or 30 seconds, 1, 5, 10, 15 or 30 minutes or 1 hour.

  Note: The unit will stop attempting pager alerts as soon as it detects a normal state.
- Click the **Test** button to send a test pager message.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

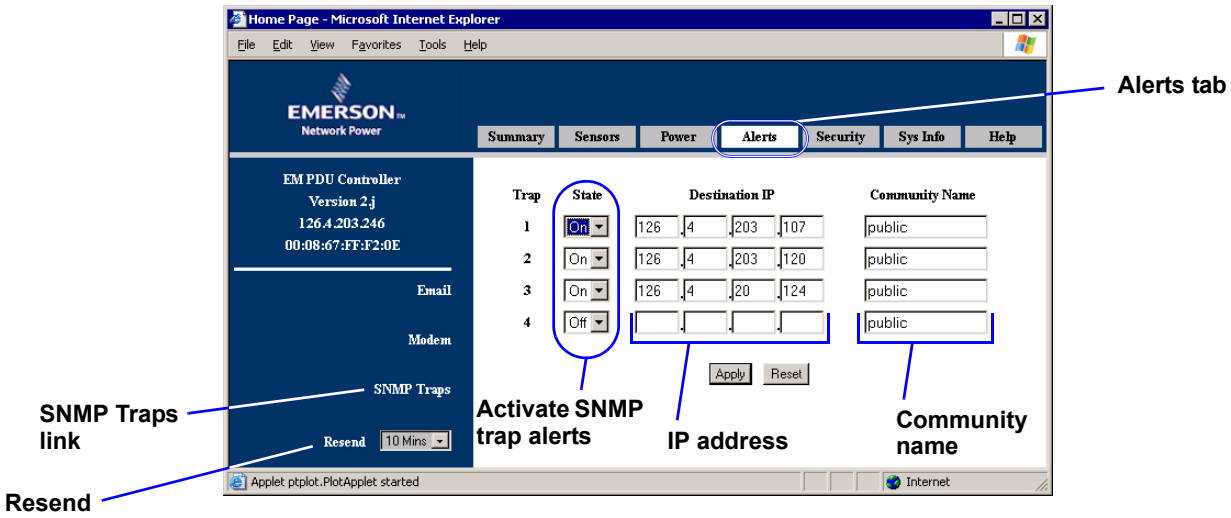
5.5.3 SNMP Trap Alerts Setup

The OpenComms EM may be configured to send SNMP trap alerts to a computer whenever the status of a sensor changes from normal to a warning or critical state, as well as a return-to-normal alert when the reading falls within the normal range. These alerts may be sent to up to four IP addresses, typically Network Management Station (NMS).

If you activate SNMP traps, see also **5.7.2 - SNMP Information**.

To generate SNMP traps when a sensor reading crosses a threshold, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **SNMP Traps** tab at the top of the Web interface, as shown below.



- Click on the **SNMP Traps** link on the left side of the window. The right side of the window displays setup information for SNMP Trap alerts, as shown above.
- Configure the following settings for each of the four Traps you wish to use:
  - In the State box, click on the Down arrow and select **On** to activate or **Off** to de-activate SNMP trap alerts
  - In the Destination IP box, enter the IP address of the computer where traps should be sent.
  - In the Community Name box, enter the community string of the computer where traps are directed—for example, **liebert** or **public**. Community strings are case-sensitive.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

5.6 Security Window

To protect configuration settings from unauthorized users, the Web interface allows you to set up users with different levels of access.

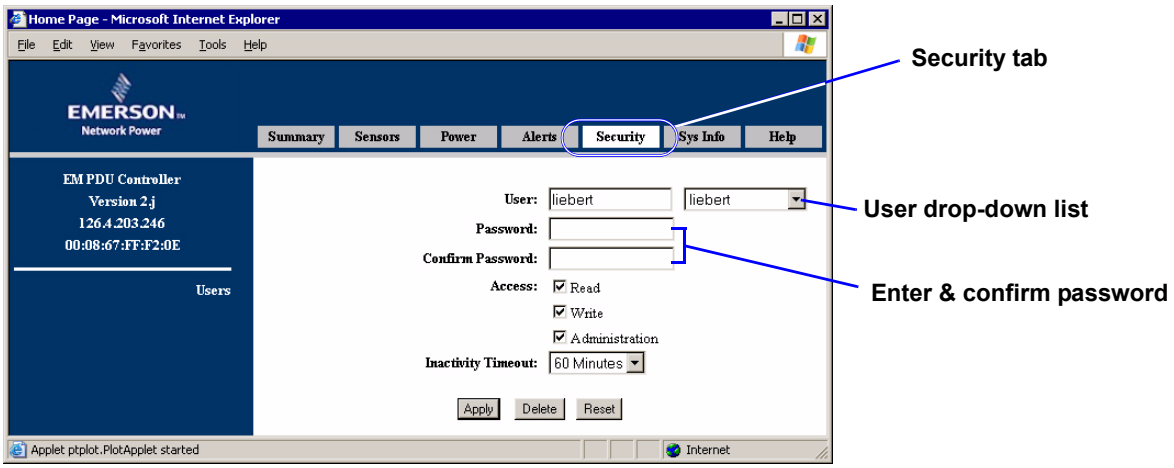
- A user with **Administration** privileges has full access, including creating and modifying other user accounts.
- Users with **Read/Write access** may change their own password, but are not permitted to make any other modifications.

