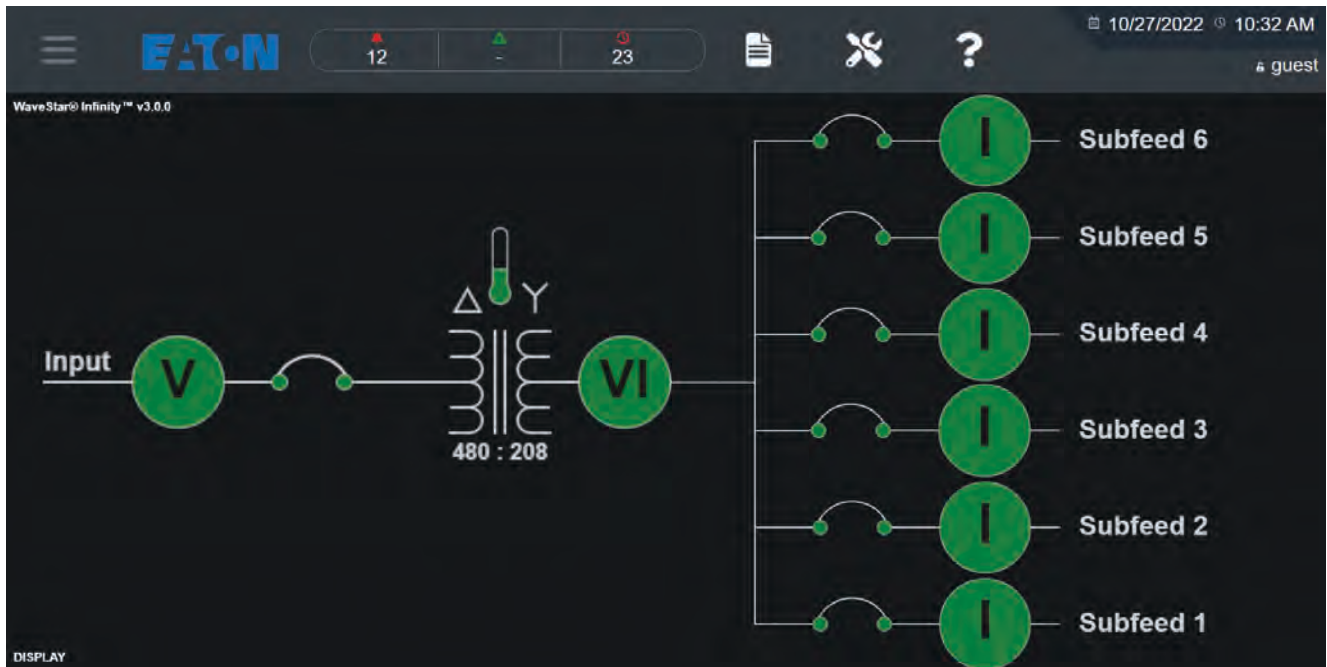


Eaton® PDI WaveStar Infinity 2 Monitoring System

Setup and Operation Manual



Thank you for your recent purchase of an Eaton PDI WaveStar Infinity 2 Monitoring System.

NOTICE

For safety reasons as well as to ensure optimal performance of your Eaton PDI WaveStar Infinity 2 Monitoring System, please carefully read the instructions before trying to install, operate, service or maintain the system.

For any questions regarding the installation, operation, service or maintenance, contact the Eaton Help Desk. See paragraph [2.1 Getting Help](#) for details.

Please use the following e-mail for manual comments, suggestions, or to report a technical error in this manual.

E-SSDocumentation@eaton.com

You can download the most recent version of this product manual from the Eaton web site's Product page, Resources section:

<https://www.eaton.com/us/en-us/catalog/low-voltage-power-distribution-controls-systems/eaton-pdi-busway/resources.html>

Eaton PDI WaveStar Infinity 2 Monitoring System Setup and Operation

Cover Photo: Eaton PDI WaveStar Infinity 2 Monitoring System Home Screen

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Dear Customer,

On behalf of everyone at Eaton, we thank you for partnering with us, for trusting us to maintain your business continuity and for preventing downtime at your facility.

Our suite of backup power, power distribution and power management products are designed to protect you from a host of threats including power outages, surges, and lightning strikes, and enable you to monitor and control your power infrastructure.

We trust that our products will deliver high quality, reliable power for your business, and we are committed to your success.

Please read this manual, which details the installation and operation processes for your new Eaton product.

Thank you for choosing Eaton!

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Chapter 1 Safety

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the Eaton PDI WaveStar Infinity 2 Monitoring System. Read all instructions before operating the equipment and save this manual for future reference.

Please pay special attention to the use of “Danger” symbols throughout this manual indicating electrical or other safety hazards. Following these safety instructions is extremely important to avoid possible injury or death.



This symbol is used throughout this manual to indicate the presence of high voltages, representing a hazard for electric shock, burn or explosion. Follow the instructions carefully to avoid serious or fatal injury.

Follow safe electrical work practices:

- Read, understand, and follow the instructions before installing this product.
- Ensure all power is disconnected before performing installation or service.
- Install equipment in an appropriate electrical environment per local regulations.
- PCBs are ESD sensitive equipment: Ground yourself, discharge any static charge and ensure that the device is effectively grounded before handling the unit.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel and in accordance with all local safety codes. Eaton assumes no responsibility for any consequences arising out of the use of this manual.

This document should NOT be viewed as sufficient by otherwise non-qualified personnel to operate, service, or maintain the equipment discussed.

Chapter 2 Introduction

The Eaton PDI Infinity 2 Monitoring Systems are high-performance monitoring systems for Eaton power distribution equipment and are customized for the underlying equipment configuration according to customer requirements.

Infinity 2 consists of these elements:

- Infinity 2 Monitor, an information display/monitor with many monitoring screens
 - 7" Color Touchscreen display on monitored unit
 - Remote browser access to same screens as the local display
- Customized set of Sensor Boards (PCBs) configured according to customer monitoring requirements. Sensors may include monitoring for these power distribution components:
 - Transformers
 - Subfeeds (voltage and/or current)
 - Panelboards (North American 42- or 84-pole)
 - Digital inputs
- Sensor boards may also have other connections, such as Emergency Power Off (EPO), Remote EPO (REPO), or output relays.
- Internal Ethernet Sensor Board network, providing fast collection of sensor data
- Upstream Ethernet and Modbus RTU connectivity, allowing Infinity 2 to interface to various customer management systems
- Single consolidated Modbus Points list and SNMP Management Information Block (MIB) matching your customized configuration

Infinity 2 Monitoring Systems are integrated into Eaton PDUs or RPPs during manufacturing.

This manual describes how to:

- Make customer network connections to Infinity 2 ([Chapter 3 Customer Network Connections](#)).
- Make local customer connections to sensor boards for REPO, building alarms, and relays ([Chapter 4 Customer Sensor Board Connections](#)).
- Associate your Modbus points list and SNMP MIB to your physical sensor configuration (Paragraph [4.4 Modbus Points List and SNMP MIB](#)).
- Use your Infinity 2 system to monitor your power distribution equipment ([Chapter 5 Setup](#) and [Chapter 6 Operation: Monitoring Your System](#)).
- Make physical adjustments to your Infinity 2 system through circuit calibration and panelboard CT replacement ([Chapter 7 Maintenance](#)).



NOTE

The term PDI in this manual refers to products previous manufactured by Power Distribution, Inc. All service and support for these features are now supplied by Eaton.

2.1 Getting Help

If help is needed with any of the following:

- Scheduling initial startup
- Regional locations and telephone numbers

- A question about any of the information in this manual
- A question this manual does not answer

Please call the Eaton Help Desk at:

United States: **1-800-843-9433** or **1-919-870-3028**

Canada: **1-800-461-9166 ext 260**

All other countries: **Call your local service representative**

Please use the following e-mail for manual comments, suggestions, or to report a technical error in this manual.

E-ESSDocumentation@eaton.com

2.2 Warranty

To view the warranty please click on the link or copy the address to download from the Eaton website:

[Eaton Product Warranty](#)

<https://www.eaton.com/content/dam/eaton/products/backup-power-ups-surge-it-power-distribution/backup-power-ups/portfolio/eaton-three-phase-ups-warranty.pdf>

Chapter 3 Customer Network Connections

3.1 Infinity 2 Network Structure

An Infinity 2 monitoring network is centered around the Infinity 7" Color Touchscreen Monitor (see [Figure 1](#)).

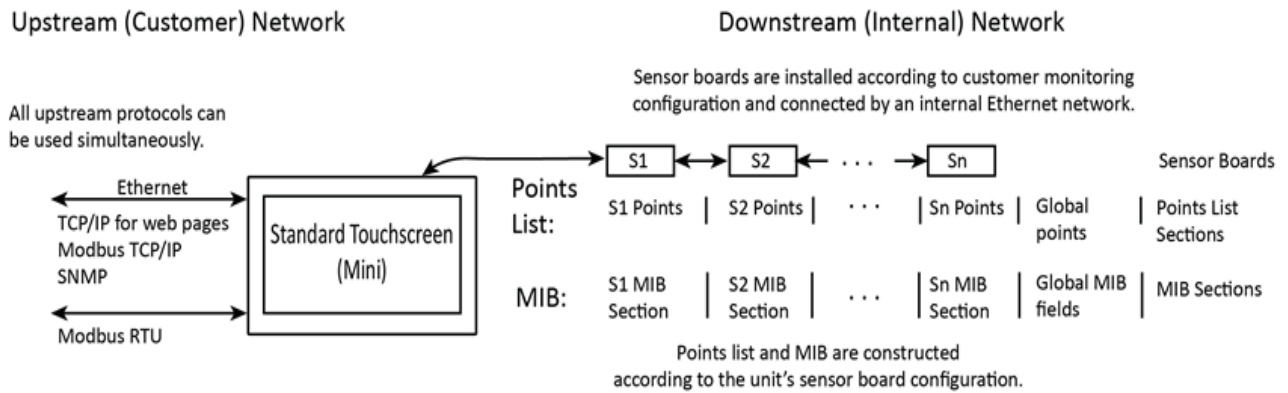
The **downstream network** connects all sensor boards to the 7" Color Touchscreen Monitor in an Ethernet loop. This sensor network is internal to the unit, but customers may make local connections to sensor boards for remote EPO signals, digital inputs such as building alarms, and relay outputs.

The **upstream network** connects the Infinity 2 to data center management and building system(s) and allow browser access to Infinity 2 for remote users. The upstream network can use the following protocols simultaneously:

- Ethernet
 - Modbus TCP/IP
 - TCP/IP for browser access to Infinity 2
 - SNMP Versions 1, 2 or 3.
- Modbus RTU (2-wire or 4-wire)

Each Infinity 2 configuration has a single **Modbus points list** and **SNMP Management Information Block (MIB)** that matches your customized Infinity 2 sensor board configuration. Points lists and MIBs can be downloaded by the customer from the Monitor.

Figure 1. Infinity 2 Network Layout



3.2 Network Connections

All customer network connections are made to the 7" Color Touchscreen backpanel (see [Figure 2](#)).

3.2.1 Ethernet (Upstream)

The customer's Ethernet network can be connected to the upstream Ethernet connector (labeled "ETHERNET") on the 7" Color Touchscreen backpanel located under the red pcb, see [Figure 2](#). Infinity 2 supports up to 1 Gigabit Ethernet upstream.

The upstream Ethernet port can provide remote access to the monitor by one of the following methods:

- **Web Browser:** Monitor can be accessed by using any web browser (Google's Chrome browser is recommended), and the unit IP address.

- **Modbus TCP/IP:** Need the unit IP address.
- **SNMP:** Need the unit IP address and SNMP settings.

For further information on the system network configuration, see paragraph [5.3 Setup: NETWORK/PROTOCOLS Screen](#).

3.2.2 Modbus RTU (Upstream)

The 7" Color Touchscreen backpanel has two (2) paralleled 5-position Modbus RTU connectors at terminals RS1 and RS2. They enable upstream Modbus RTU connection and daisy chaining together multiple displays onto a common upstream link.

4-wire Modbus RTU is the default setup. For 2-wire Modbus RTU, install jumpers on Pins 1 and 2 and Pins 5 and 6, see [Figure 2](#).

3.2.3 Modbus RTU Cable Specification

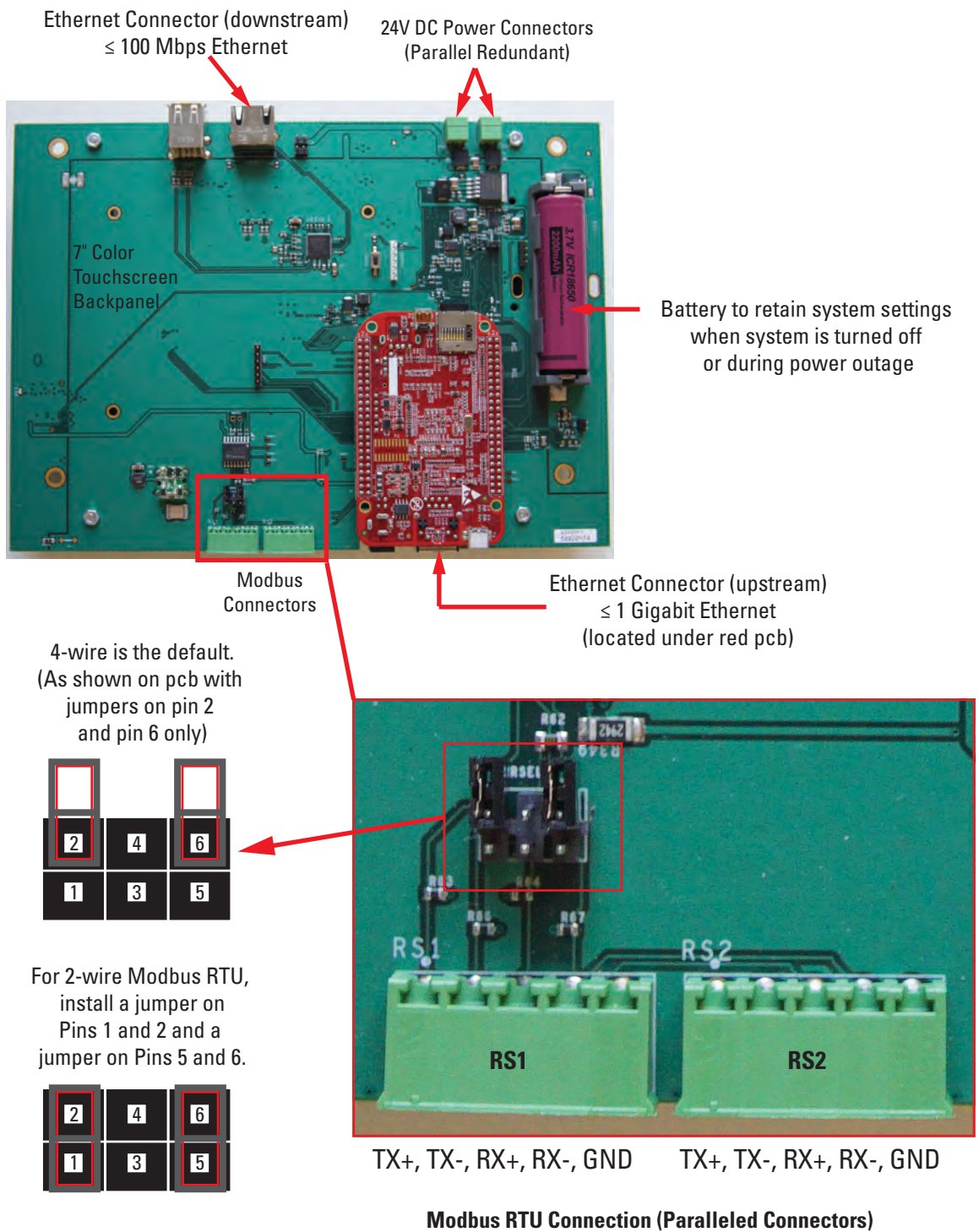
RS485/RS422 cable length can be up to 4000 ft. if you use the correct cable:

- The cable resistance should be ≤ 27 ohms/1000ft @ 1 kHz and the mutual capacitance should be ≤ 14 pf/ft. @ 1 kHz.
- 4-wire cabling:
 - RS422 is typically used for 4-wire.
 - Use a shielded cable with two (2) twisted pairs and a shield/ground wire.
 - The two transmit lines must be in one twisted pair and the two receive lines in the other twisted pair.
- 2-wire cabling:
 - RS485 is typically used for 2-wire.
 - Use a shielded cable with one (1) twisted pair and a shield/ground wire.

3.2.4 Modbus RTU Cable Biasing and Termination

Infinity 2 Monitors have soft biasing (27K pull-up and pull-down resistors) on the + and – transmit and receive lines. Therefore, if the customer's Modbus client device allows for control, Eaton recommends that the user turn on biasing and turn off termination, which may "fight" the biasing. Biasing the client device's lines is not critical because the Infinity 2 Monitor is already biasing the lines.

Figure 2. Customer Network Connections



3.2.5 Modbus RTU: Daisy-chaining Monitors

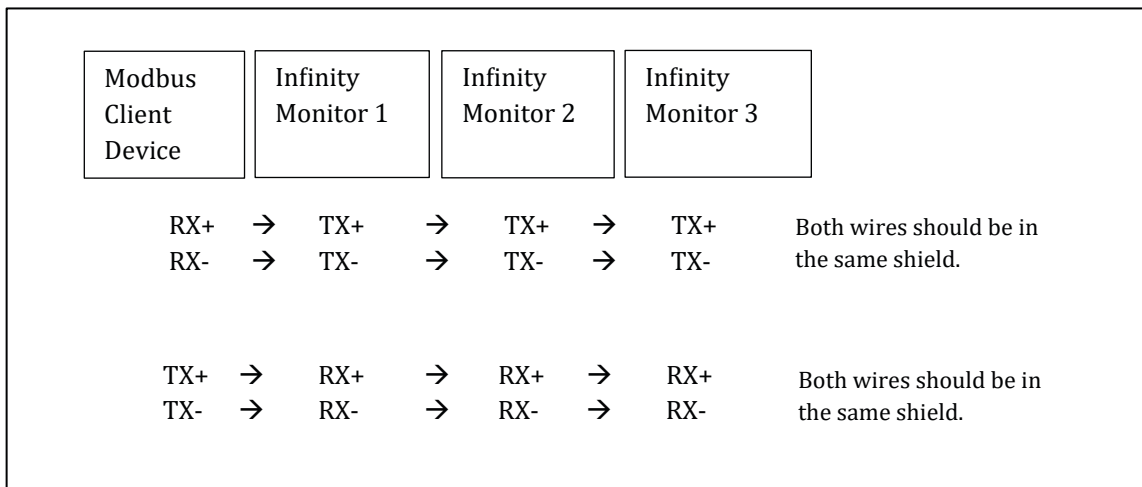
Upstream management system traffic for multiple units can be consolidated onto a single uplink by daisy-chaining Monitors using the paralleled Modbus RTU connectors (RS1 and RS2) on the Monitor PCB (see [Figure 2](#)).

4-wire Modbus RTU

4-wire Modbus RTU is the default Modbus RTU configuration. For 4-wire Modbus:

- Jumpers must be removed from Pins 1 and 2 and Pins 5 and 6 on every Monitor PCB in the chain ([Figure 2](#)). Having Pins 1 and 2 and Pins 5 and 6 jumpered on any backpanel PCB in the daisy chain will force 2-wire Modbus RTU for all units in the chain.
- Infinity 2 Monitors are all Modbus RTU servers.
 - RX+ on the upstream Modbus client device (usually the Building Management System or DCIM system) wires to TX+ on the next Monitor PCB (see [Figure 3](#)).
 - TX- from the Modbus client device wires to RX- on the next Monitor PCB (see [Figure 3](#)).
 - A second pair of wires connects the other pair of customer client TX+ to chain RX+ and customer client TX- to chain RX-.
 - The TX+ & TX- going to the RX+ & RX- should be in the same shield. Do not run the +'s in one shield and the -'s in another.
- Run a dedicated ground wire with the signal wires and ground the shield at one end only.

