WaveStar

Infinity Monitoring System

Setup and Operation

Ctrl Nr: PM375130
Revision: 000
Thank you for your recent purchase of an Infinity Monitoring System from Power Distribution, Inc.

For safety reasons as well as to ensure optimal performance of your Infinity 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 of your Infinity Monitoring System, please contact us:

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Safety

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.

**DANGER!**

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.
- Disconnect and lock-out all power supplying equipment before working on or installing an Infinity Monitoring System. Use a properly rated voltage sensing device to confirm power is OFF.
- 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. Power Distribution, Inc. 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.
1 Introduction

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

Infinity consists of these elements:

- Infinity 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 to interface to various customer management systems
- Single consolidated Modbus Points list and SNMP Management Information Block (MIB) matching your customized configuration

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

This manual describes how to:

- Make customer network connections to Infinity (Chapter 2 Customer Network Connections).
- Make local customer connections to sensor boards for REPO, building alarms, and relays (Chapter 3 Customer Sensor Board Connections).
- Associate your Modbus points list and SNMP MIB to your physical sensor configuration (Section 3.5 Modbus Points List and SNMP MIB).
- Use your Infinity system to monitor your power distribution equipment (Chapter 4 Setup and Chapter 5 Operation: Monitoring Your System).
- Make physical adjustments to your Infinity system through circuit calibration and panelboard CT replacement (Chapter 6 Maintenance).
2 Customer Network Connections

2.1 Infinity Network Structure

An Infinity monitoring network is centered around the Infinity 7” Color Touchscreen Monitor (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 Infinity to data center management and building system(s) and allow browser access to Infinity for remote users. The upstream network can use the following protocols simultaneously:

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

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

Figure 1: Infinity Network Layout

Upstream (Customer) Network

- All upstream protocols can be used simultaneously.
- Ethernet
- TCP/IP for web pages
- Modbus TCP/IP
- SNMP
- Modbus RTU

Downstream (Internal) Network

Sensor boards are installed according to customer monitoring configuration and connected by an internal Ethernet network.

Points List:
- S1 Points
- S2 Points
- ... Sn Points

MIB:
- S1 MIB Section
- S2 MIB Section
- ... Sn MIB Section

Points list and MIB are constructed according to the unit’s sensor board configuration.
2.2 Network Connections

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

2.2.1 Ethernet (Upstream)

The customer's Ethernet network can be connected to the upstream Ethernet connector (labeled "ETHERNET J11") on the 7" Color Touchscreen backpanel. Infinity supports up to 1 Gigabit Ethernet upstream.

2.2.2 Modbus RTU (Upstream)

The 7" Color Touchscreen backpanel has two (2) paralleled 5-position Modbus RTU connectors at terminals J100 and J101. 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 J102 and J103.

2.2.3 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 ≤ 14pf/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.

2.2.4 Modbus RTU Cable Biasing and Termination

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

For 2-wire Modbus RTU, install jumpers on J102 and J103. 4-wire (jumpers off) is the default.

Modbus RTU Connection (Paralleled Connectors)
2.2.5 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 (J100, J101) on the Monitor PCB (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 J102 and J103 on every Monitor PCB in the chain (Figure 2). Having J102 and J103 jumped on any backpanel PCB in the daisy chain will force 2-wire Modbus RTU for all units in the chain.
- Infinity Monitors are all Modbus RTU slaves.
  - RX+ on the upstream Modbus master device (usually the Building Management System or DCIM system) wires to TX+ on the next Monitor PCB (see Figure 3).
  - TX- from the Modbus master device wires to RX- on the next Monitor PCB (see Figure 3).
  - A second pair of wires connects the other pair of customer master TX+ to chain RX+ and customer master 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.

<table>
<thead>
<tr>
<th>Modbus Master Device</th>
<th>Infinity Monitor 1</th>
<th>Infinity Monitor 2</th>
<th>Infinity Monitor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX+</td>
<td>TX+</td>
<td>TX+</td>
<td>TX+</td>
</tr>
<tr>
<td>RX-</td>
<td>TX-</td>
<td>TX-</td>
<td>TX-</td>
</tr>
<tr>
<td>TX+</td>
<td>RX+</td>
<td>RX+</td>
<td>RX+</td>
</tr>
<tr>
<td>TX-</td>
<td>RX-</td>
<td>RX-</td>
<td>RX-</td>
</tr>
</tbody>
</table>

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

+ and – wires should be in the same shield.
3 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 on-site when your unit is installed. 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

The following sections explain how to locate the correct sensor boards for these connections.