5.6.1 Create a Password for the Default Liebert Account (Administrators Only)

The OpenComms EM comes with a user account named **liebert** with full administrative privileges to permit initial login. By default, this user account has no password. Liebert recommends creating a password for this account to prevent configuration by unauthorized users.

To do this, log in as an administrator (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Security** tab to display the Security window, as shown below.



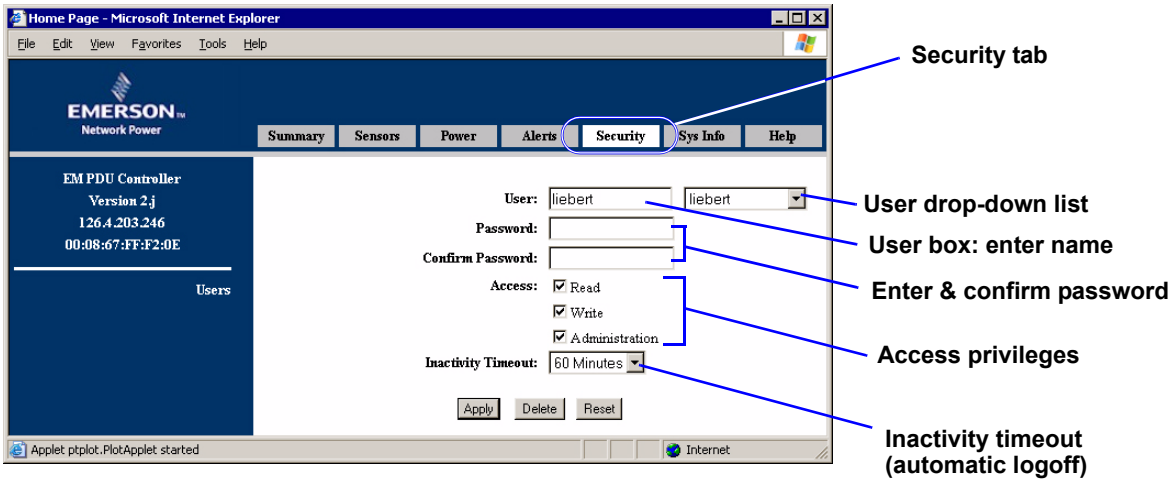
- Choose **liebert** from the User drop-down list.
- Enter a password in the Password box. The password is case-sensitive and must be alphanumeric (spaces are allowed).
- Verify the password by entering it again in the Confirm Password box.
- Click **Apply** to make these changes effective. (To cancel the changes, click **Reset**.)

5.6.2 Create a New User Account (Administrators Only)

An administrator may create user accounts for up to 50 users, including the administrator account. Only users with administrative privileges may create user accounts.

To do this, log in as an administrator (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Security** tab to display the Security window, as shown below.