Figure 3. Daisy-chained Infinity 2 Monitors with 4-wire Modbus RTU

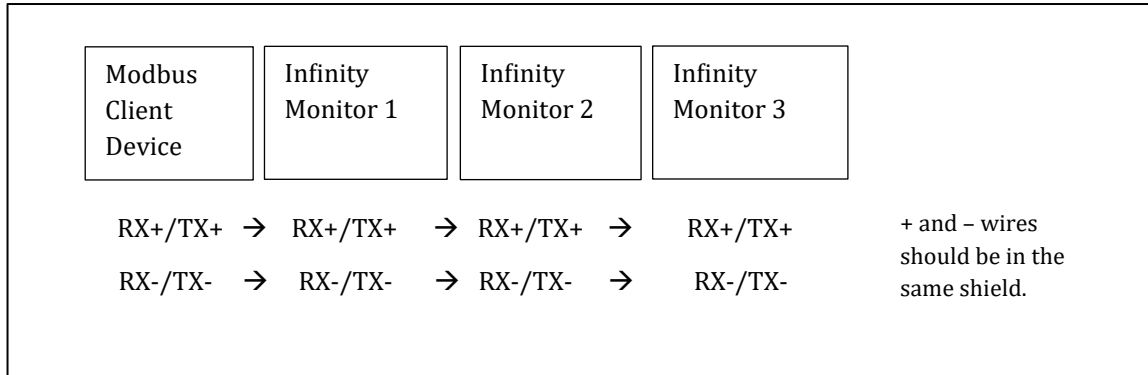


For 2-wire configuration (see [Figure 4](#)):

- At least one Monitor in a device chain must have both jumpers jumped on its Modbus connection. If any device in the chain has jumpers installed for 2-wire, all the device chain is 2-wire. To avoid confusion when troubleshooting, all the devices in the chain should be jumpered in the same way.
- TX+ or RX+ on the Monitor (either one, because the on-board 2-wire jumpers short them together) wires to TX+ or RX+ on downstream devices.
- TX- or RX- on the Monitor wires to TX- or RX- on downstream devices.

- The + and - signal wires should be comprised of a (twisted) wire pair residing in the same shield.

Figure 4. Daisy-chained Infinity 2 Monitors with 2-wire Modbus RTU



Chapter 4 Customer Sensor Board Connections

All sensor board connections internal to the monitored unit are made in manufacturing. However, any external sensor board connections must be made during installation. These connections typically are limited to the following connections, which are made to sensor boards in the Monitoring Compartment:

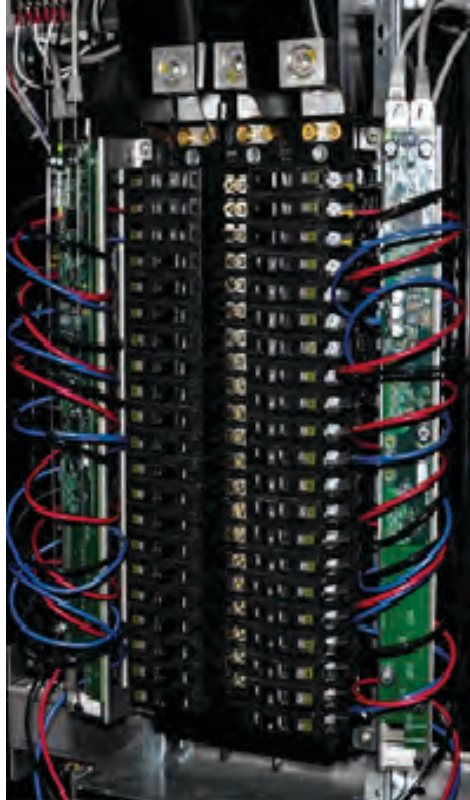
- Remote Emergency Power Off (REPO)
- Local digital input connections, such as building alarms
- Local relay output connections, such as a summary alarm

4.1 Sensor Types

To monitor your system, Infinity has a variety of sensors including:

- Voltage sensor for (1) source, 3-Phase + Neutral $\leq 660\text{Vac}$.
- Current sensor for (1) source 3-Phase + Neutral + Ground.
- Panelboard Sensor Strips with solid core 100A CTs for monitoring panelboard circuits ([Figure 5](#)).
- Transformer Sensor, monitoring (2) temperatures (high-temp and over-temp).
- Digital Inputs Option Board, monitoring up to (8) digital inputs, such as circuit breaker aux contacts and building alarms.
- Relay Option Board with (4) relay outputs.

Figure 5. Panelboard with Sensor CT Strips on Each Side



4.1.1 Sensor Boards

Sensors are arranged on PCBs with other components such as relays, digital inputs, EPO, and REPO. Multiple sensors and sensor types can be placed on the same PCB. Boards include:

- **Sensor Combo Board**, typically the first board in the sensor chain, combines voltage, current, or transformer monitoring on the same board with digital inputs and relays and is.
- **Sensor Base Board** holds up to (4) **Option Boards**, each specialized for a specific function, such as voltage measurement, current measurement, digital inputs or relays. Option Boards offer flexibility for customizing Infinity monitoring.
- **Sensor Combo 8x1 Board** monitors current on up to (8) subfeeds.
- **Sensor CT Strip** can monitor current on up to (21) panelboard circuits ([Figure 5](#)).

Sensor Combo Boards and Sensor Base Boards are in the unit's Monitoring Compartment.

Sensor Combo 8x1 Boards and Sensor CT Strips are placed next to or near the subfeeds or panelboards.

4.1.2 Sensor Board Configuration

Eaton Manufacturing generates a sensor board configuration based on the physical power distribution configuration of your unit and your requested components.

Manufacturing also creates a single Modbus points list (Modbus register map) and SNMP MIB that matches the generated configuration.

4.2 Sensor Board Layout

4.2.1 Sensor Board Order

The physical position of Sensor Boards in a Monitoring Compartment matches their order in the **Sensors' Status** list, Points List, and SNMP MIB, but the physical order of sensor boards varies by the type of unit being monitored.

The Sensor Board order within a Monitoring Compartment is shown by unit type in the next section.

4.2.2 Monitoring Compartments

Each unit has a monitoring compartment containing Sensor Combo Boards and optionally Sensor Base Boards. The physical network order of the boards is shown by the arrows in the following illustrations. When you have more than one sensor board of the same type, the network order of boards is important for identifying which board to connect to.

Figure 6. Modular Compact Remote Power Panel, Monitoring Compartment

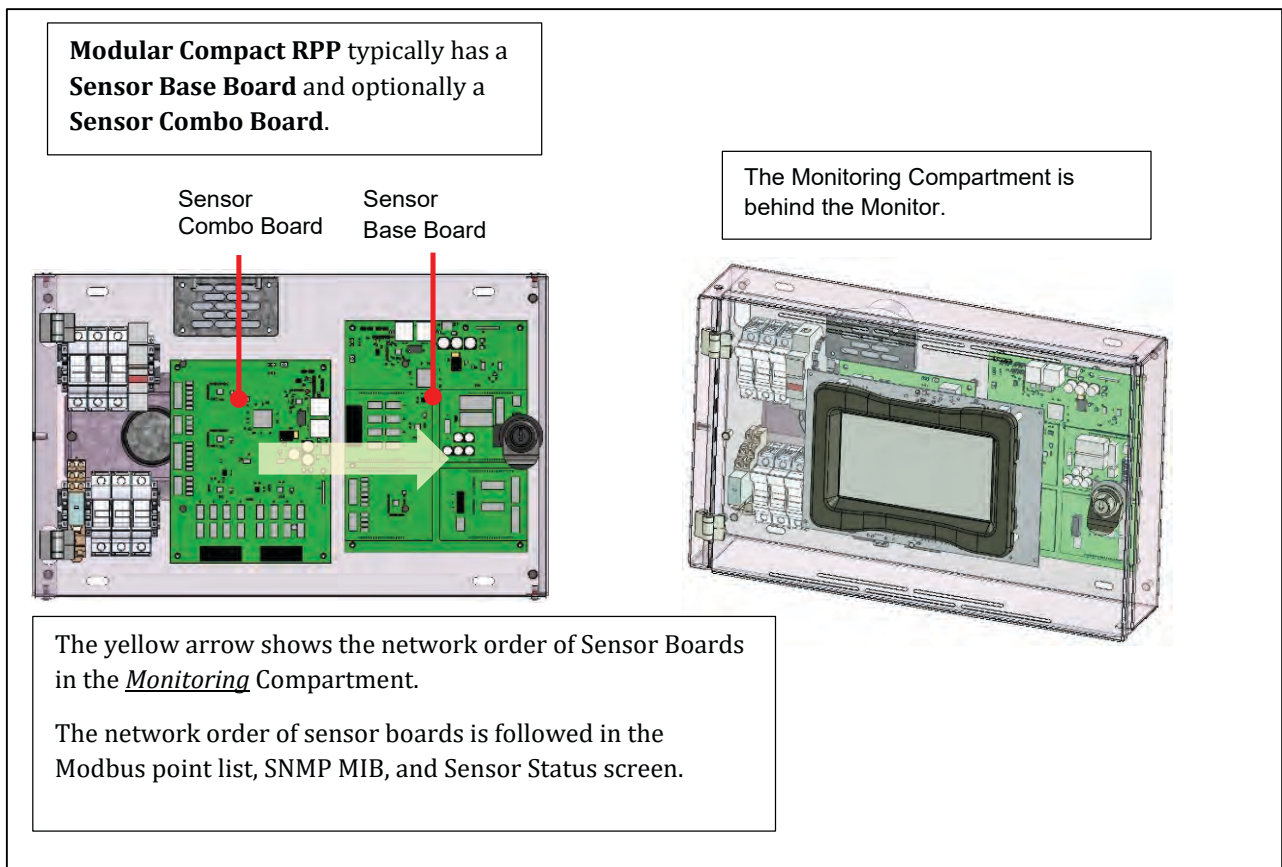


Figure 7. PowerPak Remote Power Panel, Sensor Boards

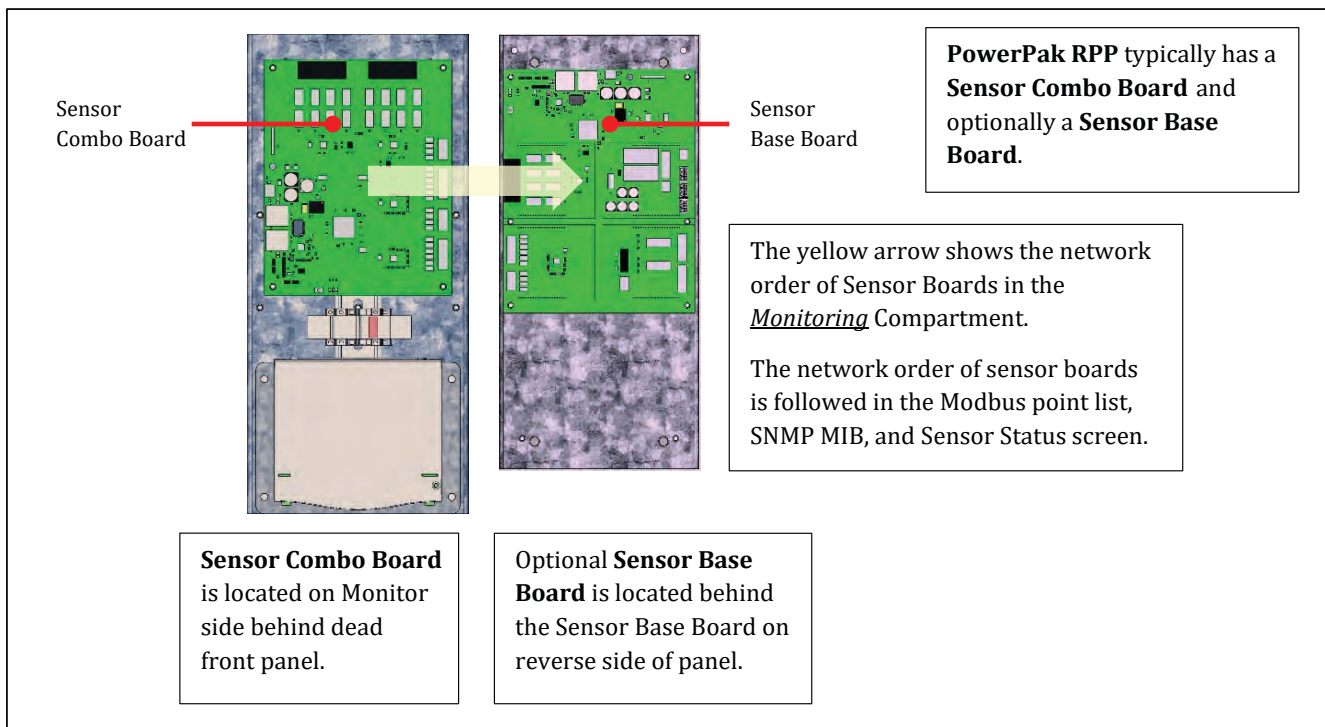
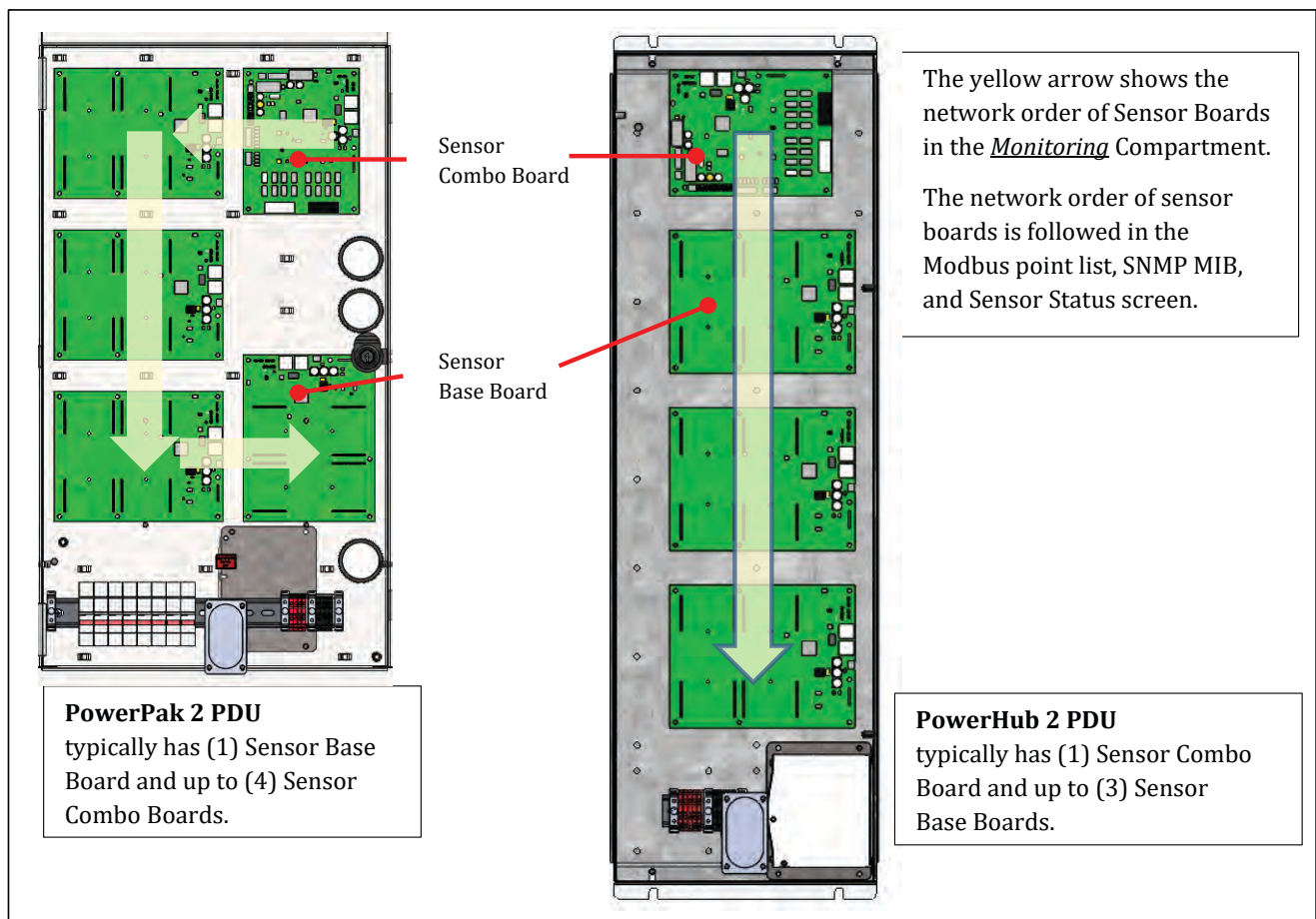


Figure 8. PDU Monitoring Compartments with Sensor Boards

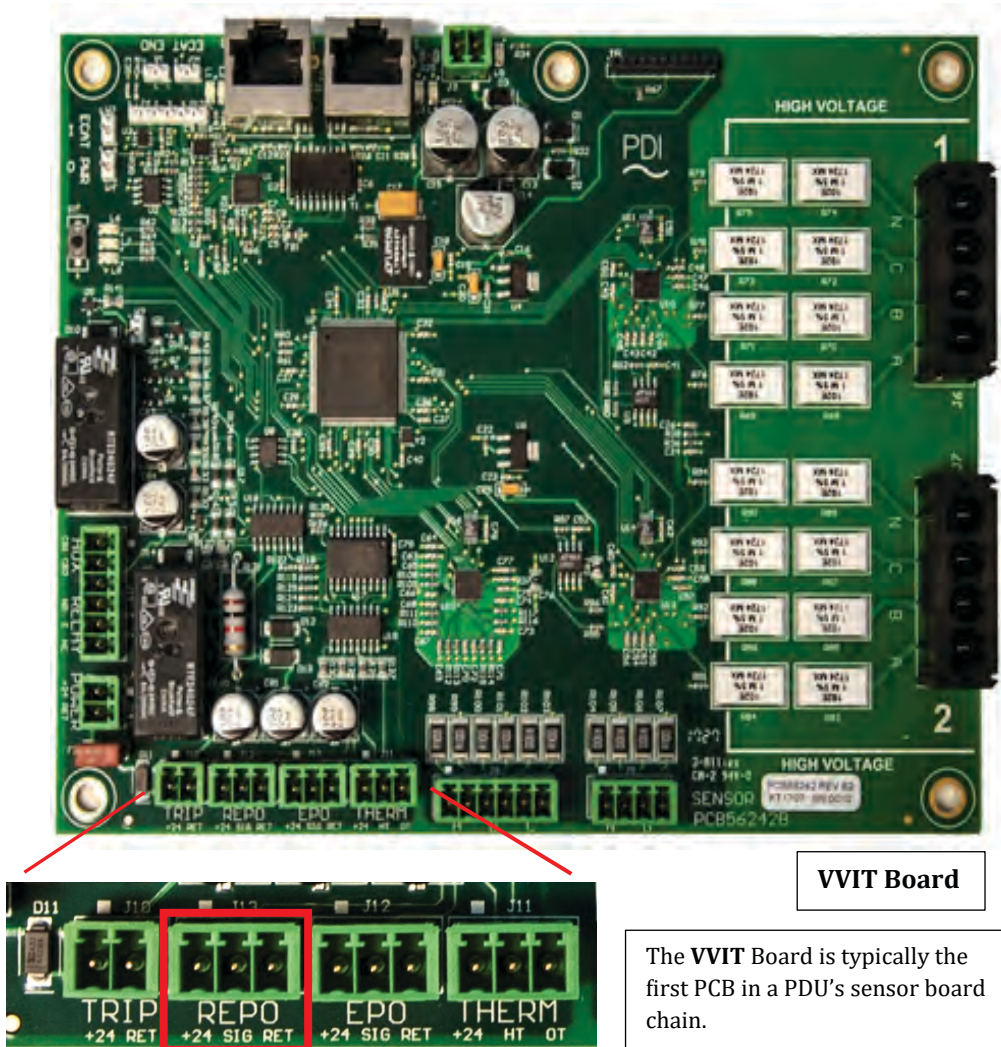


4.2.3 REPO Connection

A customer REPO connection is usually made to a **VVIT Sensor Base Board**. (VVIT=Voltage-Voltage-Current-Transformer, the sensor types on the board.) A VVIT Sensor Combo Board is typically the first Sensor Board in a PDU Sensor Board chain (see [Figure 9](#)) and has connections typical for a PDU, such as transformer thermal monitoring and EPO.