3.1 Sensor Types

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

- Voltage sensor for (1) source, 3-Phase + Neutral ≤ 660Vac.
- 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.

3.1.1 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 Base 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 Combo 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 Base Boards and Sensor Combo 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.
3.1.2 Sensor Board Configuration

PDI 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.

3.2 Sensor Board Layout

3.2.1 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.

3.2.2 Monitoring Compartments

Each unit has a monitoring compartment containing Sensor Base Boards and optionally Sensor Combo 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

Sensor Base Board is located on Monitor side behind dead front panel.

Optional Sensor Combo Board is located behind the Sensor Base Board on reverse side of panel.

PowerPak RPP typically has a Sensor Base Board and optionally a Sensor Combo Board.

The yellow arrow shows the network order of Sensor Boards in the Monitoring Compartment.

The network order of sensor boards is followed in the Modbus point list, SNMP MIB, and Sensor Status screen.

PowerPak 2 PDU typically has (1) Sensor Base Board and up to (4) Sensor Combo Boards.

PowerHub 2 PDU typically has (1) Sensor Base Board and up to (3) Sensor Combo Boards.

Figure 8 PDU Monitoring Compartments with Sensor Boards

The yellow arrow shows the network order of Sensor Boards in the Monitoring Compartment.

The network order of sensor boards is followed in the Modbus point list, SNMP MIB, and Sensor Status screen.
3.2.3 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 Base Board is typically the first Sensor Board in a PDU Sensor Board chain (see Figure 8) and has connections typical for a PDU, such as transformer thermal monitoring and EPO.

The REPO connection on the VVIT Board is clearly marked.

![Image of VVIT Board with REPO connection highlighted]

*Figure 9 REPO Connection to VVIT Board*
3.2.4 Sensor Combo Boards and Option Boards

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

![Diagram of Sensor Combo Board with Two Option Boards]

Option Board positions are numbered 1-4.

The order of the Option Boards is reflected in your Sensors' Status screen, Modbus Points List and SNMP MIB.

In this example, the Voltage Option Board (1) would be listed ahead of the Current Option Board (2).

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 listed in the sensor chain.
3.2.5 Digital Inputs Option Board

Each Digital Inputs Option 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 28), 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.

3.2.6 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 30.

3.2.7 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 3.1.1 Sensor Board Order, 3.1.2 Monitoring Compartments, and Figures 6-8.)
2. Sensor Combo Board layout: Options Boards are ordered by position number 1-4 on the Sensor Combo Board (See 3.1.4 Sensor Combo Boards and Option Boards and Figure 10)
3.3 Your Sensor Board Configuration

To list the sensor boards on your unit with their status, select the question mark symbol on any screen header (Figure 13). The software version, points list version, and communications status are shown for all sensor boards. Software levels are also shown for other components of the Infinity system.

![Figure 13 Sensors' Status List for a PDU](image)

3.4 Modbus Points List and SNMP MIB

There is one consolidated Modbus points lists and one SNMP MIB that is specific to your unit’s monitoring configuration, with an analog points section and a digital points section. The names of sensors and sensor boards in your configuration 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.