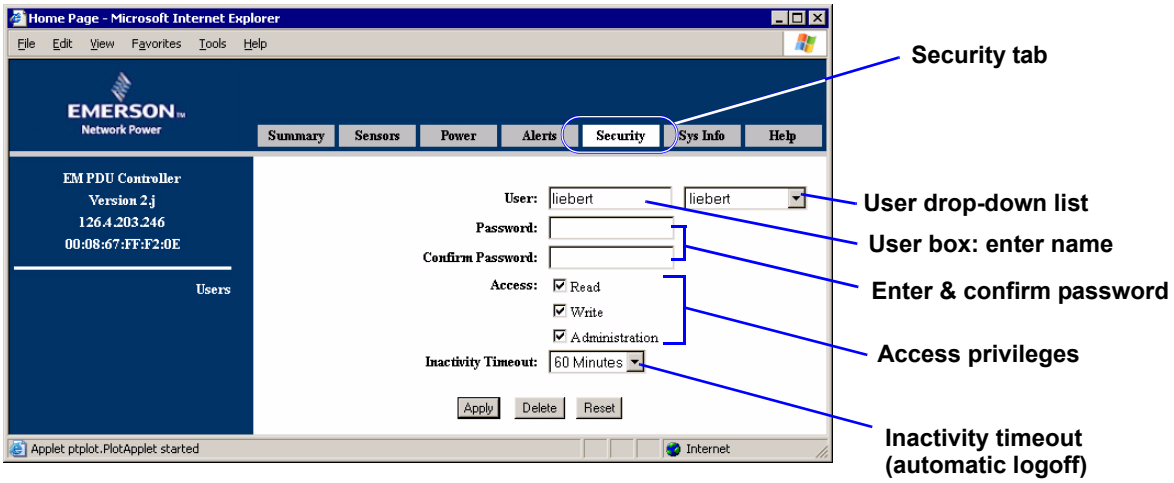
- Choose **Add New User** from the User drop-down list.
- Enter a name for this user in the User box. The user name is case-sensitive and must be alphanumeric (spaces are allowed).
- Enter a password for this user in the Password box. The password is also case-sensitive and must be alphanumeric (spaces are allowed). Verify the password by entering it again in the Confirm Password box.
- Specify the type of access privileges for this user by placing a check mark in the appropriate Access box:
  - **Read** permits viewing only; users cannot make any changes, except to their own passwords.
  - **Write** (includes Read access) allows access to all functions except other users' accounts; users can view data, change configuration settings and change their own passwords.
  - **Administration** (includes Read & Write access) provides full access to all functions, including creating and modifying other user accounts.
- Specify whether the Web interface will log off automatically after the computer is idle for a specified time in the Inactivity Timeout drop-down list. The choices are **Never** or 1, 2, 5, 15 or 60 minutes. This setting is applied to all users.
- Click **Apply** to make these changes effective. (To cancel the changes, click **Reset**.)

5.6.3 Modify an Existing Account (Administrators Only)

Users with administrative privileges may change all options on all users' accounts, including their own. Users without administrative access are prevented from changing anything except their own password; for details, see **5.6.4 - Change Password (Users with Read/Write access)**.

To change a user account, log in as an administrator (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Security** tab to display the Security window, as shown below.



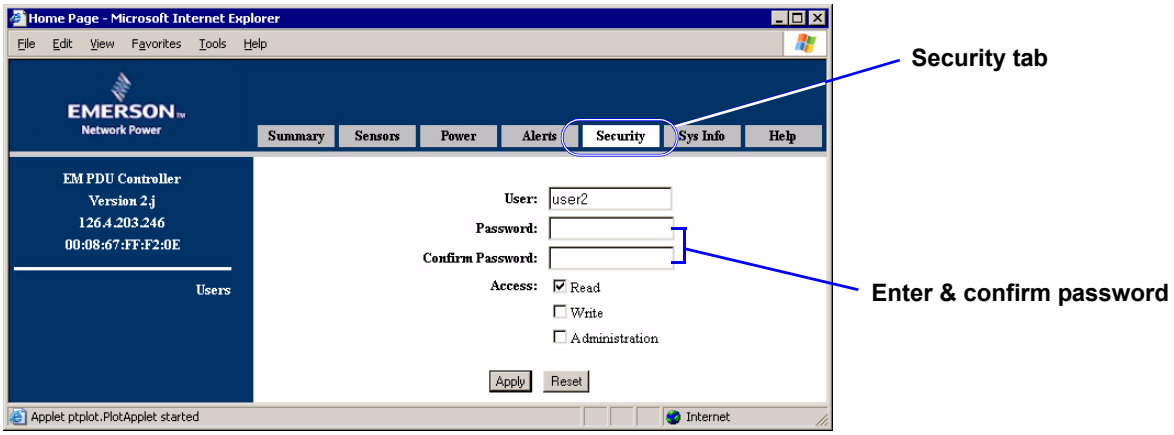
- Choose the user name you wish to change from the User drop-down list.
- You may not change a user name for an existing account. Instead, delete the existing account, as described in **5.6.5 - Delete a User Account (Administrators Only)**, and then add a user with the new name (see **5.6.2 - Create a New User Account (Administrators Only)**).
- Enter a password for this user in the Password box. The password is case-sensitive and must be alphanumeric (spaces are allowed). Verify the password by entering it again in the Confirm Password box.
- Specify the type of access privileges for this user by placing a check mark in the appropriate Access box:
  - **Read** permits viewing only; users cannot make any changes, except to their own passwords.
  - **Write** (includes Read access) allows access to all functions except other users' accounts; users can view data, change configuration settings and change their own passwords.
  - **Administration** (includes Read & Write access) provides full access to all functions, including creating and modifying other user accounts.
- Specify whether the Web interface will log off automatically after the computer is idle for a specified time in the Inactivity Timeout drop-down list. The choices are **Never** or 1, 2, 5, 15 or 60 minutes. This setting is applied to all users.
- Click **Apply** to make these changes effective. (To cancel the changes, click **Reset**.)