The REPO connection on the VVIT Board is clearly marked.

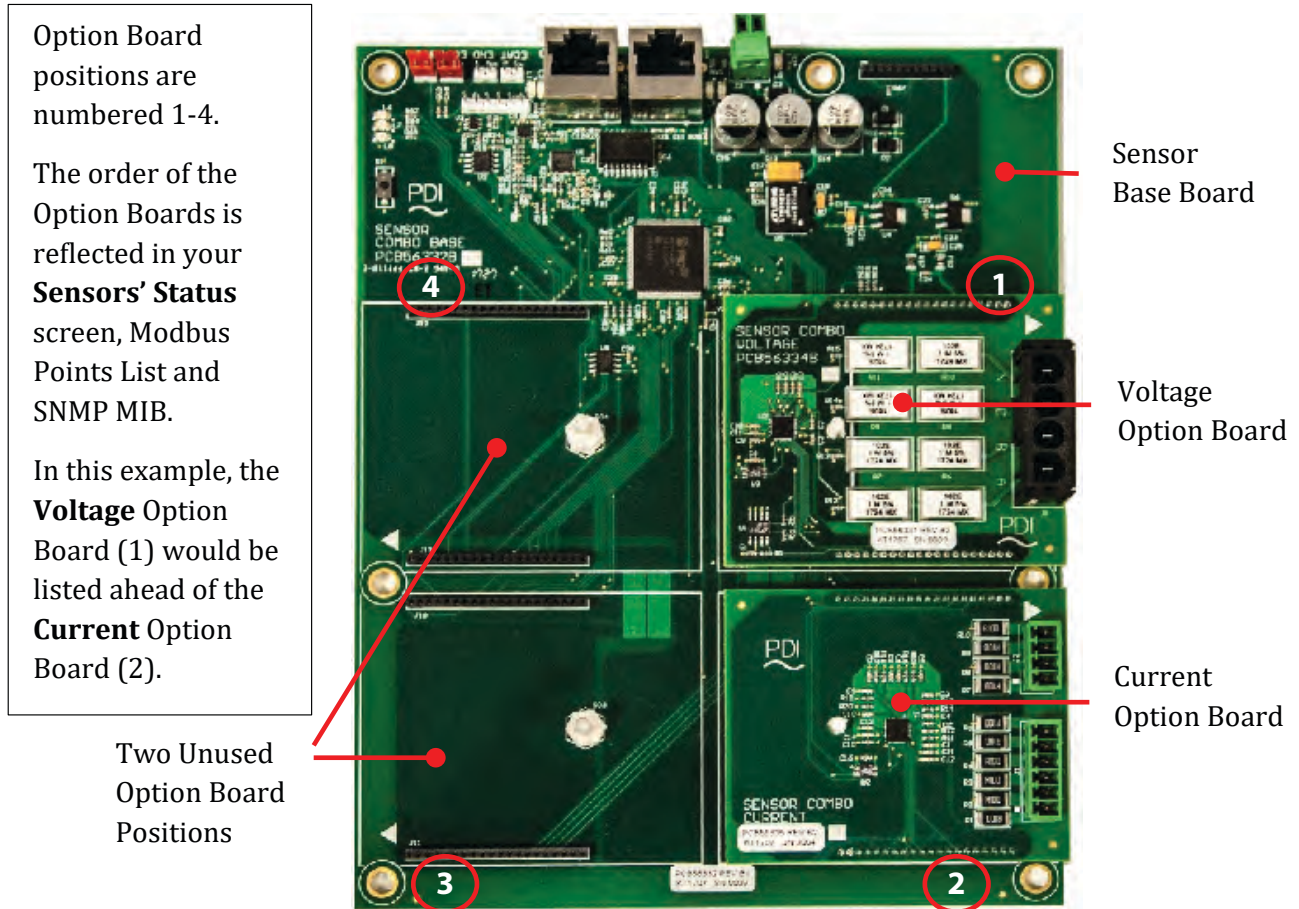
Figure 9. REPO Connection to VVIT Board



4.2.4 Sensor Base Boards and Option Boards

Sensor Base Boards can attach up to (4) four Option Boards. Option boards provide great flexibility for customizing Infinity monitoring configurations.

Figure 10. Sensor Base Board with Two Option Boards



The only connections to Option Boards that customers usually make are to a Digital Inputs Option Board and a Relay Option Board. Digital Inputs and Relays are typically the last boards in the sensor chain.

4.2.5 Digital Inputs Option Board

Each Digital Inputs Options Board has (8) eight Digital Inputs connections.

If you have only one Digital Inputs Option Board, it will be listed on your **Sensors' Status** screen as "Digital 1." Digital Inputs on the board are numbered 1-8 and are identified as D1-D8 on the Digital Inputs Screen ([Figure 35](#)), Modbus Points List, and SNMP MIB.

To test that your selected Digital Input sets the correct alarm, you can jumper the Digital Input. Check the **Alarm** Screen to see that the correct alarm is issued.

Figure 11. Digital Inputs Option Board

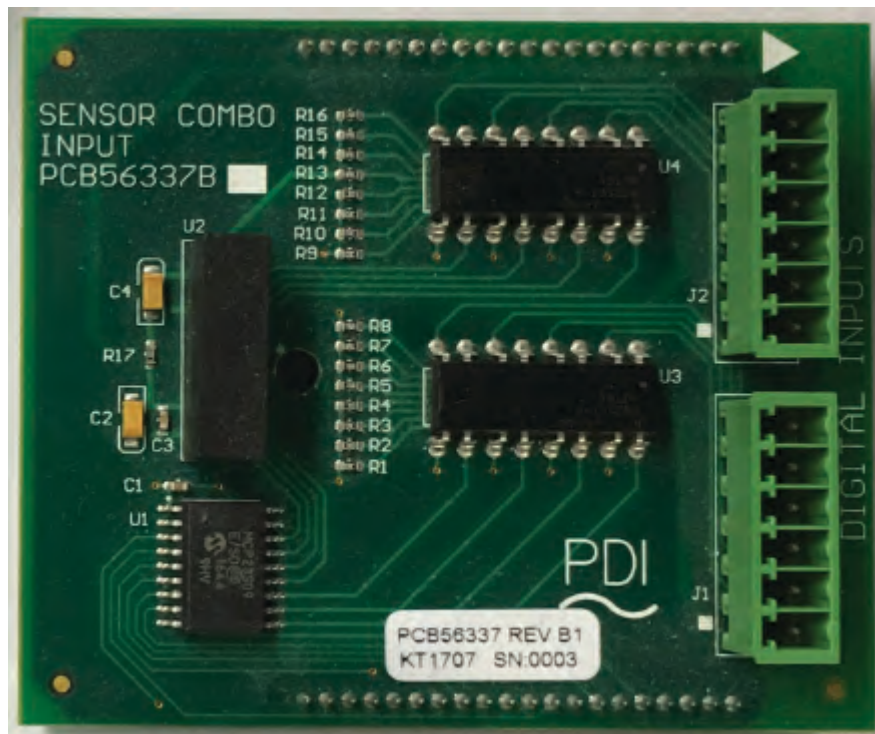


Figure 12. Digital Inputs Option Board – Sensor Status Screen

Status shows whether the current bit state is high (=1) or low (=0).

Normal shows whether the normal (non-alarm) bit state is high (=1) or low (=0). Check the **Normal** box when the **Normal** state is high.

A check box in the **Alarm** column indicates an active alarm for that Digital Input.

Input	Status	Normal	Alarm	Enable Alarm
Input CB Aux NC (D1):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Input 2 CB Aux NC (D2):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Panel 1 CB Aux NC (D3):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Subfeed 1 CB Aux NC (D4):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Door Open (D5):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Extra (D6):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra (D7):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra (D8):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D1-D8 correspond to the D1-D8 connections on the Digital Inputs Options board.

Unassigned digital inputs are named as Extra, with its connection number in parentheses: **Extra (D6)**

If Status ≠ Normal AND Enable Alarm is checked THEN an Alarm is signaled.

4.2.6 Relay Option Board

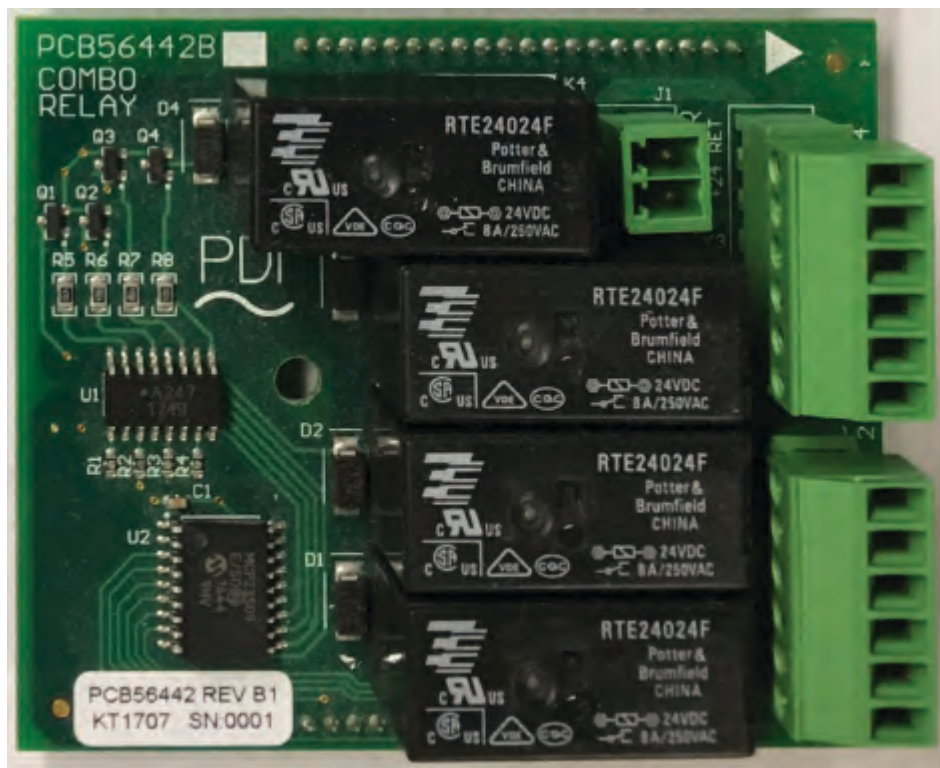
Each Relay Option Board has (4) Form C Relays. Each relay can function as Normally Open (NO) or Normally Closed (NC).

Relays are identified on the board as Relay 1 – Relay 4. The first Relay Option Board is listed on your **Sensors' Status** screen as "Relay 1" and individual relays are listed as (Sensor Board Name/Relay Name):

- Relay1 Relay 1
- Relay1 Relay 2
- Etc.

See also Relay Screen, [Figure 37](#).

Figure 13. Relay Option Board



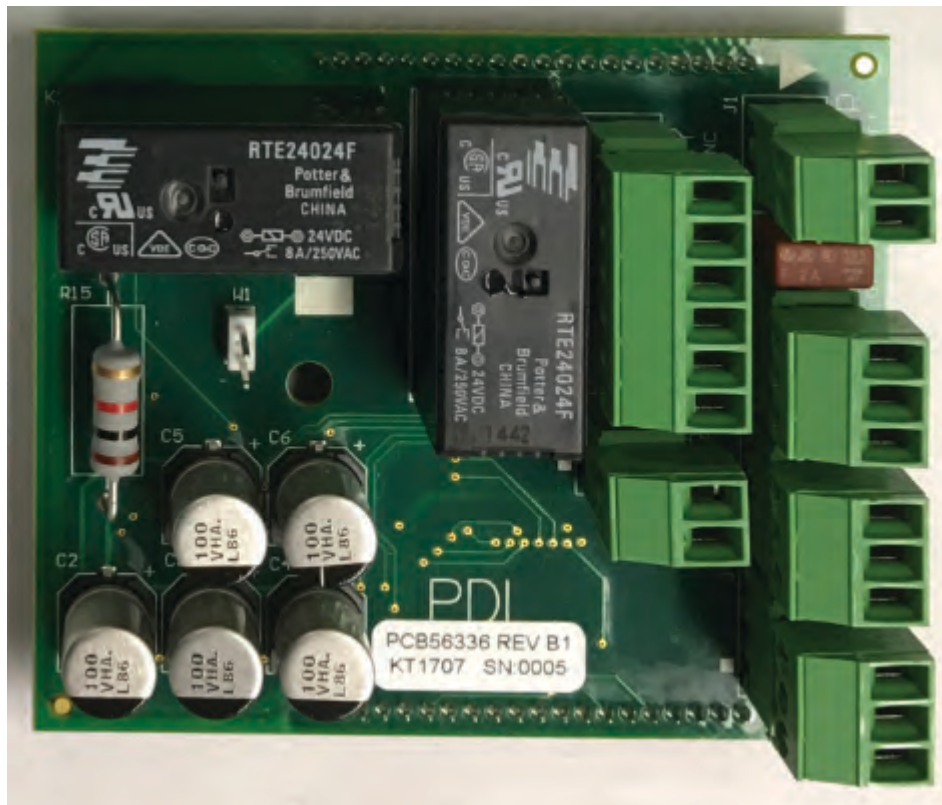
4.2.7 Transformer Sensor Board

The Transformer Sensor Board monitors the transformer's temperature status.

The temperature status is shown on the Home screen with one of the following color statuses:

- Green = normal or temperature is within normal parameters
- Orange = high temperature
- Red = over-temperature

Figure 14. Transformer Sensor Board



4.2.8 Multiple Option Boards of the Same Type

You may have more than one Option Board of the same type. For example, Digital Inputs are used for circuit breaker aux contacts and on a PDU with many subfeeds you may have more than one Digital Inputs Option Board.

When you have more than one Option Board of the same type, they are ordered in the Sensor List, Modbus Points List, and SNMP MIB as follows:

1. Sensor boards earlier in the Monitoring Compartment layout are listed first. (See paragraphs [4.2.1 Sensor Board Order](#), and [4.2.2 Monitoring Compartments](#), as well as [Figure 6](#), [Figure 7](#), and [Figure 8](#)).
2. Sensor Base Board layout: Options Boards are ordered by position number 1-4 on the Sensor Base Board (See paragraph [4.2.4 Sensor Base Boards and Option Boards](#), and [Figure 10](#)).

4.3 Sensor Board Configuration

To list the sensor boards on your unit with their status, select the question mark symbol on any screen header ([Figure 15](#)). The software version, points list version, and error status are shown for all sensor boards. Software levels are also shown for other components of the Infinity system.

Figure 15. Sensors’ Status List for a PDU

S	Sensor Board	Stale	Error	SW Version
1	TLN	-	-	11100128
2	Mini Display	--	-	2.0.0
3	Configurator	-	-	2.1.0
4	GUI [Pages]	--	-	3.0.0
5	WEB Server [Vobs]	--	-	3.0.0
6	Input Voltage	No	None	Software: 2.2.0 Points list: 1.1.0
7	Input Current	No	None	Software: 2.2.0 Points list: 1.1.0
8	Transformer	No	None	Software: 2.2.0 Points list: 1.1.0
9	Output Voltage	No	None	Software: 2.2.0 Points list: 1.1.0
10	Output Current	No	None	Software: 2.2.0 Points list: 1.1.0
11	Subfeed 1 Current	No	None	Software: 2.2.0 Points list: 1.1.0
12	Subfeed 2 Current	No	None	Software: 2.2.0 Points list: 1.1.0
13	Subfeed 3 Current	No	None	Software: 2.2.0 Points list: 1.1.0
14	Subfeed 4 Current	No	None	Software: 2.2.0 Points list: 1.1.0
15	Subfeed 5 Current	No	None	Software: 2.2.0 Points list: 1.1.0
16	Subfeed 6 Current	No	None	Software: 2.2.0 Points list: 1.1.0
17	Digital 1	No	None	Software: 2.2.1 Points list: 1.1.0
18	Digital 2	No	None	Software: 2.2.1 Points list: 1.1.0

Sensor Board
List of sensor boards in the system.

Sensor boards can be renamed *on screen* with the **NAMES** screen.

Boards listed vary based system configuration.

Stale
"No" = OK
"Yes" = Sensor Board has not updated status within a given period.

Error
"None" = no errors

See table below for list of errors and their meanings

SW Version
Software Version and Modbus points list version.

Table 1. Sensor Board Errors and Descriptions

Error Name	Description
Data Ready Error	Did not receive data from the ADC (Analog to Digital Converter).
Voltage Waveform Error	Did not receive voltage waveform data.
Math Completion Error	Did not complete the Math process needed to display data readings.
Strip Sync. Error	Did not receive the three sets of data readings from the CT strip sensor board.

4.4 Modbus Points List and SNMP MIB

There is one consolidated Modbus points lists and one SNMP MIB that is specific to the unit's monitoring configuration, with an analog points section and a digital points section. The names of sensors and sensor boards are listed on the **Sensors' Status** screen. These same sensor names are used on the **Sensors' Status** screen, the Modbus points list, and SNMP MIB.

In the Modbus Points List and SNMP MIB:

- Points are grouped together by sensor board and each group of sensor points appears in the same order as on the **Sensors' Status** screen.
- The first part of each point name is the name of the sensor or sensor board.
- 42-Pole panelboards have separate sensor strips for the odd side (CTs 1,3,5, etc.) and even side (CTs 2,4,6, etc.), which are addressed in the Points List and MIB as a single contiguous set of points (CTs 1,2,3,4,5,6, etc.). 84-Pole panelboards have four (4) sensor strips.

[Table 2](#) shows how the Sensors' Status list corresponds to sections of the Modbus points list.



NOTE

System configurations vary based upon customer request.

Table 2. Sensor Status List vs. Modbus Point List

Sensors' Status Screen	Modbus Analog Points section (1st point in each section is shown)	Modbus Digital Points section (1st point in each section is shown) The Digital Points section is found after the Analog Points section.
(Global Points in your Points List Prolong are not found on any sensor board.)	Prolog: Global Points , such as total number of alarms outstanding	Prolog: Global Points , such as System All Alerts, showing alarms are present
Input Voltage	Input Voltage A-B (1 st analog Input Voltage point)	Input Voltage A-B High (1 st digital point)
Input Current	Input Current A (1 st Input Current analog point)	Input Current A High (1 st Transformer Input Current digital point)
Transformer	Transformer Debounce (this is the only analog Transformer point)	Transformer Thermal High Temp Status (1 st digital Transformer Output point)
Output Voltage	Output Voltage A-B (1 st Output Voltage point)	Output Voltage A-B High (1 st digital Transformer Output Voltage point)
Output Current	Output Current A (1 st Output Current analog point)	Output Current A High (1 st Transformer Output Current digital point)
Subfeed 1 Current	Subfeed 1 Current A (1 st Subfeed 1 Point)	Subfeed 1 Current A High (1 st Subfeed 1 digital point)
Subfeed 2 up to Subfeed 16 Current	Each Subfeed points list is the same as for others of the same type.	Each Subfeed points list is the same as for others of the same type.
Panel 1–8 CT1–41 (odd) Panel 1–8 CT2–42 (even)	Panels 1-8 are not shown. Each panelboard points list is the same as for others of the same type.	Panels 1-8 are not shown. Each panelboard points list is the same as for others of the same type.