Figure 14 shows how the Sensors’ Status list corresponds to sections of the Modbus points list.
<table>
<thead>
<tr>
<th>Sensors’ Status Screen (from Figure 13 Example)</th>
<th>Modbus Analog Points section (1st point in each section is shown)</th>
<th>Modbus Digital Points section (1st point in each section is shown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Global Points in your Points List Prolong are not found on any sensor board.)</td>
<td>Prolog: Global Points, such as total number of alarms outstanding</td>
<td>Prolog: Global Points, such as System All Alerts, showing alarms are present</td>
</tr>
<tr>
<td><strong>Input Voltage</strong></td>
<td><strong>Input Voltage</strong> A-B (1st analog Input Voltage point)</td>
<td><strong>Input Voltage</strong> A-B High (1st digital point)</td>
</tr>
<tr>
<td><strong>Transformer</strong></td>
<td><strong>Transformer</strong> Debounce (this is the only analog Transformer point)</td>
<td><strong>Transformer</strong> Thermal High Temp Status (1st digital Transformer Output point)</td>
</tr>
<tr>
<td><strong>Output Voltage</strong></td>
<td><strong>Output Voltage</strong> A-B (1st Output Voltage point)</td>
<td><strong>Output Voltage</strong> A-B High (1st digital Transformer Output Voltage point)</td>
</tr>
<tr>
<td><strong>Output Current</strong></td>
<td><strong>Output Current</strong> A (1st Output Current analog point)</td>
<td><strong>Output Current</strong> A High (1st Transformer Output Current digital point)</td>
</tr>
</tbody>
</table>
| Panel 1 CT1-41 (Odd)  
Panel 1 CT2-42 (Even) | Panel 1 Current 1 (1st Panel 1 Point)  
(Panelboard odd and even sides are consolidated into a continuous list CT1-42.) | Panel 1 Zero Current 1 (1st Panel 1 digital point)  
(Panelboard odd and even sides are consolidated into a continuous list CT1-42.) |
| Panel 2 CT1-41 (Odd)  
Panel 2 CT2-42 (Even)  
Panel 3 CT1-41 (Odd)  
Panel 3 CT2-42 (Even) | Panels 2-3 are not shown.  
Each panelboard points list is the same as for others of the same type. | Panels 2-3 are not shown.  
Each panelboard points list is the same as for others of the same type. |
| **Subfeed 1 Current** | **Subfeed 1 Current** A (1st Subfeed 1 Point) | **Subfeed 1 Current** A High (1st Subfeed 1 digital point) |
| **Subfeed 2 Current**  
**Subfeed 3 Current** | Subfeeds 2-3 points are not shown.  
Points Lists for subfeeds are all same. | Subfeeds 2-3 points are not shown.  
Points Lists for subfeeds are all same. |
| **Digital 1** | **Digital 1** Subfeed 1 CB Aux Status (1st point) | **Relay 1** Relay 1 (1st Relay 1 digital point) |

Figure 14 Sensors’ Status List vs. Modbus Point List
3.4.1 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 15 for instructions.

To download your Modbus Points List and SNMP MIB:
1. From a browser, log in (to have administrator privileges).
2. Select Gear symbol.
3. Select NETWORK button.
4. Select MODBUS or SNMP tab.
5. Select POINTS’ LIST button. Points List is downloaded as .zip file.
7. File is unzipped to two files as shown.

Figure 15 Download Modbus Points List and SNMP MIB
4 Setup

After making network and local sensor connections, you should set up Infinity 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 system, the first screen displayed is the Infinity HOME screen. Select the gear symbol to display setup screens. The first screen displayed then is always the LIMITS screen.

To make any Infinity 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 button.

4.1 Setup: User Administration
4.1.1 User Access Privileges

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

- **Administrator**: Only administrators can set or change Infinity 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 16 Guest User Access](image)

Alarm settings and check boxes are greyed out for guest users. LIMITS Screens can be displayed but parameters cannot be changed.

Guest users cannot view setup screens with greyed out command buttons.

Administrators have access to all commands.
4.1.2 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).

Figure 17 User Administration

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 = **1234**. At first login, the Administrator should change the password and save it.

3. In the banner, select the **Setup** Icon.
4. Select **USERS** command button.
5. Select user from **Users** drop-down list and choose **EDIT USER**.

6. **Change User Credentials** appears. Only the password can be changed.

   To change the user name instead, select **Delete User** and then choose **Add User**.

7. To delete a user, select a user name from the drop-down list, select **Delete User**, and confirm the deletion.
8. Add New User follows the same format.

4.1.3 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 monitoring screens. They do NOT change names in the Modbus points list or SNMP MIB.

Not all names can be changed. Chain 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
4.2 Setup: GENERAL Screen

The **GENERAL** screen has two tabs:

- **BASIC** determines Infinity 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.

![GENERAL Screen, BASIC Tab](image)

**BASIC Tab**: Enter parameters for Monitor behavior.

- **Audible Alarm**: Check **Audio Alarm** if you want an audible alarm to sound at the Infinity 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.