5.6.4 Change Password (Users with Read/Write access)

Users with Read or Read & Write access may change their password but no other user account information for their own accounts or those of other users.

To change your own password, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Security** tab to display the Security window, as shown below.

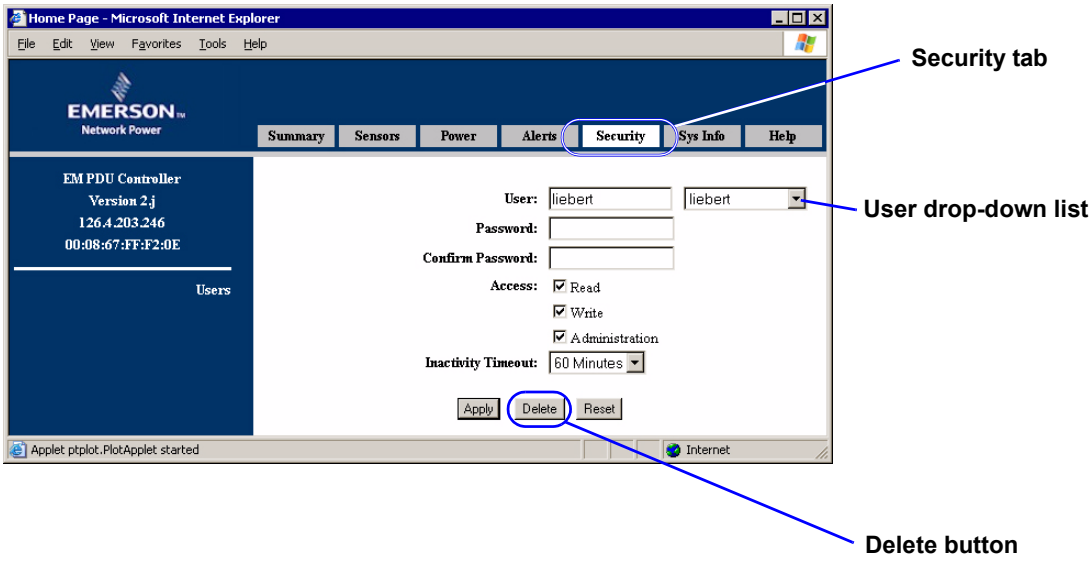


- Enter a password for this user in the Password box. The password is case-sensitive and must be alphanumeric (spaces are allowed).
- Verify the password by entering it again in the Confirm Password box.
- Click **Apply** to make these changes effective. (To cancel the changes, click **Reset**.)

5.6.5 Delete a User Account (Administrators Only)

To delete a user account, log in as an administrator (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Security** tab to display the Security window, as shown below.



- Choose the user name you wish to delete from the User drop-down list.
- Click the **Delete** button to remove the selected user account. A confirmation message asks whether to proceed with the deletion. Click **OK**.
- Click **Apply** to make these changes effective. (To cancel the changes, click **Reset**.)

5.7 Sys Info Window

The OpenComms EM may be configured to send alerts by e-mail or dial pagers to notify personnel when a sensor reading crosses a threshold, either entering a warning or critical state or returning to normal status. See **4.4 - Thresholds in the Web Interface** for more information.

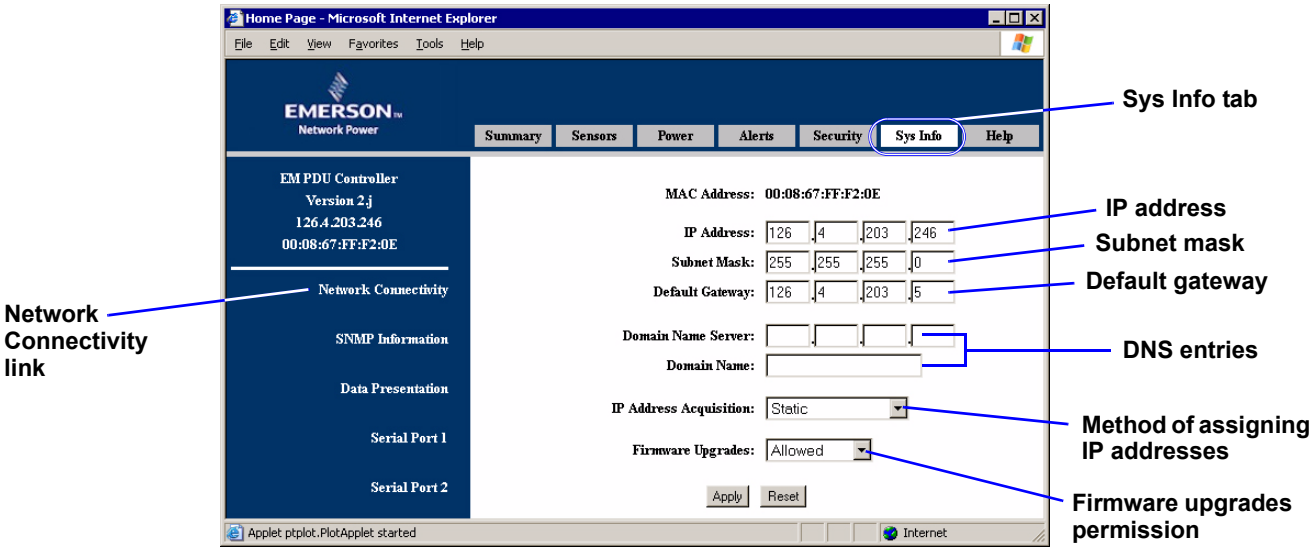
The **Sys Info** tab provides access to system configuration settings:

- Configure your network (see **5.7.1 - Network Connectivity**)
- Change SNMP trap settings (see **5.7.2 - SNMP Information**)
- Set up data refresh rates and temperature units (see **5.7.3 - Data Presentation**)
- For EM PDU and vEM-14 controllers: Configure serial ports (see **5.7.4 - Serial Ports**)

5.7.1 Network Connectivity

To access the Network Connectivity window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Sys Info** tab at the top of the Web interface, as shown below.



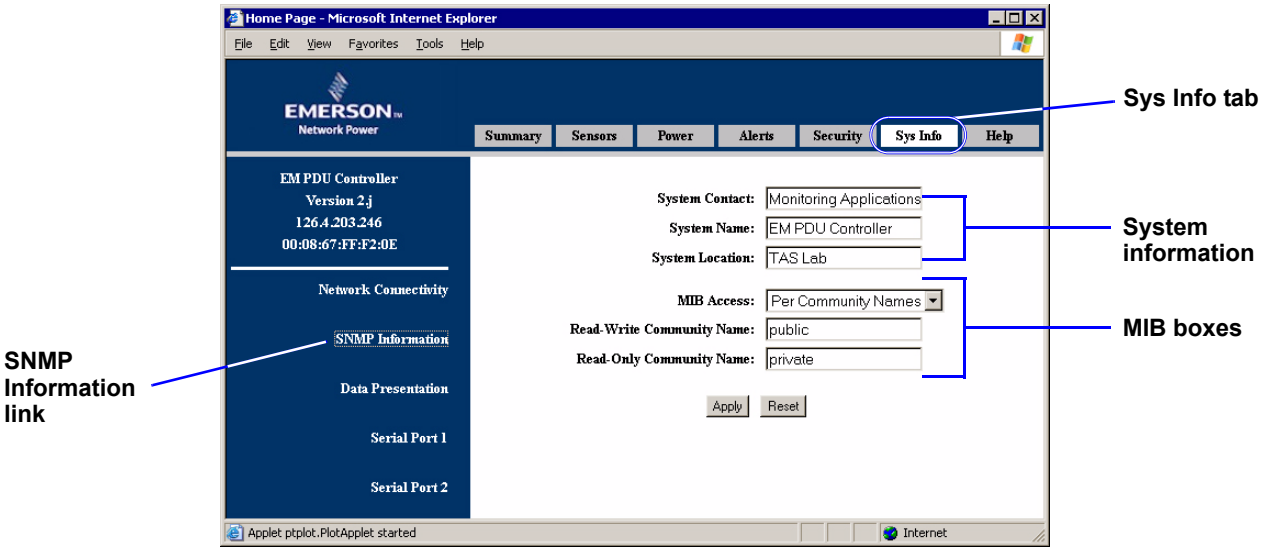
- Click on the **Network Connectivity** link on the left side of the window. The right side of the window displays setup information for connecting to a network, as shown above.
- To change the unit's IP address, enter a new address in the IP address box.
- To change the unit's subnet mask, enter a new value in the Subnet Mask box. This value is used to determine what sub-network your unit is on and depends on the type of network you have.

  Note: If you change the unit's IP address or subnet mask, your browser will lose its connection to the Web interface. To reconnect after making these changes, simply enter the new IP address in the Address bar.
- In the Default Gateway box, enter the IP address of the gateway that grants your network access to hosts and routers outside your network. In many Local Area Networks (LANs), a simple fire-wall/router serves as the default gateway. This information is necessary for the e-mail alerts fea-ture to work properly.
- The Domain Name Server (DNS) boxes permit accessing the Web interface with a domain name instead of an IP address. To use this feature, enter the IP address in the Domain Name Server box and enter the associated domain name in the Domain Name box.
- In the IP Address Acquisition box, select the method of assigning an IP address to your unit: **Static**, **RARP**, **DHCP** or **RARP and DHCP**.
- In the Firmware Upgrades box, select **Allowed** or **Not Allowed** to set up permission for upgrades. See **7.0 - Downloading Firmware Updates** for more information.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

5.7.2 SNMP Information

To access the SNMP Information window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Sys Info** tab at the top of the Web interface, as shown below.