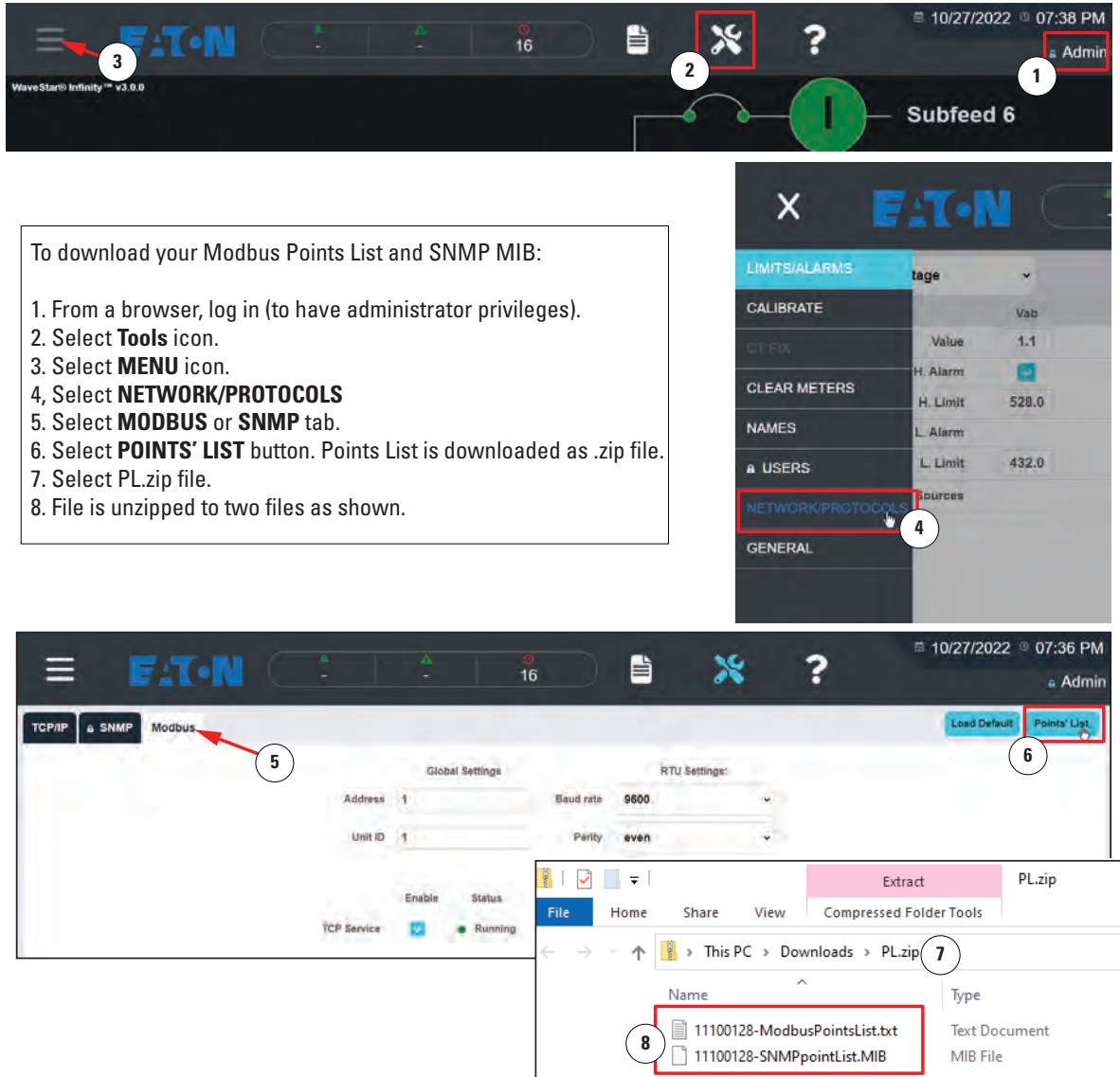
Table 2. Sensor Status List vs. Modbus Point List (Continued)

Sensors' Status Screen	Modbus Analog Points section (1st point in each section is shown)	Modbus Digital Points section (1st point in each section is shown) The Digital Points section is found after the Analog Points section.
Digital 1		Digital 1 Subfeed 1 CB Aux Status (1 st point)
Relay 1		Relay 1 Relay 1 (1 st Relay 1 digital point)

4.4.1 Downloading the Modbus Points List and SNMP MIB

You can download the Modbus Points List and SNMP MIB for your configuration from a browser. See [Figure 16](#) for instructions.

Figure 16. Download Modbus Points List and SNMP MIB



Customer Sensor Board Connections

Chapter 5 Setup

After making network and local sensor connections, you should set up Infinity 2 operating parameters. Until your network addresses are set up, you must use your unit's 7" Touchscreen Display.

When you power-on your system or when a remote user connects to an Infinity 2 system, the first screen displayed is the Infinity 2 **HOME** screen. Select the tools symbol to display setup screens. The first screen displayed then is always the **LIMITS** screen.

To make any Infinity 2 changes you must have administrator privileges, which you get by logging in. Select the upper right side of banner (time/date/user) to display the log-in screen.

Changes are automatically saved except in certain cases where there is a **Save Changes** button.



NOTE

After pressing the **Save Changes** button, the monitor will reboot.

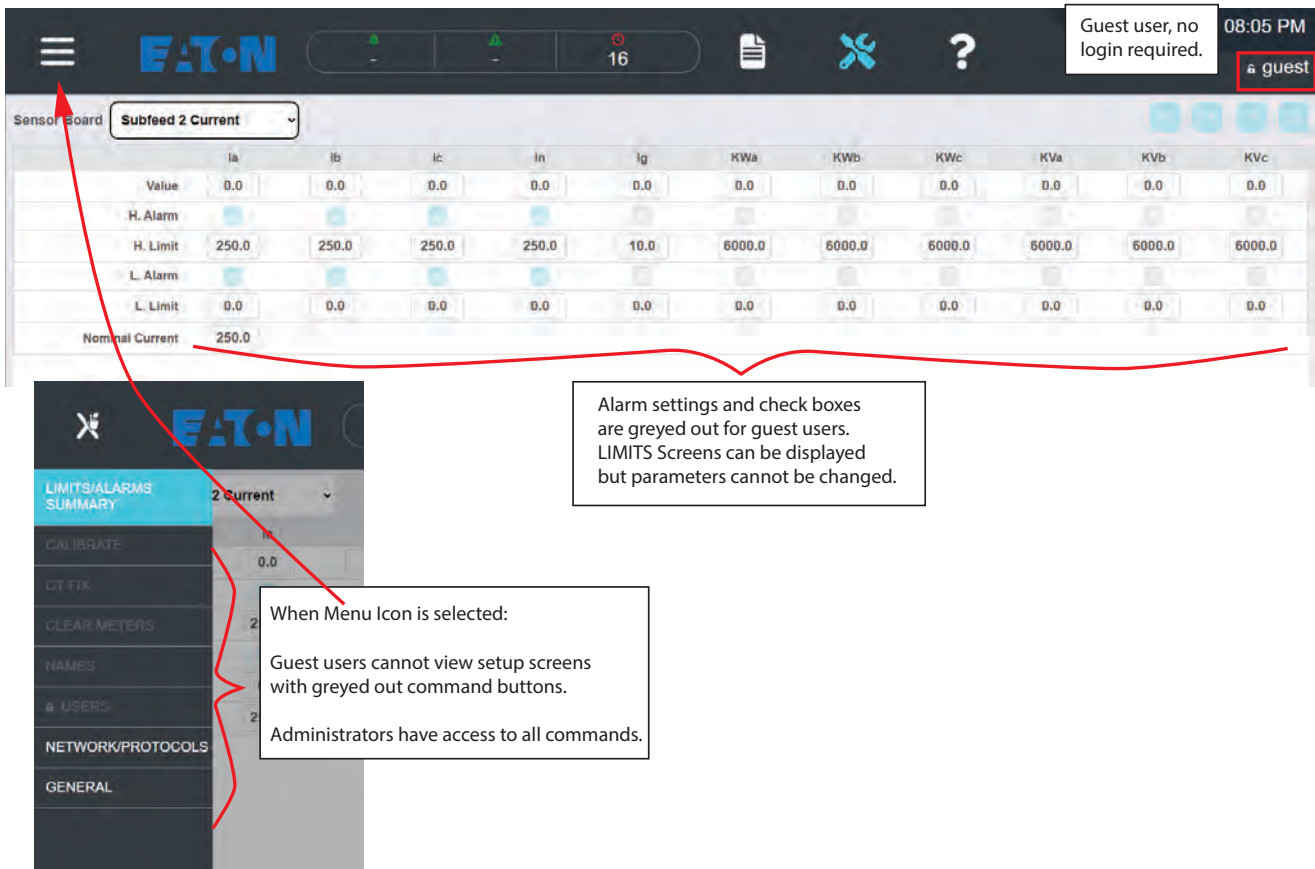
5.1 Setup: User Administration

5.1.1 User Access Privileges

There are two (2) privilege levels, **guest** and **administrator**.

- **Administrator:** Only administrators can set or change Infinity 2 parameters and only administrators must log in. Any user logging in with a correct ID and password receives administrator privileges.
- **Guest:** Other users are designated as "guest" users and do not log in. Guest users can view most screens, but they cannot change parameters. Update options and some setup screen command buttons are greyed out for guest users to show that they cannot make changes or access the screen.

Figure 17. Guest User Access




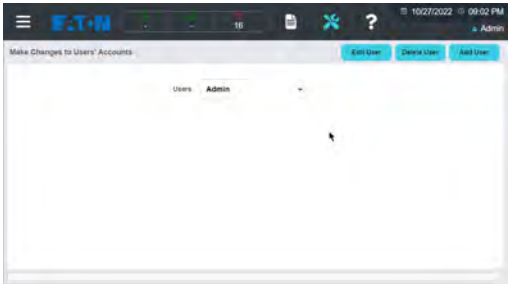



5.1.2 User Setup

User administration is very simple. The only identified users are administrators. The only user changes are adding an administrator (Add User), deleting a user, or changing a password (Edit User).

Table 3. User Administration

Process Step	Process Description	Illustration
1.	Select user name field in upper right corner (arrow) of HOME screen to initiate login.	
2.	Enter User Name and Password . The system is shipped with a default administrator user ID = Admin and password = Admin . At first login, the Administrator should change the password and save it.	

Table 3. User Administration (Continued)

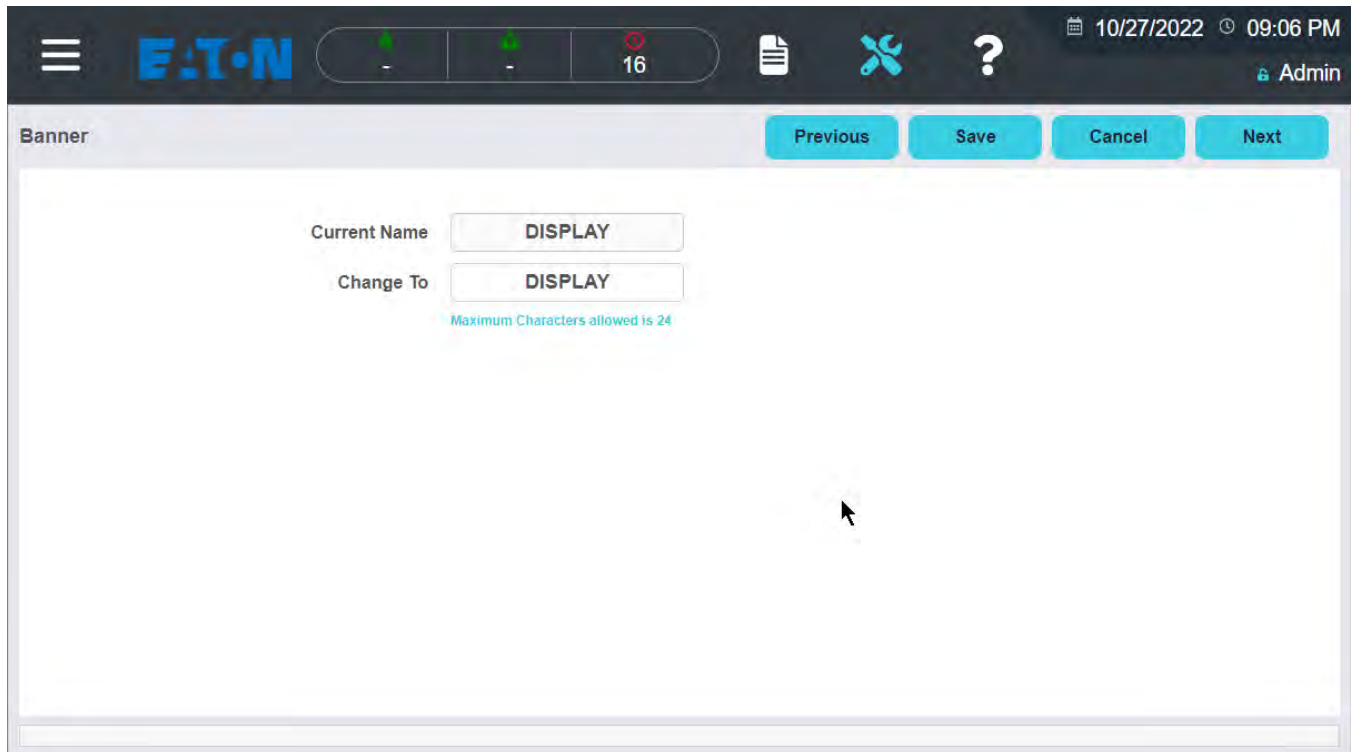
Process Step	Process Description	Illustration
<p>3.</p> <p>4.</p> <p>5.</p>	<p>In the banner, select the Setup icon.</p>  <p>Select USERS command button.</p> <p>Select user from Users drop-down list and choose EDIT USER.</p>	
<p>6.</p>	<p>Change User Credentials appears. Only the password can be changed. To change the user name instead, select Delete User and then choose Add User.</p>	
<p>7.</p>	<p>To delete a user, select a user name from the drop-down list, select Delete User, and confirm the deletion.</p>	
<p>8.</p>	<p>Add New User follows the same format.</p>	

5.1.3 NAMES Screen

An administrator can change many of the names used on-screen using the **NAMES** command button. These changes only affect names used on Infinity 2 monitoring screens. They do NOT change names in the Modbus points list or SNMP MIB.

Not all names can be changed. Scroll through the Name list using NEXT and PREVIOUS buttons. Unlike many other screens, changes are not automatically saved. You must select SAVE to implement and save changes.


Figure 18. NAMES Screen, Changing Banner Name



5.2 Setup: GENERAL Screen

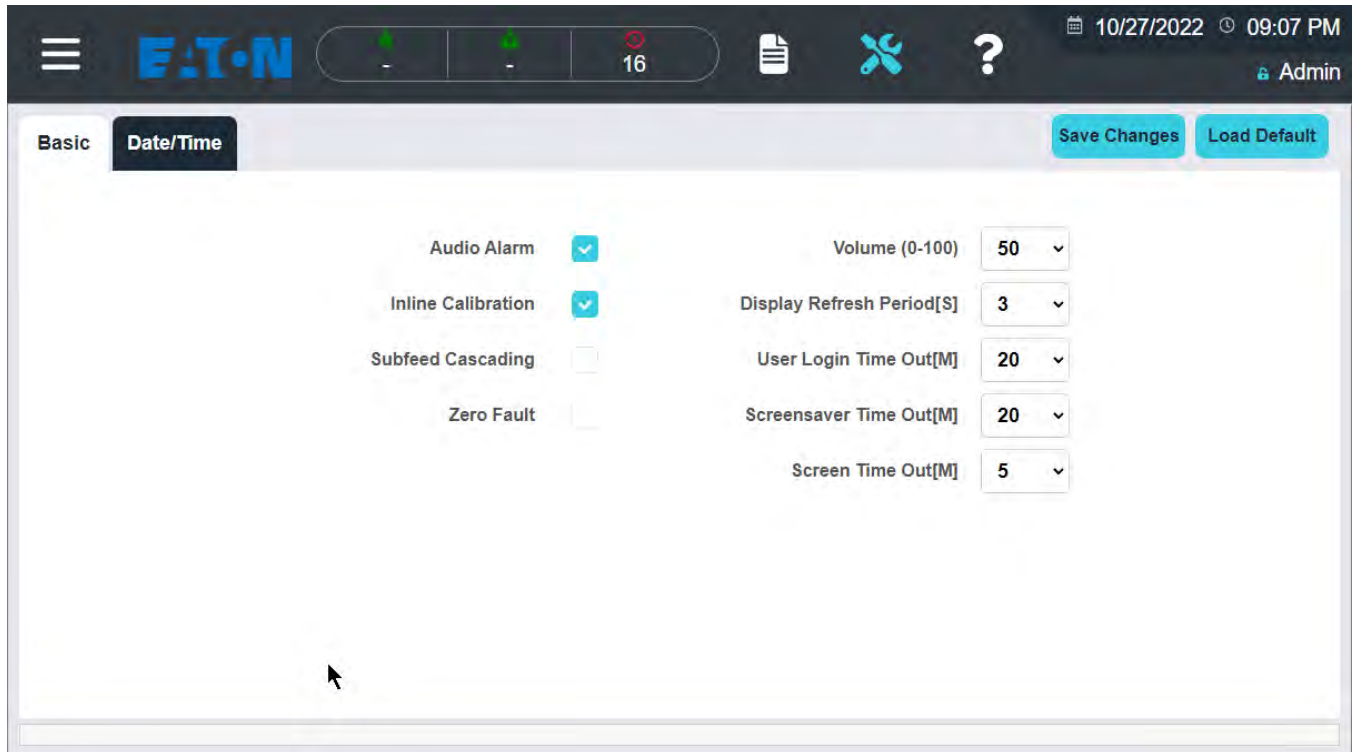
The **GENERAL** screen has two tabs:

- **BASIC** determines Infinity 2 screen and audible alarm behavior
- **DATE/TIME** sets date and time used on screens and for time-stamping events.

Select the **Setup** icon  in the banner, then select the **GENERAL** button. The display screen will show the current display parameters. For default parameters select **LOAD DEFAULT**. Then adjust parameters as necessary. Changes are automatically saved as you make them.

BASIC Tab: Enter parameters for Monitor behavior.

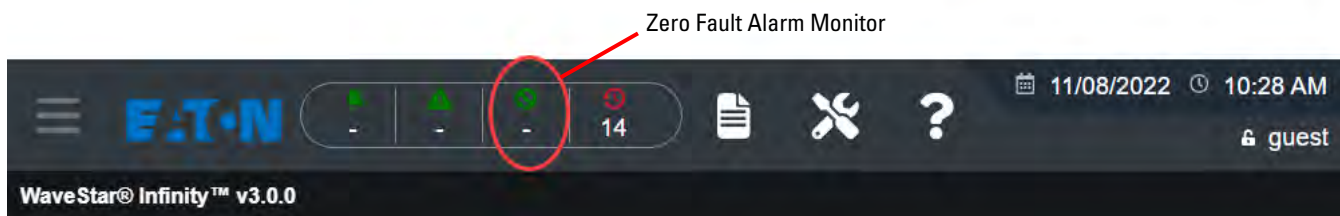
Figure 19. GENERAL Screen, BASIC Tab



- Audible Alarm: Check **Audio Alarm** if you want an audible alarm to sound at the Infinity 2 7" touchscreen when there is a new alarm. Set **Volume** with drop down list. The Audible Alarm is for the local display only and does not sound at remote user screens.
- Screen Timers: Select time delay from drop-down lists:
 - **Display Refresh Period:** The display will refresh with the latest data at this interval (seconds).
 - **User Login Time Out:** How long the Monitor will wait with no operator input before logging the user out. This only affects logged-in users, hence only administrators. Guest users do not log in and are not affected.

- **Screensaver Time Out:** When there is no operator input for the specified period the Monitor loads the screensaver. This parameter applies to both local and remote users.
- **Screen Time Out:** When there is no operator input for the specified period the screen goes blank, the backlight turns off.
- Check **Inline Calibration** to allow calibration directly from an analog measurement screen. See paragraph [7.2 Inline Calibration](#) for explanation.
- Check **Subfeed Cascading** to allow subfeeds and panelboards to display as an overlapping cascade on the **HOME** screen 1-line mimic. When you have many subfeeds and/or panelboards, cascading allows their icons to fit on the screen so that you do not have to scroll the HOME screen. See [Figure 39](#)
- Check **Zero Fault** which will monitor the current output and if one of the output's current drops to Zero after having a value, a fault will be listed. When this is checked an additional meter will be shown in the alarm header. See [Figure 20](#) below.

Figure 20. GENERAL Screen, BASIC Tab, Zero Fault Alarm in Alarm Header



- **LOAD DEFAULT** loads the parameters created in manufacturing and shipped with the unit.

DATE/TIME Tab: Enter the date and time Infinity 2 will use for time stamps and screen headers.