- Check **Inline Calibration** to allow calibration directly from an analog measurement screen. See **6.2 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 32, "HOME Screen with Cascading."

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

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

- **Date** in MM/DD/YYYY format. Select drop-down list to select date from a calendar.
- **Time Zone:** Scroll through the option list to select your time zone or the time zone you wish to use for time stamps.
- **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.

Figure 20 GENERAL Screen: DATE/TIME
4.3 Setup: NETWORK Screen

You must set up Infinity software to match the physical network configuration you connected to Infinity in section 2.2 Network Connections.

Select the NETWORK button. The NETWORK screen has three tabs.

NETWORK TAB: Enter up your Ethernet network information:

- 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 entered at the factory and cannot be changed.

Changes are not automatically saved. Select SAVE CHANGES.

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

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

![Network Screen, Network Tab](image)

Figure 21 Setup: Network Screen, Network Tab

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

- **Communities**: Enter your Get, Set, and Trap Communities.
- **Trap Settings**:
  - Specify SNMP Version 1 or 2.
  - 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).
- **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 Section 3.4.1 Downloading the Modbus Points List and SNMP MIB.)
Figure 22 NETWORK Screen, SNMP Tab

**MODBUS Tab:** Setup Modbus RTU parameters.

- **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 Monitor (1-247).
- Specify a **Unit ID**. Infinity returns this user-specified ID in response to receiving Modbus function code 17.
- Select **POINTS LIST** to download the Modbus points list for your unit. See also Section 3.4.1, *Downloading the Modbus Points List and SNMP MIB.*

Figure 23 Setup Network, Modbus RTU Tab
4.4  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 Gear icon in the banner.

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

Figure 24 Setup: Limits Screen with Sensor List

4.4.1  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 4.4.2 Panelboard Limits.
4.4.2 Panelboard Circuits

Infinity 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 24, 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.

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.

Figure 26 Panelboard Sensor Strip, Applying the Same Parameters to All Circuits
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.

![Diagram](image)

**Figure 27 Panelboard Sensor Strip, Customizing Monitoring by Circuit**
4.5 LIMITS: Set Digital Alarm Values

4.5.1 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 Figure 11).

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 28 below).

Figure 28 Digital Inputs Sensor Screen
4.5.2 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.

---

**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.

---

**Figure 29 Transformer Screen Digital Points**

- **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

---

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.

When **CB Trip** is checked, the main input circuit breaker has been tripped.

---

Ctrl Nr: PM375130-000
4.6 Relay Screen

Relays are located on Relay Option Boards (see Figure 12, “Relay Option Board”). 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.

![Relay Screen Image]

Figure 30 Relay Screen
5 Operation: Monitoring Your System

To view Infinity screens, users can use the Infinity Monitor on their monitored unit or can 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.

5.1 HOME Screen

When you power-on your unit or when a remote user connects to an Infinity system, the first screen displayed is the Infinity 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 display, touch the screen element
- On a remote browser, users select screen elements with their pointing device as they normally do.

Figure 31 HOME Screen
If your **GENERAL** screen **BASIC** tab shows “Subfeed Cascading” (See Figure 19), 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 32 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.
5.2 Analog Circuits: Measurements and Status

5.2.1 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.

NOTE: Panel 1 has one panelboard circuit in warning condition. The CT sensor strip symbol (S) and the Alarm header show orange for warning.

Figure 33 Current Sensor Screens
5.2.2 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.

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

Circuit 1 is above warning level.

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

Circuit 1 is above warning level.

Panel 1 Bar Chart has a slide-out side menu with additional screens. Select a different screen from the menu.

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)

Figure 34 Panelboard Screens (Part One)
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 ≤ 0.5A after first measuring ≥ 3A (color code=orange)

### 5.2.3 Resetting Accumulators and Min/Max Readings

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 button. (Figure 36) You have these options:

- **CLEAR MIN/MAX** for all sensors or specific sensors
- **CLEAR KWH** for all sensors or specific sensors
5.3 Digital Points Status

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

- Transformer digital points, see Transformer Sensor Status screen (Figure 29).
- Digital Inputs, see Digital 1, Digital 2, etc., Sensor Status screen (Figure 28).
- Relays, see Relay 1, Relay 2, etc., Sensor Status screen (Figure 30).