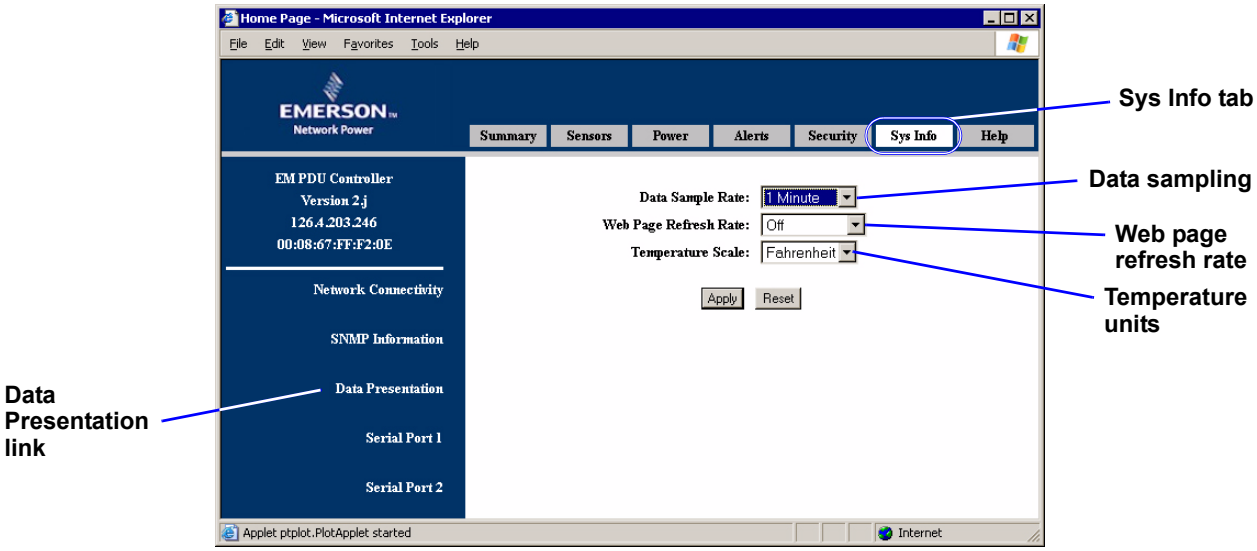


- Click on the **SNMP Information** link on the left side of the window. The right side of the window displays setup information for SNMP traps, as shown above.
- The System information boxes allow you to enter data that will be sent along with SNMP traps to help easily identify the source:
  - If desired, enter the name of a person to contact in the System Contact box.
  - The OpenComms EM model name appears in the System Name box—for example, EM PDU Controller. Enter a different name if desired.
  - If desired, enter a description of the unit's location in the System Location box.
- In the MIB Access box, specify the type of access to the unit's MIB for your Network Management System (NMS): One option is **Read-Only**; the other is **Per Community Name**, which permits user-defined access based on entries in the following two boxes:
  - **Read-Write Community Name** - Enter the community string that will allow a user to read the status of the unit and enter values to configure the unit.
  - **Read-Only Community Name** - Enter the community string that will allow a user to read the status of the unit.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

5.7.3 Data Presentation

To access the Data Presentation window, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Sys Info** tab at the top of the Web interface, as shown below.



- Click on the **Data Presentation** link on the left side of the window. The right side of the window displays setup information for refresh rates and temperature units, as shown above.
- The OpenComms EM samples data from all connected sensors at regular intervals specified in the Data Sample Rate box. To change the interval, click on the Down arrow to the right of the box and select the interval: 1, 5, 10 or 15 minutes.

  NOTE: The chosen interval also affects the display of line graphs (see **5.3.3 - View Sensor Graphs** and **5.4.3 - View Power Strip Graphs**).
- In the Web Page Refresh Rate box, you may choose whether to refresh pages automatically in the Web interface. Click on the Down arrow and select **Off** or specify the time interval: 30 seconds, 1 minute, 5 minutes or 10 minutes.
- In the Temperature Scale box, you may specify which temperature scale to use in the Web interface display of temperature sensor readings. Click on the Down arrow to the right of the box and select **Fahrenheit** or **Celsius**.
- Click on the **Apply** button to keep your changes. (Or click **Reset** to cancel the changes.)