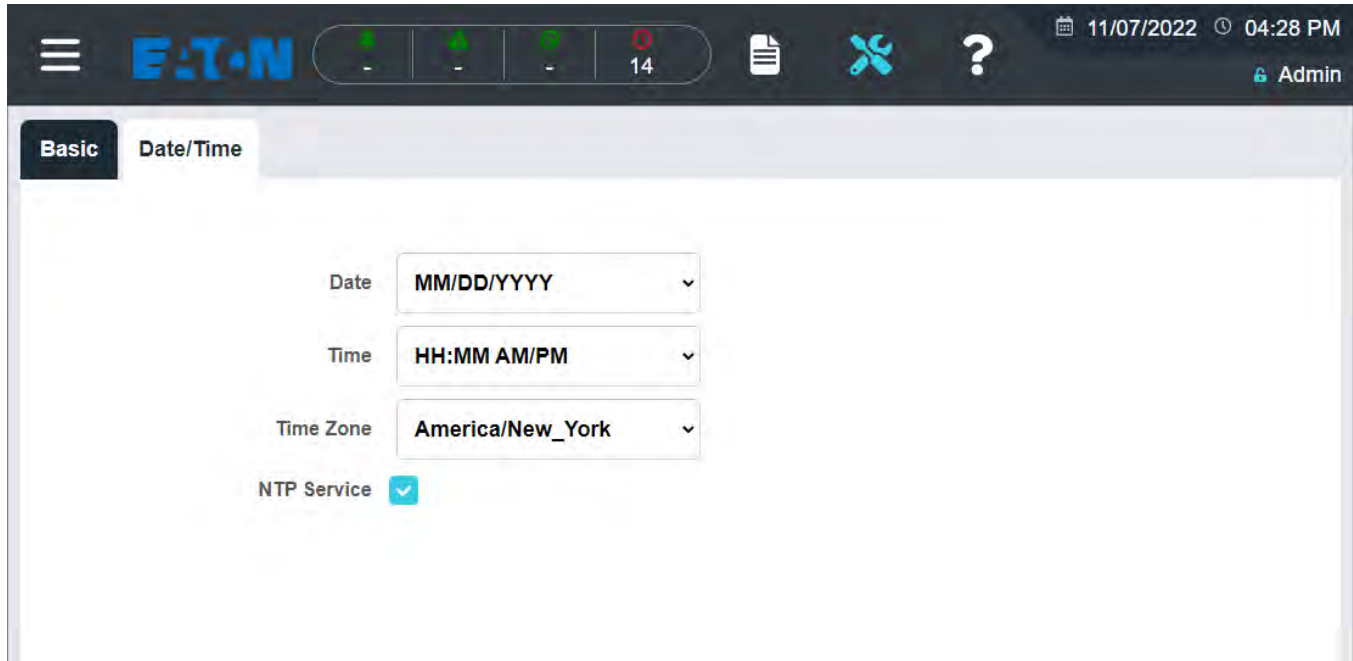
Figure 21. GENERAL Screen: DATE/TIME

The screenshot shows the 'Date/Time' configuration page in the EAT-N monitoring system. The page has a dark header with the EAT-N logo, status indicators (two green dots, one red circle with '16'), and navigation icons (document, wrench, question mark). The top right of the header displays the current date '10/27/2022' and time '09:08 PM', along with an 'Admin' user indicator. Below the header, there are two tabs: 'Basic' (selected) and 'Date/Time'. The 'Date/Time' tab contains the following configuration options:

- Date:** A dropdown menu set to 'MM/DD/YYYY' and a text box containing '10/27/2022'.
- Time:** A dropdown menu set to 'HH:MM AM/PM' and a text box containing '09:07 PM'.
- Time Zone:** A dropdown menu set to 'America/New_York'.
- NTP Service:** An unchecked checkbox.

- **Date** in MM/DD/YYYY format. Select drop-down list to select date format. Input the current date into the text box in the specified date format.
- **Time:** Set time based on your local time zone in 12-hour clock format with AM/PM. 24-hour clock time is not used. Time resolution is in minutes.
- **Time Zone:** Scroll through the option list to select your time zone or the time zone you wish to use for time stamps.
- **NTP Service:** When this check box is selected, the date/time will set automatically according to the Network Time Protocol Service and the date and time user input boxes will disappear. See for details.

Figure 22. GENERAL Screen: DATE/TIME — NTP Service Selected



5.3 Setup: NETWORK/PROTOCOLS Screen

You must set up Infinity 2 software to match the physical network configuration you connected to Infinity 2 in paragraph [3.2 Network Connections](#).



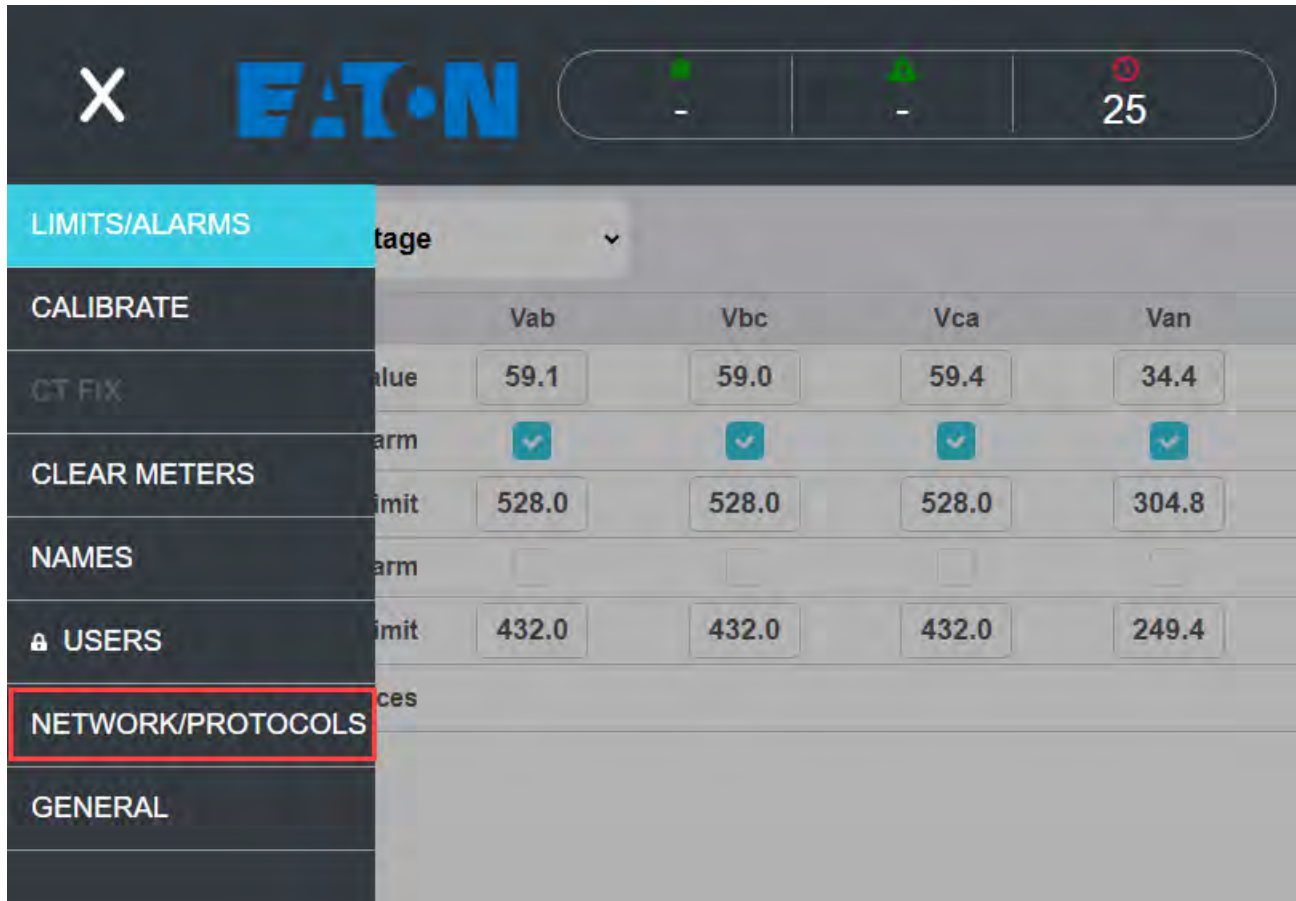
Select the **Setup** icon  in the banner, then select the **Menu** icon , select **NETWORK/PROTOCOLS**. (See [Figure 23](#)).

Figure 23. NETWORK/PROTOCOLS, Menu Option



TCP/IP Tab: Enter up your Ethernet network information:

Figure 24. Setup: NETWORK/PROTOCOLS, TCP/IP Tab

The screenshot displays the EATON network configuration web interface. At the top, there is a navigation bar with the EATON logo, status indicators (two green lights and a red light with '16'), and a date/time display (10/27/2022 09:09 PM). Below the navigation bar, there are tabs for 'TCP/IP', 'SNMP', and 'Modbus'. The 'TCP/IP' tab is selected. The configuration area contains the following fields and options:

- IP address:** 10.130.121.10
- Subnet mask:** 255.255.255.128
- Gateway:** 10.130.121.1
- MAC address:** d0-03-eb-28-57-a3
- USE DHCP:**
- Buttons:** 'Save Changes' and 'Load Default' are located in the top right corner of the configuration area.

- Enter your network **IP address**, **Subnet mask**, and **Gateway** address.
- Alternatively, check **USE DHCP** to have your installation dynamically assign these addresses.
- The **MAC address** is stored in the ROM chip and cannot be changed.

Changes are not automatically saved. Select **SAVE CHANGES**.

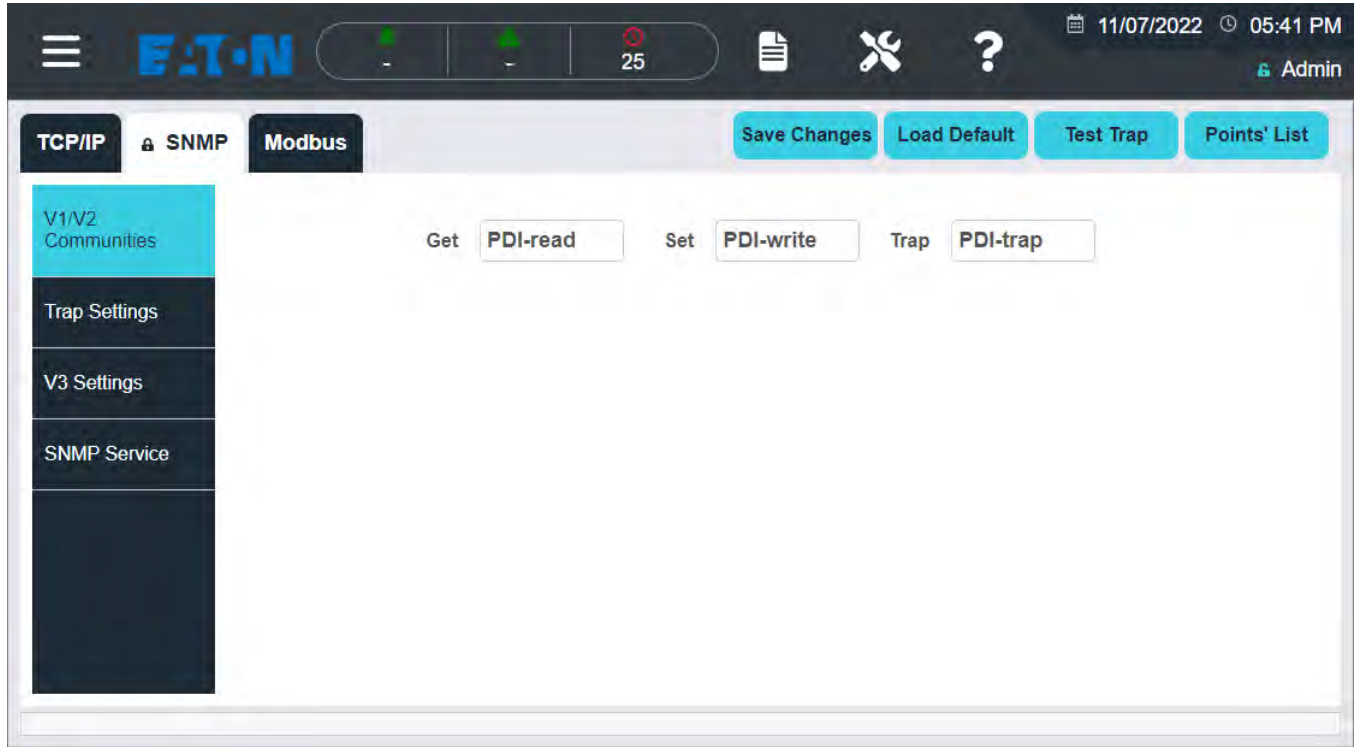
After saving, your Infinity 2 Monitor will reboot with these network parameters.

LOAD DEFAULT loads network information created in manufacturing and shipped with the unit.

SNMP Tab: If you are using SNMP you must also select the **SNMP** tab to set up additional SNMP parameters.

- **V1/V2 Communities:** Enter your **Get**, **Set**, and **Trap** Communities.

Figure 25. Setup: NETWORK/PROTOCOLS, V1/V2 Communities Tab



- **Trap Settings:**

- Specify SNMP **Version** 1, 2, or 3.
- Specify Trap **Interval** in seconds using drop-down list. SNMP sends only a summary alarm trap. The trap is sent repeatedly at this interval if alarms remain outstanding.
- Define the addresses of up to (3) three trap servers and individually enable the server(s).

Figure 26. Setup: NETWORK/PROTOCOLS, Trap Settings Tab

	Version	Interval (Sec.)	Enable	Address
Server 1	1	5	<input type="checkbox"/>	172.18.10.1
Server 2			<input type="checkbox"/>	172.18.10.1
Server 3			<input type="checkbox"/>	172.18.10.1

- **V3 Settings:**

- Specify **Authentication: User Name:**
 - Select **Algorithm** using the drop-down list.
 - Enter **Password**.
- Specify **Encryption :**
 - Select **Algorithm** using the drop-down list.
 - Enter **Password**.

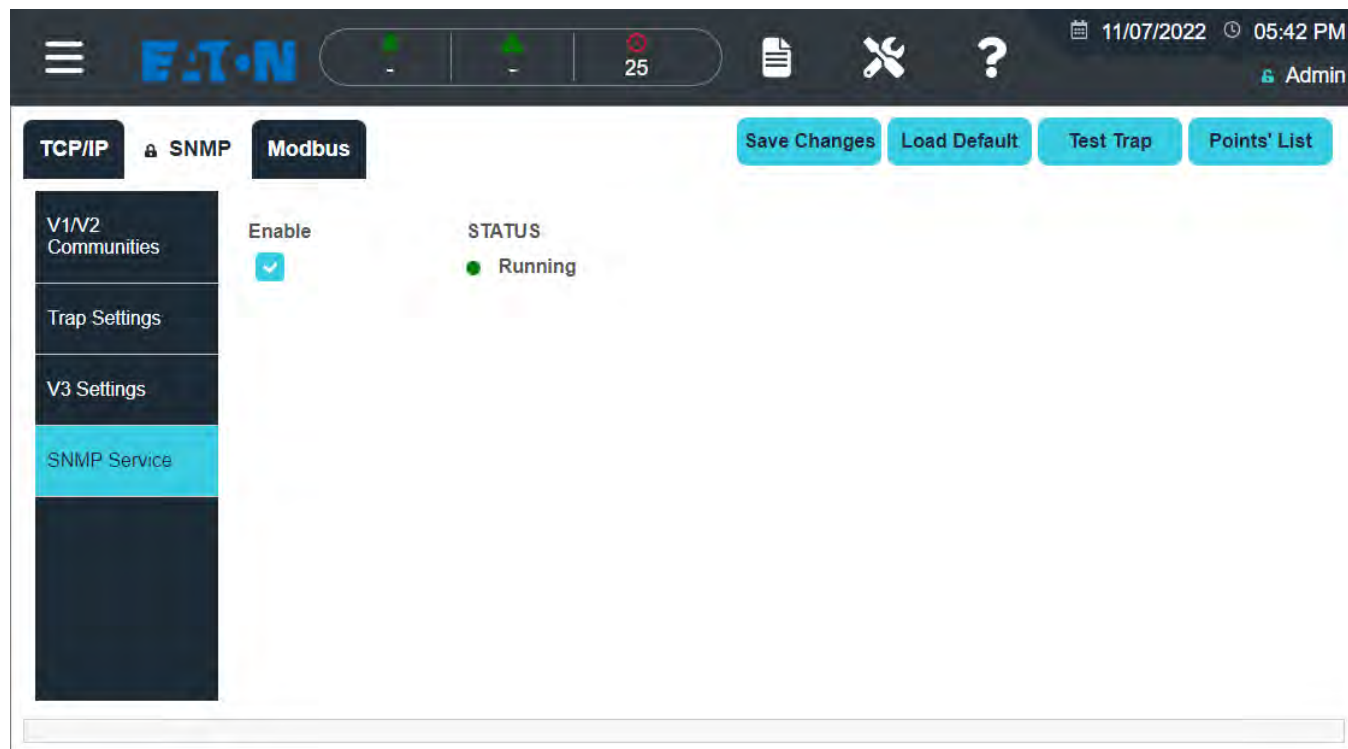
Figure 27. Setup: NETWORK/PROTOCOLS, V3 Settings Tab

The screenshot displays the V3 Settings configuration page. At the top, there is a navigation bar with the Eaton logo, status indicators (two green dots and a red circle with '25'), and a date/time display (11/07/2022 05:42 PM). Below the navigation bar are tabs for TCP/IP, SNMP, and Modbus. The V3 Settings tab is active, showing a table with columns for User Name, Enable, Algorithm, and Password. The Authentication section has a User Name field containing 'MD5AES192', an Enable checkbox checked, and an Algorithm dropdown menu set to 'MD5'. The Encryption section has an Enable checkbox checked and an Algorithm dropdown menu set to 'AES19'. There are also buttons for 'Save Changes', 'Load Default', 'Test Trap', and 'Points' List' at the top right of the settings area.

	User Name	Enable	Algorithm	Password
Authentication	MD5AES192	<input checked="" type="checkbox"/>	MD5	
Encryption		<input checked="" type="checkbox"/>	AES19	

- **SNMP Service:** Select Enable to activate service.
Uncheck to stop the SNMP Service. *Reboot is required to Enable/Disable Service.*

Figure 28. Setup: NETWORK/PROTOCOLS, SNMP Service Tab



- **TEST TRAP** sends a single test trap to your specified trap servers.
- **LOAD DEFAULT** loads SNMP information created in manufacturing and shipped with the unit.
- Select **POINTS LIST** to download the SNMP MIB, which must be done from a browser. (See also paragraph [4.4.1 Downloading the Modbus Points List and SNMP MIB.](#))



NOTE

After pressing the **Save Changes** button, the monitor will reboot.

Modbus Tab: Setup Modbus RTU parameters.

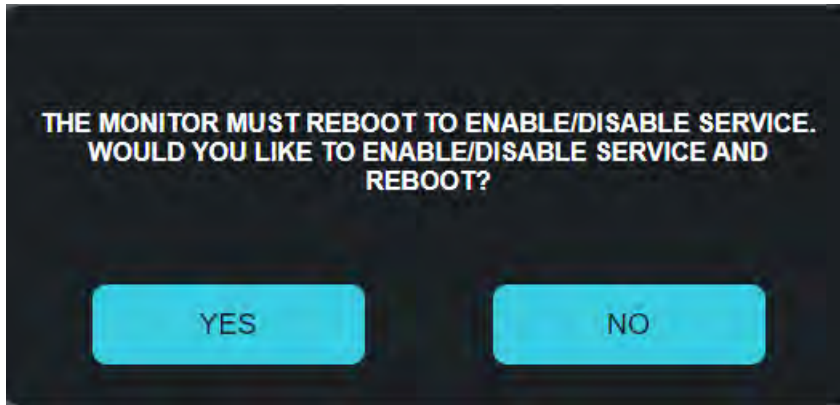
Figure 29. Setup Network, Modbus RTU Tab

The screenshot displays the Modbus configuration page. At the top, there is a navigation bar with the Eaton logo, status indicators (two green dots and a red circle with '16'), and a date/time display (10/27/2022, 09:27 PM). Below the navigation bar are tabs for TCP/IP, SNMP, and Modbus. The Modbus tab is active, showing 'Global Settings' and 'RTU Settings'. Global Settings includes 'Address' (1) and 'Unit ID' (1). RTU Settings includes 'Baud rate' (9600) and 'Parity' (even). At the bottom, there is a section for 'TCP Service' which is checked and shows a 'Running' status with a green dot.