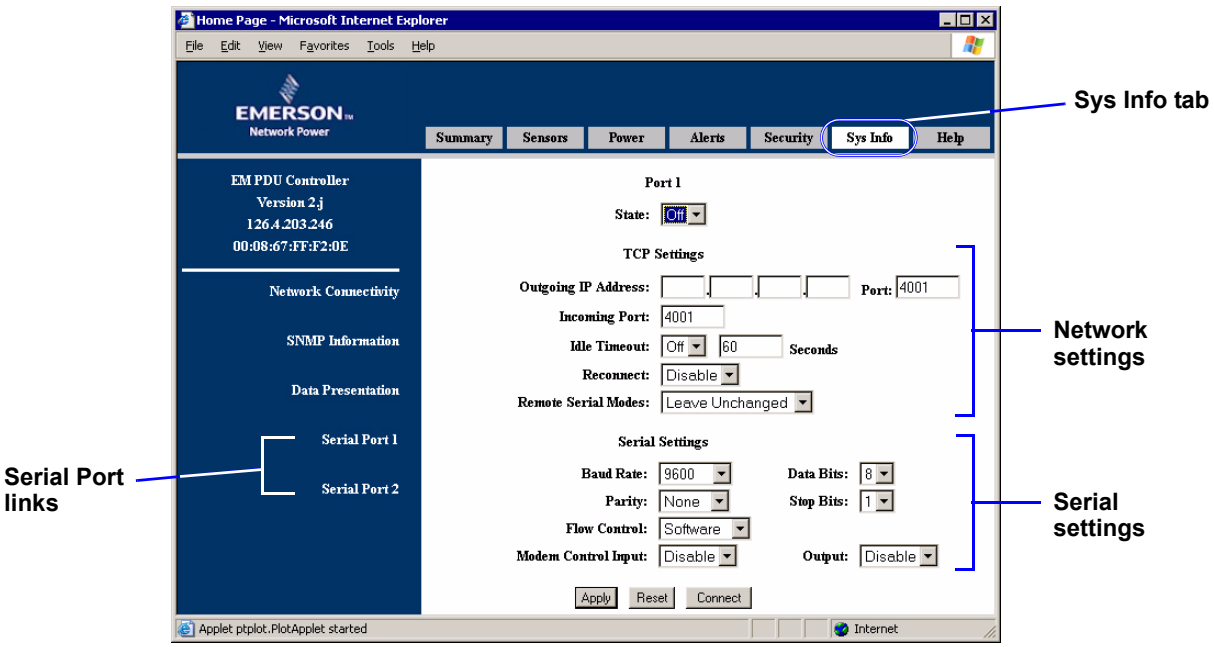
5.7.4 Serial Ports

NOTE

The Serial Port 1 and 2 windows are reserved. This section shows the default settings, which should NOT be changed.

To view the Serial Port 1 and 2 windows, log in (see **5.1 - Open the Web Interface and Log In**) and:

- Click on the **Sys Info** tab at the top of the Web interface, as shown below.



- The **Serial Port 1** and **Serial Port 2** links on the left side of the window determine which port information is displayed in the right side of the window. **Do not change these settings.**

6.0 PINOUT GUIDES

6.1 Modem Setup and Pinout Guide

The OpenComms EM must be connected to a modem to send pager alerts when a sensor reading crosses a user-defined threshold (see **5.5.2 - Modem Setup** for more information).

The unit is compatible with modems that have DB9 or DB25 serial COM ports. A proper cable must be constructed to allow communication between the unit and the modem. This cable connects the RJ45 connector labeled Modem on the back of the unit to the serial port on the modem.

Refer to **Table 13** for a pinout guide for building the correct cable. For more information on constructing this type of cable, call Liebert Monitoring Application Support at 1-800-222-5877 or contact your local Liebert representative.

Table 13 OpenComms EM to DCE modem pinout guide

RJ45 Pin #	Signal Name	Description	DB25 Pin #	DB9 Pin #
1	DTR	Data Term Ready	20	4
2	CTS	Clear to Send	5	8
3	GND	Signal Ground	7	5
4	TXD	Transmit Data	2	3
5	RXD	Receive Data	3	2
6	CD	Carrier Detect	8	1
7	RTS	Request to Send	4	7
8	DSR	Data Set Ready	6	6

6.2 Contact Closure Cable Pinout Guide

All OpenComms EM models can accommodate a contact closure cable in either sensor port. Contact closure cables are available separately from Liebert in various lengths (see **Table 3**).

To make your own contact closure cable, refer to **Table 14** for the pinout for this cable.

- Pin 2 is the contact that may be defined as either Normally Open or Normally Closed.
- Pins 6 and 8 must be tied together to form the common.

Table 14 Contact closure cable pinout

OpenComms EM RJ45	Dry-Contact Device
1	—
2	Normally Open or Normally Closed
3	—
4	—
5	—
6	Common - tied to Pin 8
7	—
8	Common - tied to Pin 6

6.3 Serial Cable Pinout Guide (EM PDU & vEM-14 Controllers)

The serial cable included with OpenComms EM PDU and vEM-14 controllers is designed for connecting the OpenComms EM unit to an MP Advanced power strip.