- **LOAD DEFAULT** loads parameters created in manufacturing and shipped with the unit.
- Select **Baud Rate** and **Parity** using drop-down lists.
- Specify the Modbus **Address** of the Infinity 2 Monitor (1-247).
- Specify a **Unit ID**. Infinity 2 returns this user-specified ID in response to receiving Modbus function code 17.
- Select **TCP Service** to enable.

Uncheck to stop the Modbus TCP Service. *Reboot is required to Enable/Disable Service.*

Figure 30. Setup: NETWORK/PROTOCOLS, Modbus Tab, Reboot Message



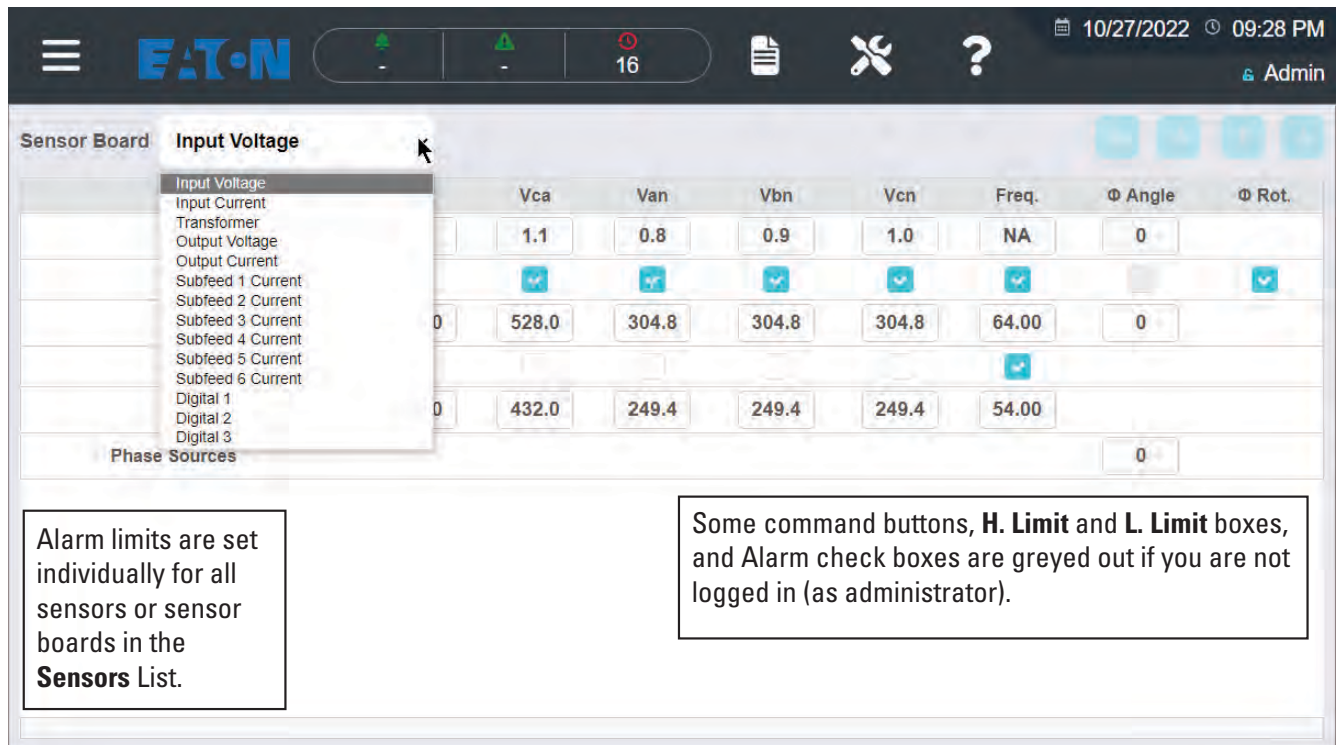
- Select **POINTS LIST** to download the Modbus points list for your unit. See also paragraph [4.4.1 Downloading the Modbus Points List and SNMP MIB](#).

5.4 Limits: Set Analog Alarm Values

The **LIMITS** screen lets you set alarm levels for analog circuits and alarm triggers for digital points. To set sensor limits you must logged in, then select the **Tool** icon in the banner.

The **LIMITS** screen is displayed. The **Sensors** drop-down list shows all sensors in your Infinity 2 system. Select a sensor from the list to display the **LIMITS** screen for that sensor.

Figure 31. Setup: Limits Screen with Sensor List



The screenshot shows the Eaton PDI WaveStar Infinity 2 Monitoring System interface. The top banner includes the Eaton logo, a status bar with a green tree icon, a red tree icon, and a '16' indicator, along with a 'Tool' icon (wrench) and a help icon (question mark). The date and time are 10/27/2022 09:28 PM, and the user is logged in as 'Admin'.

The main content area is titled 'Sensor Board' and 'Input Voltage'. A dropdown menu is open, listing various sensors: Input Voltage, Input Current, Transformer, Output Voltage, Output Current, Subfeed 1 Current, Subfeed 2 Current, Subfeed 3 Current, Subfeed 4 Current, Subfeed 5 Current, Subfeed 6 Current, Digital 1, Digital 2, and Digital 3. The 'Input Voltage' sensor is selected.

The main display shows a table of sensor readings:

	Vca	Van	Vbn	Vcn	Freq.	Φ Angle	Φ Rot.
	1.1	0.8	0.9	1.0	NA	0	
	528.0	304.8	304.8	304.8	64.00	0	
	432.0	249.4	249.4	249.4	54.00		
Phase Sources						0	

Two callout boxes provide additional information:

- Alarm limits are set individually for all sensors or sensor boards in the **Sensors List**.
- Some command buttons, **H. Limit** and **L. Limit** boxes, and Alarm check boxes are greyed out if you are not logged in (as administrator).

5.4.1 Main Circuits and Subfeeds

AC voltage and/or current sensors are used to measure input voltage, transformer output voltage and current, main feeds to panelboards, and subfeeds. For all analog sensor measurements other than for individual panelboard circuits, you set alarms in two steps:

1. Set High and Low limit values that will trigger an alarm.
2. Choose whether an alarm is issued when a limit is reached.

Panelboard sensor strips provide a richer set of alarm options. See paragraph [5.4.2 Panelboard Circuits](#).

Figure 32. Setting Up Analog Limits

Setting up analog alarms is a two-step process:

1. Set the H/L Alarm limit value.
2. Check the Alarm box if Alarms should be issued for this measurement.

Phase-phase limits are set here with alarms enabled.

Phase-neutral limits are set but alarms are not enabled (boxes not checked).

Command buttons, High and Low Limit values and Alarm check boxes are in **bold** lettering showing that the (logged-in) user can set limits.

	Vab	Vbc	Vca	Van	Vbn	Vcn	Freq.	Φ Angle	Φ Rot.
Value	1.1	1.1	1.1	0.8	0.9	1.0	NA	0	
H. Alarm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H. Limit	528.0	528.0	528.0	304.8	304.8	304.8	64.00	0	
L. Alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Limit	432.0	432.0	432.0	249.4	249.4	249.4	54.00		

5.4.2 Panelboard Circuits

Infinity 2 provides a lot of flexibility for monitoring panelboard circuits. There are (3) three types of amperage alerts: **Warning** and **Alarm**, providing high usage alerts, and **Zero**, providing a low usage alert.

- Upper Limits:
 - **Warning Threshold** as percent of breaker size (default 70%). For a warning to be issued, a circuit must be above the warning threshold for the specified **Warning Time** (default 5 sec).
 - **Alarm Threshold** as percent of breaker size (default 80%). For an alarm to be issued, a circuit must be above the alarm threshold for the specified Alarm Time (default 5 sec).
- Lower Limit:
 - **Zero**, showing that a circuit that previously measured at least 3A has measured < 0.5A. Zero alert levels cannot be adjusted.

You can apply these alerts to all circuits uniformly or customize alerts by individual circuit.

Limits are not set by panelboard but by sensor strip. As shown in [Figure 31](#), there are separate sensor strips for both the odd-numbered and even-numbered sides of a 42-circuit panelboard. For 84-circuit panelboards, you must set limits for four (4) sensor strips.

You must be logged in (as administrator) to set panelboard **Limits**.

Applying Identical Parameters for All Circuits

On the **LIMITS** screen, select a panelboard sensor strip from the **Sensors** drop-down list.

To set the same values for all circuits monitored by the sensor strip, check **All** and fill in the correct values in the first column.

Figure 33. Panelboard Sensor Strip, Applying the Same Parameters to All Circuits

You should specify

- Circuit Breaker (CB) size**, default = 20A
- Warning Threshold (W. Thresh.)** as percent of CB size default = 70.
- Alarm Threshold (A. Thresh.)** as percent of CB size, default = 80.
- Warning Time (W. Time)** in seconds: the circuit must exceed the Warning Threshold for the specified time to declare a warning (default = 5 sec.)
- Alarm Time (A. Time)** in seconds: the circuit must exceed the Alarm Threshold for the specified time to declare an alarm (default = 5 sec.)

Check **Warning**, **Alarm**, and/or **Zero** boxes if you want these alerts to be issued. If you do not check its box, the alarm will not be issued even if you specified a threshold.

CTs	
Value(A)	
CB size(A)	20
W.Thresh.(%)	70
A.Thresh.(%)	80
W.Time(S)	5
A.Time(S)	5
Warning	<input checked="" type="checkbox"/>
Alarm	<input checked="" type="checkbox"/>
Zero	<input checked="" type="checkbox"/>

Customizing Alarm Parameters by Circuit

If you do not check **All**, values can be changed individually by circuit.

You can set typical circuit parameters using **All**, then specify parameters for individual circuits as needed.

Figure 34. Panelboard Sensor Strip, Customizing Monitoring by Circuit

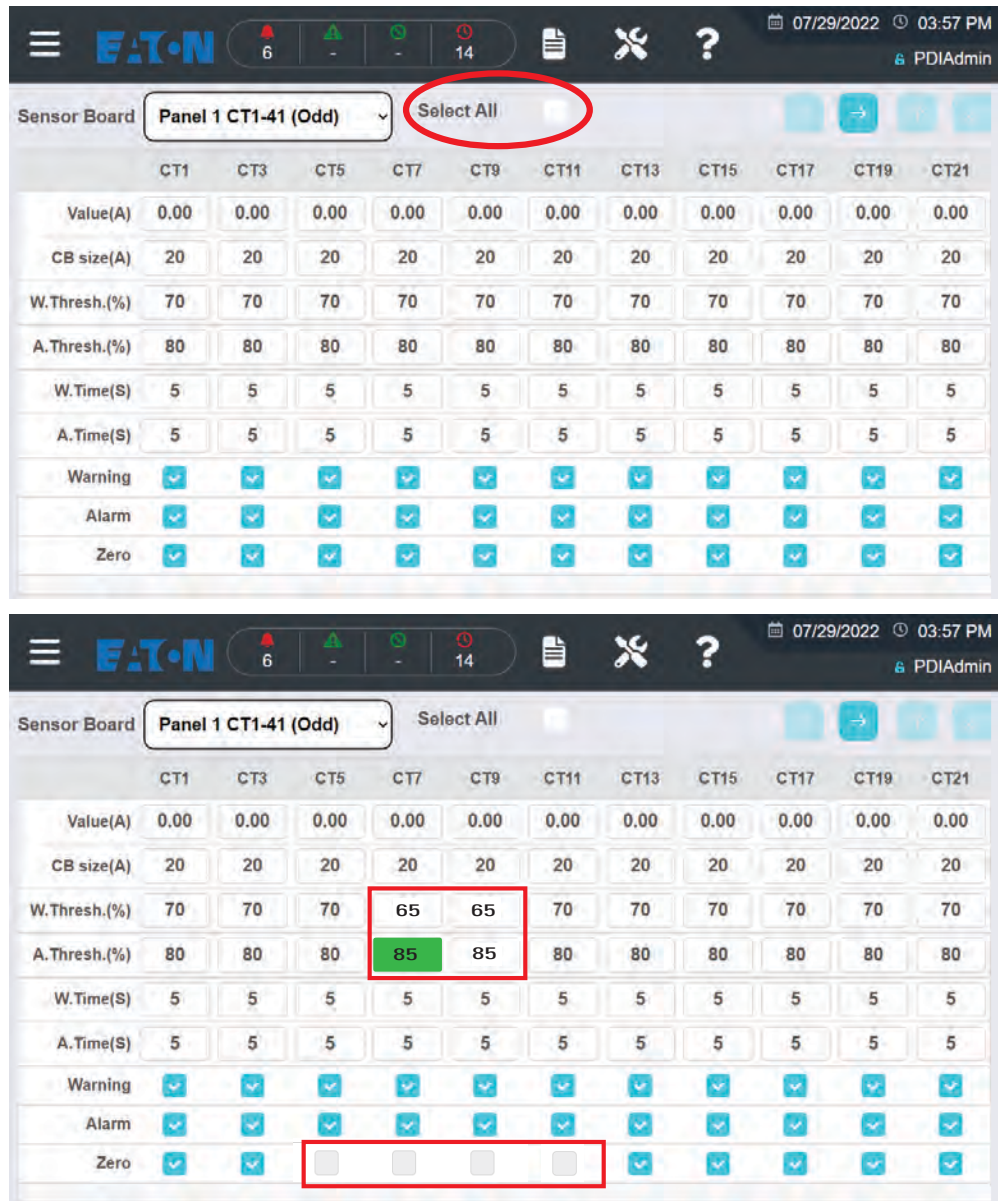
Use **PREVIOUS** and **NEXT** to scroll to the settings for the other half of the sensor strip.

Value(A) shows the last measured amperage for the circuit.

When you remove the check mark in **All**, the values in the first column propagate to all circuits.

You can then change any circuit value individually.

The last value you entered is highlighted in **green** if the change was successful.



5.5 LIMITS: Set Digital Alarm Values

5.5.1 Digital Inputs Screen

Digital inputs are binary signals that can indicate warning or alarm conditions or simply changes of state. Digital Inputs include Circuit Breaker Aux Contacts, building alarms, or unit status, such as “door open.” Digital inputs are found on the **Digital Inputs Options Board** and can also be found on Sensor Base Boards.

Digital Inputs Option Boards are by default named “Digital 1,” “Digital 2,” etc. Digital Inputs Option Boards have eight (8) points D1-D8 (see).

You specify the “Normal” state for a digital input (bit=1 or bit=0). When the digital point’s status does not match its normal state, an alarm is triggered, if you have enabled alarms for that digital input.

The only Digital Inputs status indicators on the **HOME** screen are for circuit breaker aux contacts. For a complete view, see the **Sensor Status** screen for the Digital Input Board (see [Figure 35](#)).

Figure 35. Digital Inputs Sensor Screen

The screenshot shows the 'Digital 1' sensor board configuration screen. It features a table with columns for Status, Normal, Alarm, and Enable Alarm. The rows represent digital inputs D1 through D8. Callouts provide detailed explanations for each column and the naming convention.

Input	Status	Normal	Alarm	Enable Alarm
Input CB Aux NC (D1):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Input 2 CB Aux NC (D2):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Panel 1 CB Aux NC (D3):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Subfeed 1 CB Aux NC (D4):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Door Open (D5):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Extra (D6):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra (D7):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra (D8):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Status shows whether the current bit state is high (=1) or low (=0).

Normal shows whether the normal (non-alarm) bit state is high (=1) or low (=0). Check the **Normal** box when the **Normal** state is high.

A check box in the **Alarm** column indicates an active alarm for that Digital Input.

D1-D8 correspond to the D1-D8 connections on the Digital Inputs Options board.

Unassigned digital inputs are named as Extra, with its connection number in parentheses: **Extra (D6)**

If Status ≠ Normal AND Enable Alarm is checked THEN an Alarm is signaled.

5.5.2 Transformer Screen

The Transformer Sensor is found on the **VVIT Sensor Base Board** (Voltage-Voltage-Current-Transformer). Alarm declaration for the Transformer Sensor works the same as for Digital Inputs. The “Normal” state for the digital point is specified (bit=1 or bit=0). When the digital point’s Status does not match its Normal state, an alarm is triggered, if you have enabled alarms for the point.

Transformer temperature alarms, EPO, and CB Trip are set up in manufacturing. Transformer temperature status is also shown on the **HOME** screen.

Figure 36. Transformer Screen Digital Points

The screenshot shows the 'Transformer' sensor board configuration page. The interface includes a header with the Eaton logo, navigation icons, and a status bar showing the date (07/29/2022) and time (03:55 PM). The main content area is a table with columns for 'Status', 'Normal', 'Alarm', and 'Enable Alarm'. The rows represent different digital points: Thermal High Temp., Thermal Over Temp., EPO, REPO, (CB1), and (CB2). The REPO row is highlighted with a red box, and red arrows point from its 'Normal' and 'Alarm' checkboxes to the 'Status' checkbox. To the right of the table, there are sections for 'EPO Emergency Power Off', 'REPO Remote Emergency Power Off', 'Status Current Input State. [Checked = Closed]', and 'Normal Desired Input State. [Checked = Closed]'. Three callout boxes provide additional information: the first explains the 'Status' field, the second explains the 'Normal' field, and the third explains the logic for triggering an alarm. A fourth callout box explains the use of digital inputs and relays for PDU source synchronization.

Status shows whether the current bit state is high (=1) or low (=0).

Normal shows whether the normal (non-alarm) bit state is high (=1) or low (=0). Check the **Normal** box when the **Normal** state is high.

If **Status ≠ Normal** AND **Enable Alarm** is checked THEN an alarm is signaled.

These digital inputs and relay are used to synchronize Manual Dual PDU source transfers.

Status indicated for

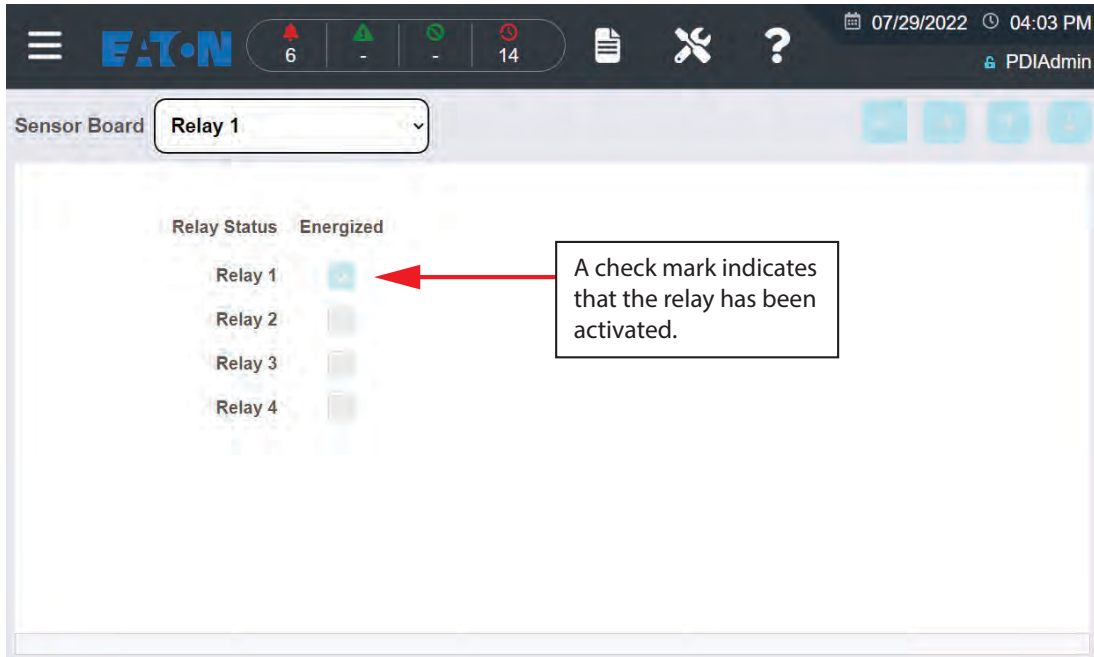
- Thermal High Temp = Warning Temperature Level reached on transformer
- Thermal Over Temp = Alarm Temperature Level reached on transformer (may cause shutdown)
- EPO (Emergency Power Off)
- Remote EPO
- CB Trip ****** Note: when CB Trip is checked, the main input circuit breaker has been tripped.