To make your own cable, refer to **Table 15** for the pinout for this cable.

Table 15 Serial cable pinout - MP Advanced Power Strip

OpenComms EM RJ45	MP Advanced power strip
1	8
2	3
3	2
4	5
5	4
6	Not Connected
7	Not Connected
8	1

7.0 DOWNLOADING FIRMWARE UPDATES

This section explains how to update the unit's firmware.

CAUTION
When the firmware is updated, all settings except the network configuration are lost.

1. The first step is to download the upgrade text file. To do this, visit Liebert's Web site at **http://www.liebert.com** and go to the **OpenComms EM** section. Or contact Liebert Monitoring Application Support at 1-800-222-5877. The firmware upgrade files are named with the model name, firmware version number and the extension ".txt" as follows:
   - The filename for the EM Controller is **em-x.x.txt**, where **x.x** is the firmware version number.
   - The filename for the EM PDU Controller is **empdu-x.x.txt**, where **x.x** is the firmware version number.
   - The filename for the vEM-14 Controller is **vem-14-x.x.txt**, where **x.x** is the firmware version number.
2. Connect the unit to your network using an Ethernet cable or crossover cable (see **2.3.2 - Connect to an Ethernet Network**).
3. Make sure the permission to upgrade is set to **Allowed** (see **5.7 - Sys Info Window**).

NOTE
***Steps 4** through **11** must be done on the same network segment where the OpenComms EM is connected.*

NOTE
The following instructions refer to the Microsoft® Windows® HyperTerminal program. These steps may vary for other communications programs.

4. Open a communications program such as HyperTerminal.
   (One way to do this in Windows is to click on the **Start** button, then on **Programs**, then **Accessories**, then **Communications** and finally **HyperTerminal**.)
5. Create a new connection in HyperTerminal.
6. When prompted, enter a name for the new connection and click **OK**. This opens the Connect To window.
7. In the Connect To window:
   a. Select **TCP/IP (Winsock)** as the type of connection in the Connect Using box. After TCP/IP is selected, the Host Address and Port Number boxes appear in the window.
   b. In the Host Address box, enter the IP address of the OpenComms EM.
   c. In the Port Number box, enter **3001**.
8. This should allow you to connect to the unit. The status area at the bottom left corner of the HyperTerminal window will display **Connected** and the amount of time you have been connected.
9. Click the **Transfer** tab at the top of the HyperTerminal window, then select **Send Text File**.
10. In the Send Text File window, specify the location of the firmware text file, then click **Open**. Several dots will appear across the HyperTerminal screen, indicating that it is checking for errors. Then it will begin downloading the file to the unit.
11. When the download is complete, a message appears and the status area changes to **Disconnected**. At this point, you may close the HyperTerminal program by clicking on the **File** menu, then on **Exit**.
    If you have not saved the connection created in **Step 5**, a prompt message will ask whether you wish to do so.
12. After downloading a firmware update to the unit, you must wait about one minute before disconnecting power from the unit.

8.0 SPECIFICATIONS

Table 16 OpenComms EM specifications

Power Requirements	EM & EM PDU controller	vEM-14 controller
Input	120 VAC, 60 Hz	120 VAC, 60 Hz
Output	9 VDC, 500 mA, unregulated	9 VDC, 500 mA, unregulated
Dimensions W x D x H, in. (mm)	4.75 x 2.5 x 1.625 (120.7 x 63.5 x 41.3)	17 x 5 x 1.75 (431.8 x 127 x 44.5mm)
Weight	7 oz. (198g)	2 lb. (0.9kg)
Mounting	0U, wall-mount or desktop	1U, wall-mount, rack-mount or desktop
Ambient Operating Environment, °F (°C)	32 to 158 (0 to 70) 10-95% RH non-condensing	32 to 158 (0 to 70) 10-95% RH non-condensing
Communications		
Network Interface	RJ45 10BASE-T connector HTTP (Web), E-mail, SNMP	RJ45 10BASE-T connector HTTP (Web), E-mail, SNMP
Modem	9600 baud, Numeric	9600 baud, Numeric
Agency Listings	FCC Class A, CE Mark	FCC Class A, CE Mark
LEDs	Power, Link, Modem, Sensor, Serial	
Ports		
Sensor Ports	2	4
Temperature, °F (°C), with ranges:	-22 to 248 (-30 to 120)	-22 to 248 (-30 to 120)
Humidity with ranges:	0 to 100% RH	0 to 100% RH
Contact closure	Normally Open / Normally Closed	
2 Serial Ports *(EM PDU & vEM-14 controllers)*	MP Advanced Power Strips	
10 Dry Contact Inputs *(vEM-14 controllers)*	—	Form C dry contacts

NOTE

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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