5.6 Relay Screen

Relays are located on Relay Option Boards (see [Figure 13](#)). Relays have no setup screens. Relay function is configured and relay names are set during manufacturing. An administrator can change the Relay Option Board name (by default Relay 1, Relay 2, etc.) on screen with the **NAMES** command, but not the specific relay name.

The **Relay** Sensor screen simply shows whether the relay has been activated. Activating a relay makes an entry in the Event **Log**. There are no relay status indicators on the **HOME** screen 1-line.

Figure 37. Relay Screen



Chapter 6 Operation: Monitoring Your System

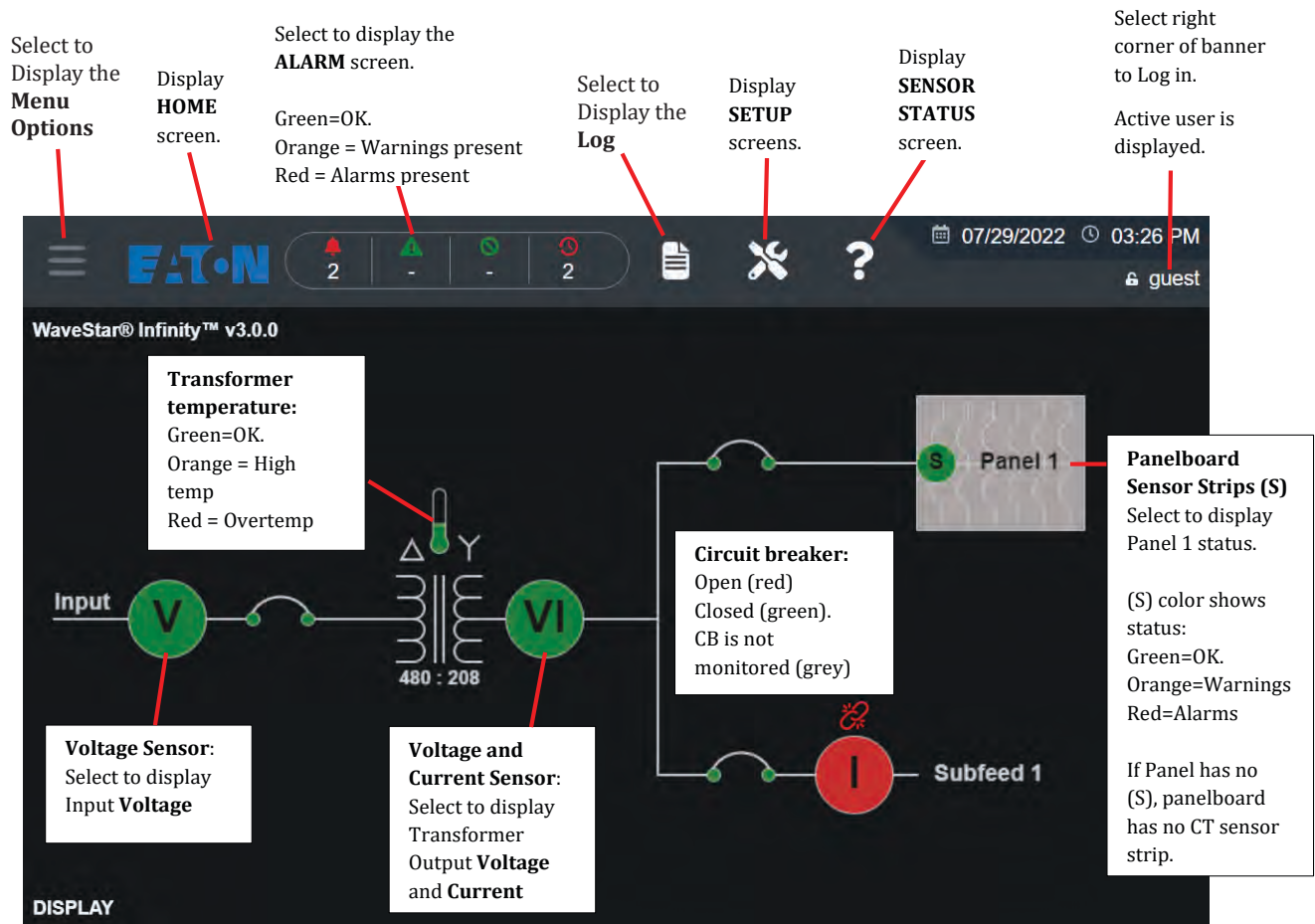
To view Infinity 2 screens, utilize the Infinity 2 Monitor on the monitored unit or access the Monitor remotely from a browser. Remote users must enter the unit's IP address into a browser. (Currently Google's Chrome browser is supported.) To view monitoring information, no login is necessary.

6.1 HOME Screen

When you power-on your unit or when a remote user connects to an Infinity 2 system, the first screen displayed is the Infinity 2 **HOME** screen. The **HOME** screen displays a dynamic 1-line showing the configuration of your monitored unit with an at-a-glance status summary. By selecting elements on this screen, a user can navigate to other screens to display monitoring information or to set system parameters. To select screen elements:

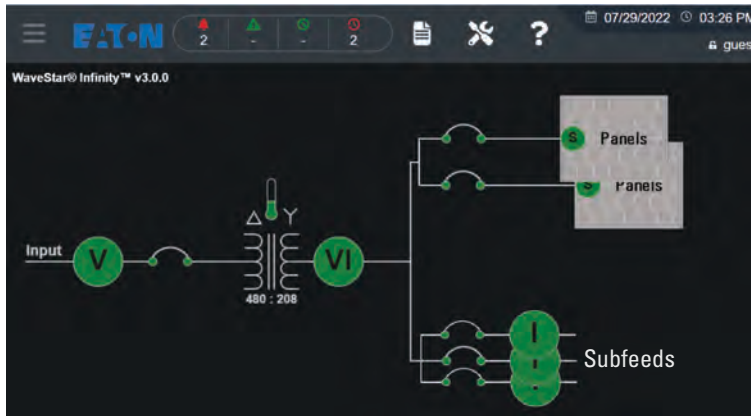
- On the Infinity 2 display, touch the screen element
- On a remote browser, users select screen elements with their pointing device as they normally do.

Figure 38. HOME Screen



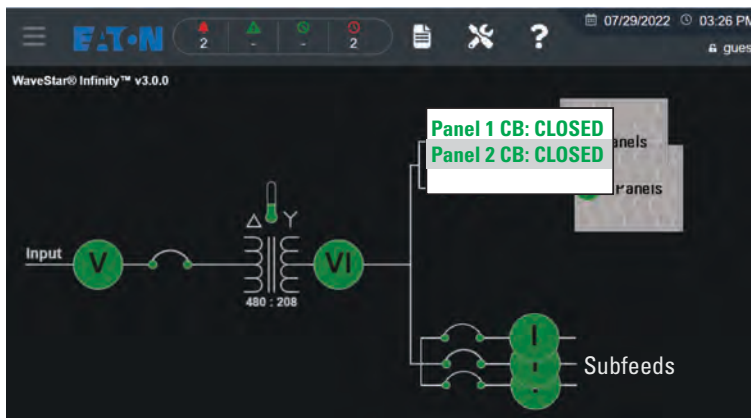
If your **GENERAL** screen **BASIC** tab shows “Subfeed Cascading” (See [Figure 39](#)), circuit breaker, panel and subfeed icons are cascaded when they do not fit on screen. To display information for a specific item in the group, select the icon group to show a list. Select the appropriate item to display its status screen.

Figure 39. HOME Screen with Cascading

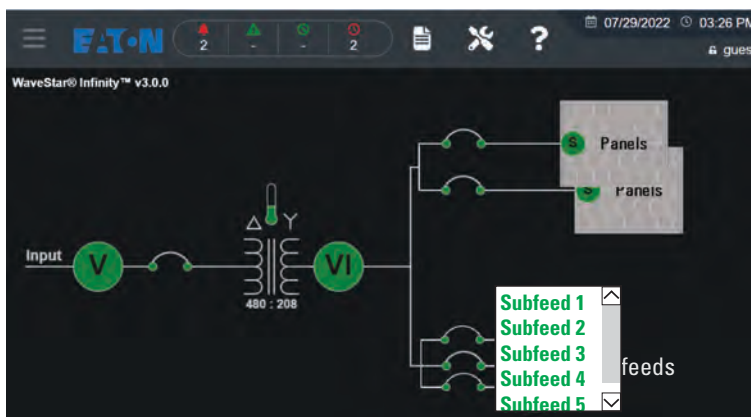


Select any cascaded group:

- Circuit Breakers
- Main panelboard feeds
- Panels
- Subfeeds



Circuit breakers show open/closed status only.



Select item from list to display its status screen.

6.2 Analog Circuits: Measurements and Status

6.2.1 Analog Sensors: Single Circuits

Voltage and current sensors provide measurements for individual circuits, such as input voltage (**V**), transformer output voltage and current (**VI**), or current (**I**) for subfeeds or panelboard main feeds.

Select the **V**, **I**, or **VI** icon to display a screen with readings. Screens for all single-circuit sensors have similar formats. If the sensor has multiple screens, there will be a slide-out side menu.

Figure 40. Current Sensor Screens

Select **Current Sensor (I)** for Subfeed 1 (or other sensor option)

Select the Menu Icon to view Metrics options

Subfeed 1 Current Summary

	Phase A	Phase B	Phase C	Neutral	Ground	Status
Current (A)	10.5	10.5	10.5	6.3	0.0	Good
%Load (%)	4.6	4.6	4.6	-	-	-
%THD-F (%)	13.9	13.9	13.9	13.9	-	-
%THD-3rd (%)	13.7	13.7	13.7	13.8	-	-
%THD-5th (%)	3.8	3.8	3.8	3.8	-	-
%THD-7th (%)	1.6	1.6	1.6	1.6	-	-
%THD-9th (%)	0.5	0.5	0.5	0.5	-	-
%THD-11th (%)	0.2	0.2	0.2	0.2	-	-
%THD-13th (%)	0.2	0.2	0.2	0.2	-	-
%THD-15th (%)	0.1	0.2	0.1	0.1	-	-
%THD-17th (%)	0.0	0.2	0.0	0.0	-	-
%THD-19th (%)	0.0	0.1	0.0	0.1	-	-
%THD-21st (%)	0.0	0.2	0.0	0.0	-	-

Subfeed 1 Current

	Current (A)	Demand (A)	Max Demand (A)	Min (A)	Max (A)	CF
Phase A	10.4	158.1	158.1	0.0	359.3	1.53
Phase B	10.4	157.9	157.9	0.0	359.0	1.67
Phase C	10.4	158.0	158.0	0.0	359.8	1.67
Neutral	6.3	-	-	0.0	214.3	-
Ground	0.0	-	-	0.0	132.0	-

Subfeed 1 Power

	KW (KW)	Demand (KW)	Max Demand (KW)	KVA (KVA)	KVAR (KVAR)	PF(+ Inductive)	KW/Hours (KWH)
Phase A	1.2	10.9	10.9	1.3	0.4	+ 0.82	2
Phase B	0.9	19.1	19.1	1.3	0.8	- 0.69	4
Phase C	0.2	8.2	8.2	1.3	1.2	+ 0.15	1
Total	2.3	38.2	38.2	3.3	2.4	0.69	7

Current (A), Demand, Max Demand, Min, Max, and Crest Factor (CF)

Power Metrics screen with KW, Demand KW, Max Demand, KVA, KVAR, PF, and KWH.

6.2.2 Analog Sensors: Panelboard CT Strips

Panelboards have side mounted CT strips with (42) CTs each. To view panelboard sensor data, select the panelboard symbol. Panelboards have multiple menus that can be viewed using the slide-out side menu.

Figure 41. Panelboard Screens (Part One)

Panelboard circuits can have limits specified individually by circuit. Bars are colored by status:

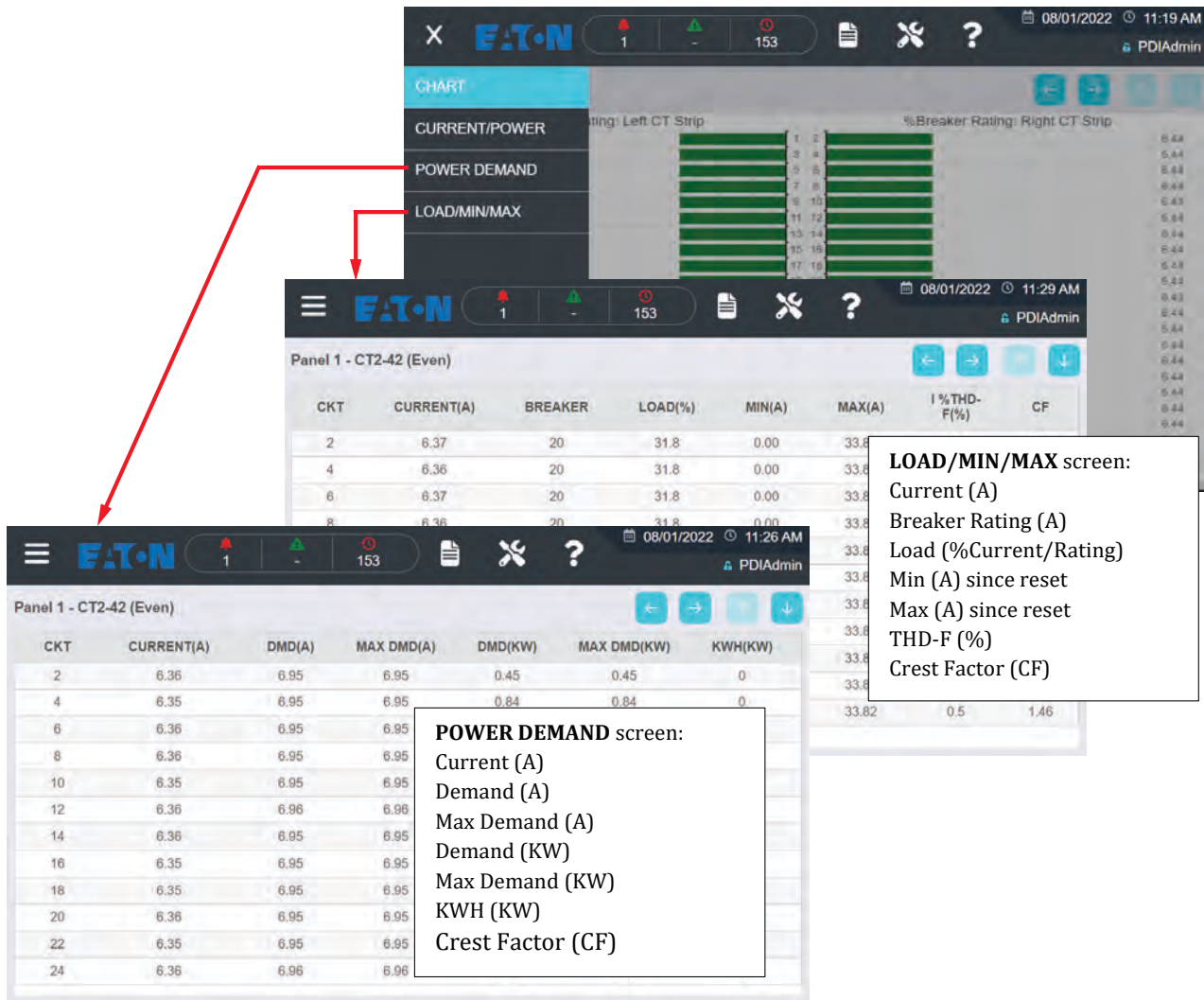
Green = Under limit (OK).
 Orange = Above warning limit
 Red = Above alarm limit

Current/Power Screen by circuit (CKT):

Current(A)
 Load (% of Breaker Rating)
 Power(KW)
 Power(KVA)
 Power(KVAR)
 Power Factor(PF)
 Circuit Status:
 –Good (Green)
 – Warning (Orange)
 –Alarm (Red)

CKT	CURRENT(A)	LOAD(%)	Power(KW)	Power(KVA)	Power(KVAR)	PF	STATUS
2	6.38	31.9	0.36	0.78	0.67	0.46	Good
4	6.38	31.9	0.77	0.78	0.06	0.98	Good
6	6.38	31.9	0.39	0.78	0.66	0.50	Good
8	6.38	31.9	0.36	0.78	0.67	0.46	Good
10	6.38	31.9	0.77	0.78	0.04	0.98	Good
12	6.39	31.9	0.35	0.78	0.69	0.44	Good
14	6.38	31.9	0.42	0.78	0.65	0.53	Good
16	6.38	31.9	0.78	0.78	0.03	1.00	Good
18	6.38	31.9	0.35	0.78	0.69	0.44	Good
20	6.38	31.9	0.41	0.78	0.65	0.52	Good
22	6.38	31.9	0.78	0.78	0.03	1.00	Good
24	6.39	31.9	0.35	0.78	0.69	0.44	Good

Figure 42. Panelboard Screens (Part 2)



Unlike major circuits or subfeeds, panelboard circuits have (3) alarm types:

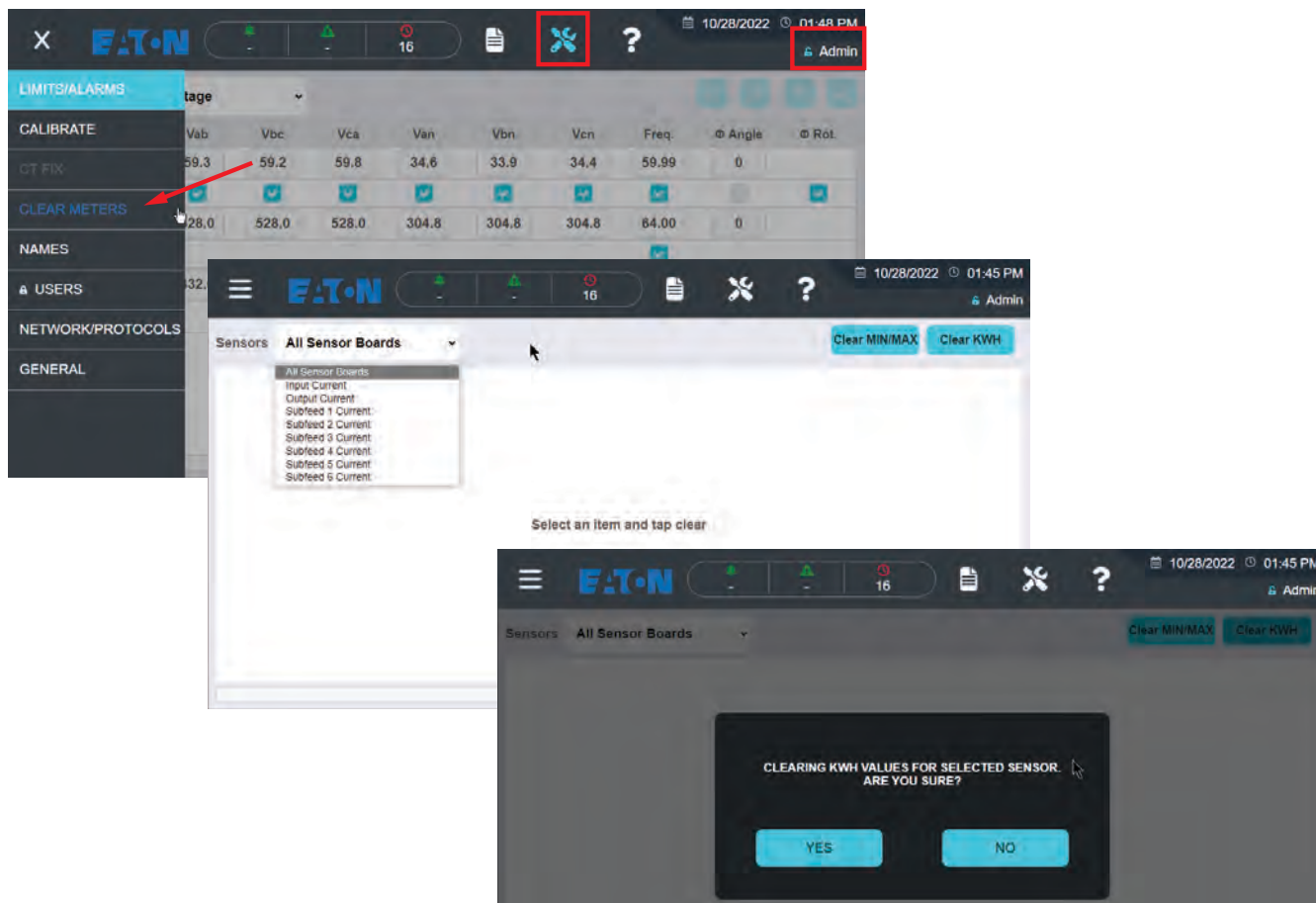
- Alarm: current exceeded alarm level (color code=red)
- Warning: current exceeded warning level (color code=orange)
- Zero: current fell to $\leq 0.5A$ after first measuring $\geq 3A$ (color code=orange)

6.2.3 Resetting Accumulators and Min/Max Readings — Clear Meters

Analogs sensors have accumulators for KWH and minimum and maximum readings for A and KW. A logged-in user can reset these accumulators using the **CLEAR METERS** button. (see [Figure 43](#)) You have these options:

- **CLEAR MIN/MAX** for all sensors or specific sensors
- **CLEAR KWH** for all sensors or specific sensors

Figure 43. Clear Meters



6.3 Digital Points Status

Status for Digital Points is shown on the related **Sensor Status** screen:

- Transformer digital points, see **Transformer Sensor Status** screen ([Figure 36](#)).
- Digital Inputs, see **Digital 1, Digital 2, etc., Sensor Status** screen ([Figure 35](#)).
- Relays, see **Relay 1, Relay 2, etc., Sensor Status** screen ([Figure 37](#)).

Digital Inputs status for circuit breakers with aux contacts is shown on the **HOME** screen ([Figure 38](#)).

6.4 Alarms

6.4.1 Alarm Notification

If an alarm of any type occurs, it triggers several notifications, according to your unit's configuration:

- It is listed on the **ALARM** screen as both an Active Alarm and Alarm History.
- The alarm is listed in the **LOG**. (System can log up to 250 events).
- If so configured, an audible alarm will sound at the unit's Infinity 2 Monitor.
- The Alarm section the screen banner is colored according to the highest active alarm severity and the alarm, warning, or zero count in the banner is incremented.
- If the affected sensor has a sensor symbol on the **HOME** screen 1-line, it is colored according to alarm severity.
- If analog, the corresponding analog sensor page will also have color-coded status information.
- If digital, the corresponding digital sensor page will show the alarm active.
- Transformer temperature alarms will show color-coded by severity on the **HOME** screen 1-line.
- The Modbus Points List will provide alarm status.
- If so configured, SNMP will send a trap indicating an active summary alarm.
- If so configured, a relay summary alarm will activate.

6.4.2 Alarm Screen

Select the Alarm (center) section of the **HOME** screen banner to view the **Alarm** screen. The **Alarm** screen can be toggled between showing active alarms and alarm history.

Active Alarm: Alarms are placed on the active list when they occur and are automatically removed when the alarm condition clears.

Alarm History: All alarm events are recorded, that is, retained in the Alarm History list, when they become active. To clear the Alarm History, select the garbage can icon. (You must be a logged-in user to clear the alarm history.)

An alarm will never occur more than once on the Active or History list. However, if an alarm is raised multiple times, each occurrence will be listed in the **Log**. See paragraph [6.5 Log Events Screen](#).

Figure 44. Active Alarms vs. Alarm History

Select Alarm section of banner to display **ALARM** Screen.

The Alarm screen has two views Active Alarms and Alarm History.
Select the tab to toggle between views.

Active alarms are cleared only when the alarm condition is removed.
When alarms clear, they are automatically removed from the Active Alarms view.
The color of the Alarm section of the banner adjusts to the current situation.

But alarms remain in the Alarm History until removed.

Select Garbage Can icon to clear the Alarm History.
(Alarms cannot be individually cleared.)
You must be logged in to clear the Alarm History.

Alarm	Name	Alert	Eastern Daylight Time
1	Digital 2	Subfeed 3 CB Aux NC	10/27/2022, 01:19:40 PM
2	Digital 3	Subfeed 5 CB Aux NO	10/27/2022, 01:12:17 PM
3	Transformer	Thermal High Temp	10/24/2022, 01:46:41 PM
4	Transformer	Thermal Over Temp	10/24/2022, 01:46:41 PM
5	Digital 3	Subfeed 6 CB Aux NO	10/24/2022, 09:58:08 AM
6	Digital 3	Subfeed 5 CB Bell NC	10/24/2022, 09:57:37 AM
7	Digital 3	Subfeed 6 CB Aux NC	10/20/2022, 01:01:00 PM
8	Digital 1	Input CB Aux NC	10/20/2022, 01:00:50 PM
9	Digital 1	Input CB Aux NO	10/20/2022, 01:00:50 PM

6.5 Log Events Screen

The Log records events as they occur with timestamps, source of event, and action taken. Events include:

- Alarms (including all severities: Alarm, Warning, Zero, Digital Input, or Relay)
- User log in
- User log out
- Relay activated
- Infinity 2 rebooted

To view the **Log Events** screen, select the left section of the banner.

The Log lists up to 250 events.

Figure 45. Log Events Screen

The screenshot shows the Log Events screen with the following callouts:

- Select Event Log Icon to view the Log Screen.** (Points to the document icon in the top navigation bar)
- Reverse time-display order.** (Points to the 'A-Z' sort button)
- To clear the Log, select the Garbage Can icon. You must be logged into clear the Log.** (Points to the trash can icon)
- Scroll buttons** (Points to the left and right arrow buttons)

The Log Events table contains the following data:

Log	Source	Event	Action	Eastern Daylight Time
1	System	Communications Lost	Alarm Cleared	7/29/2022, 07:29:39 PM
2	System	Communications Lost	New Alarm	7/29/2022, 07:26:12 PM
3	127.0.0.1	USER: PDIAdmin	Log Out	7/29/2022, 03:15:44 PM
4	127.0.0.1	USER: PDIAdmin	Log In	7/29/2022, 02:55:34 PM
5	0.0.0.0	Start	System	7/29/2022, 02:54:38 PM
6	0.0.0.0	Reboot	System	7/29/2022, 02:53:29 PM
7	127.0.0.1	USER: PDIAdmin	Log In	7/29/2022, 02:50:29 PM
8	0.0.0.0	Start	System	7/29/2022, 02:49:32 PM
9	0.0.0.0	Reboot	System	7/29/2022, 02:48:23 PM
10	127.0.0.1	USER: PDIAdmin	Log In	7/29/2022, 02:45:55 PM
11	0.0.0.0	Start	System	7/29/2022, 02:44:27 PM

Chapter 7 Maintenance

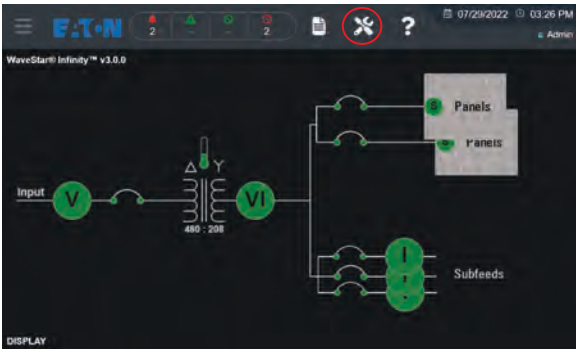
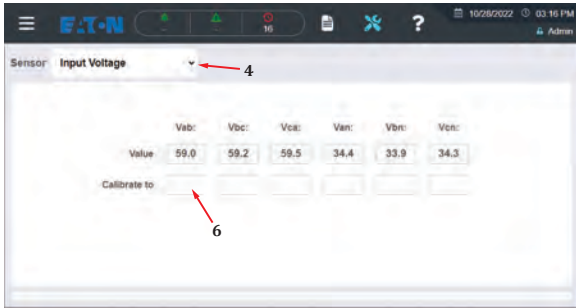
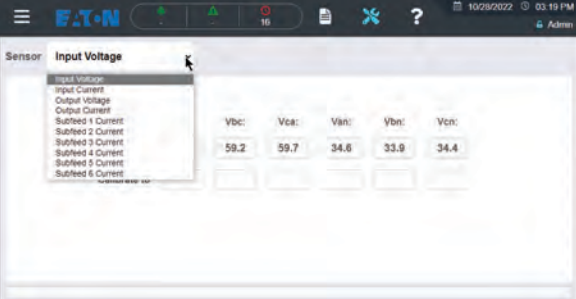


Calibrating circuit measurements or replacing a panelboard CT can expose you to live voltages. Exercise caution and wear personal protective equipment (PPE).

7.1 Calibration

The measurement of any input voltage, input current, or current for an individual panel board circuit can be calibrated. To use calibration screens, the user must be logged in.

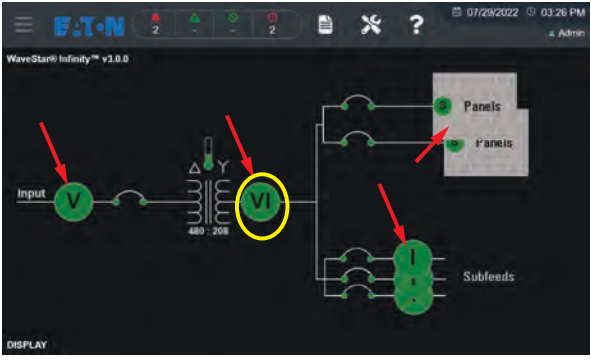
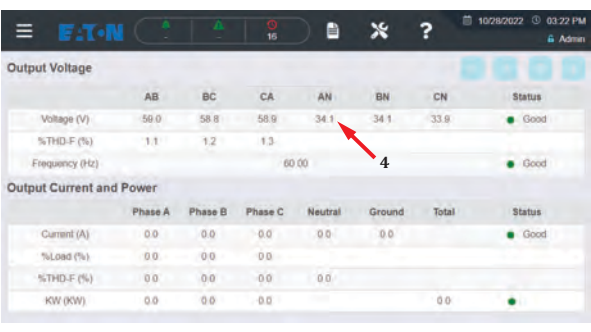
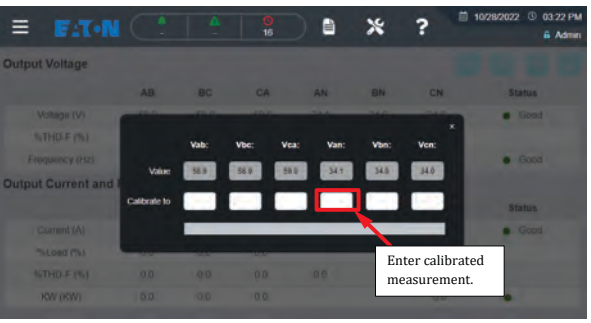
Table 4. Calibration Procedure with Calibrate Screen

Calibration Step	Screen or Illustration
<ol style="list-style-type: none"> 1. Display Home screen. 2. Log in. 3. Select icon to bring up the Calibrate screen. 	
<ol style="list-style-type: none"> 4. Select circuit group you wish to calibrate on Sensor Board drop-down list. 5. Measure circuit value. 6. Enter correct measurement in 'Calibrate to:' field. 	
<ol style="list-style-type: none"> 7. On panel boards, you can scroll the circuit display using NEXT or PREVIOUS button. 	

7.2 Inline Calibration

If **Inline Calibration** is checked on the **GENERAL** screen, you can calibrate any analog measurement directly from a measurement screen without going to the **CALIBRATE** screen.

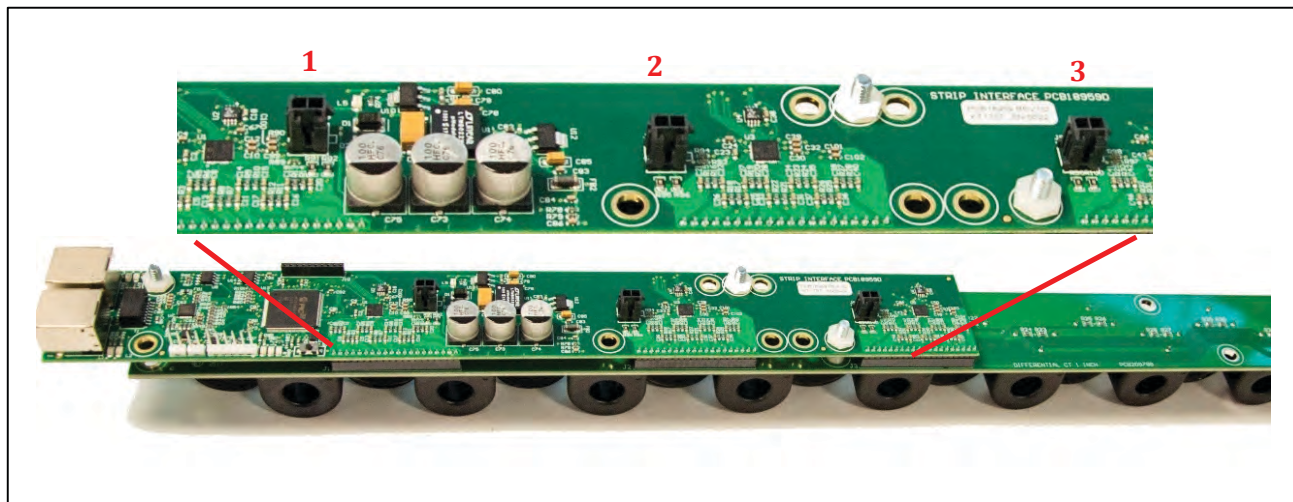
Table 5. Inline Calibration Procedure

Calibration Step	Screen or Illustration
<ol style="list-style-type: none"> 1. Display HOME screen. 2. Log in (as an administrator). 3. Touch or click an analog measurement field on the HOME screen, such as V, VI, I, or Panels. (Output Voltage is used in this example.) 	
<ol style="list-style-type: none"> 4. Touch or click the measurement field you wish to calibrate. (When using a mouse, when you mouse over the measurement field it will change color.) 	
<ol style="list-style-type: none"> 5. A small screen pops up over the measurement screen that lets you enter any calibrated measurement in the selection. 6. Enter value for the circuit you are calibrating, then select outside the box (so that the box "loses focus"). The box will turn green if calibration is successful, but red if not successful. 7. Close pop-up when you are done. 	

7.3 Replacing a Failed Panelboard CT

Each panelboard sensor strip has (21) solid-core on-strip CTs and allows dynamic replacement of up to (3) of these CTs with split-core CTs without powering down the monitored unit.

Figure 46. CT Fix Positions on Panelboard CT Strip



Replacement split-core CTs have the same monitoring accuracy as the on-strip solid-core CTs. The following procedure to replace a failing panelboard CT is to be performed by Field Service personnel only.

Table 6. Replacing a Failed Panelboard CT – Procedure

Procedure Step	Illustration
1. Identify the failing CT and panelboard CT strip.	
2. Log in to Infinity Monitoring System.	
3. Select the Tools button to bring up Sensor Board screen.	
4. Select the Menu button to display Menu Options.	

Table 6. Replacing a Failed Panelboard CT – Procedure (Continued)

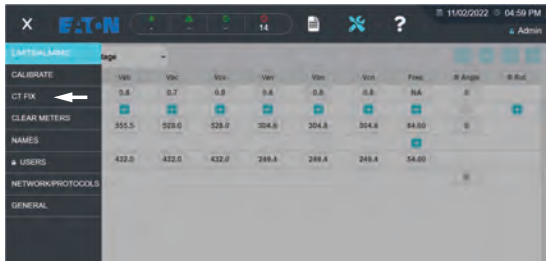
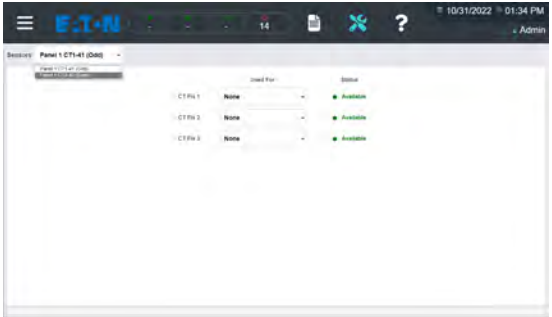

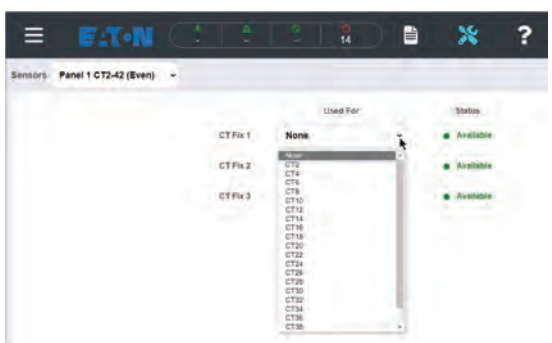

<p>5. Select the CT FIX button to bring up CT Fix screen.</p>	
<p>6. Select the CT strip with the failing CT from the drop-down list.</p>	
<p>7. The CT Fix screen shows available and assigned CT Fix positions. Three (3) substitute CT positions are available for each panelboard strip.</p>	
<p>8. Select a CT Fix position. (CT Fix 1=Top, 2=Middle, 3=Bottom on the panelboard strip.) The scrollable CT list is shown truncated here.</p> <p>In this example, a split-core CT will be connected to CT Fix 1 position to substitute for CT2.</p>	
<p>9. CT Fix screen shows CT Fix 1 position in use for CT2.</p>	

Table 6. Replacing a Failed Panelboard CT – Procedure (Continued)

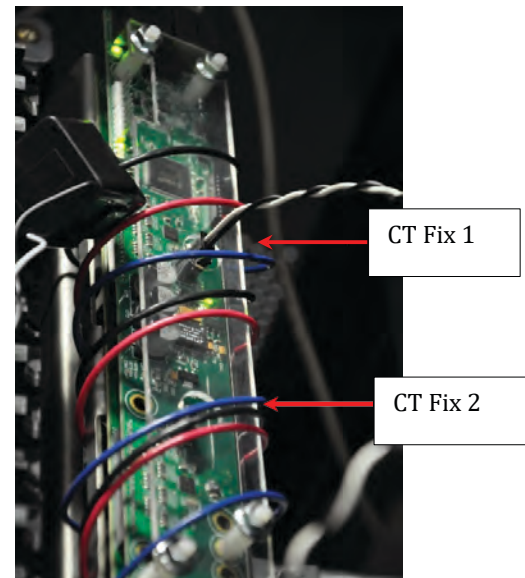
- 10.** Clip a **split-core CT** over the panelboard circuit wire for **CT2**.



- 11.** Connect the split-core CT monitoring cable to the CT Fix position on the CT Strip that corresponds to the screen CT Fix position. (1=Top, 2=Middle, 3=Bottom)

NOTE: On 84-pole panelboards, there are four (4) sensor strips and lower strips are inverted compared to upper strips. CT Fix positions are as follows:

- Upper strips (CT Fix 1=Top, 2=Middle, 3=Bottom)
- Lower strips (CT Fix 1=Bottom, 2=Middle, 3=Top)



Chapter 8 Bibliography

This manual and other product documentation for the Eaton Infinity Monitoring System can be downloaded from the product page on the Eaton website:

<https://www.eaton.com/us/en-us/catalog/backup-power-ups-surge-it-power-distribution/eaton-pdi-wavestar-infinity-monitoring-system.html>

Eaton manufactures a variety of power distribution products. Product documentation can be downloaded from Eaton website:

<https://www.eaton.com/us/en-us/products/backup-power-ups-surge-it-power-distribution/power-distribution-for-it-equipment.html>



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