Digital Inputs status for circuit breakers with aux contacts is shown on the HOME screen (Figure 31).

5.4 Alarms

5.4.1 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 Latched Alarm.
- The alarm is listed in the LOG.
- If so configured, an audible alarm will sound at the unit’s Infinity 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.
5.4.2 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 latched alarms.

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

**Latched alarms:** All alarms are “latched,” that is, retained in the latched list, when they are become active. To clear latched alarms, select the garbage can icon. (You must be a logged-in user to clear latched alarms.)

An alarm will never occur more than once on the Active or Latched list. However, if an alarm is raised multiple times, each occurrence will be listed in the Log. See 5.5 LOG Screen.
The **ALARM** Screen has two views: **ACTIVE ALARMS** and **LATCHED ALARMS**.

Toggle between views by selecting this field.

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 on the 'Latched Alarms' view until removed.

Select **Garbage Can** icon to clear all Latched Alarms. (Alarms cannot be individually cleared.)

You must be logged in to clear Latched Alarms.

---

**Figure 38 Active vs. Latched Alarms**

5.5 **LOG 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 rebooted

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

The Log lists up to 100 events.
Select left side of banner to view the Log Screen.

To clear the Log, select the Garbage Can icon. You must be logged into clear the Log.

Reverse time-display order.

Scroll buttons

Figure 39 LOG Screen

<table>
<thead>
<tr>
<th>Log</th>
<th>Source</th>
<th>Event</th>
<th>Action</th>
<th>Eastern Daylight Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Output</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>2</td>
<td>Input</td>
<td>Frequency Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>3</td>
<td>Input</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>4</td>
<td>Output</td>
<td>Frequency Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>5</td>
<td>Output</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>6</td>
<td>Output</td>
<td>Vcb Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>7</td>
<td>Output</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>8</td>
<td>Input</td>
<td>Vcb Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>9</td>
<td>Output</td>
<td>Vdc Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>10</td>
<td>Output</td>
<td>Vab Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>11</td>
<td>Transformer</td>
<td>Input CB Aux</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>12</td>
<td>Transformer</td>
<td>Thermal Over Temp</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>13</td>
<td>Input</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 2:11 PM</td>
</tr>
<tr>
<td>14</td>
<td>172.18.7.69</td>
<td>USER Admin</td>
<td>Log In</td>
<td>Tue, Apr 17, 2018, 2:10 PM</td>
</tr>
<tr>
<td>15</td>
<td>172.18.7.69</td>
<td>USER Admin</td>
<td>Log In</td>
<td>Tue, Apr 17, 2018, 1:35 PM</td>
</tr>
<tr>
<td>16</td>
<td>Input</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>17</td>
<td>Input</td>
<td>Vca Low</td>
<td>New Alarm</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>18</td>
<td>Input</td>
<td>Vcb Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>19</td>
<td>Input</td>
<td>Vcb Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>20</td>
<td>Input</td>
<td>Vca Low</td>
<td>Alarm Cleared</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>21</td>
<td>Input</td>
<td>Vcb Low</td>
<td>New Alarm</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>22</td>
<td>Input</td>
<td>Vcb Low</td>
<td>New Alarm</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
<tr>
<td>23</td>
<td>Input</td>
<td>Vca Low</td>
<td>New Alarm</td>
<td>Tue, Apr 17, 2018, 11:54 AM</td>
</tr>
</tbody>
</table>
6 Maintenance

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

6.1 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.

Figure 40 Calibration Procedure with Calibrate Screen

<table>
<thead>
<tr>
<th>Calibration Step</th>
<th>Screen or Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Display HOME screen.</td>
<td><img src="image" alt="Calibrate Screen Illustration" /></td>
</tr>
<tr>
<td>2. Log in.</td>
<td></td>
</tr>
<tr>
<td>3. Select Gear icon to bring up the CALIBRATE screen.</td>
<td></td>
</tr>
<tr>
<td>4. Select circuit group you wish to calibrate on Sensor Board drop-down list.</td>
<td><img src="image" alt="Calibration Values Illustration" /></td>
</tr>
<tr>
<td>5. Measure circuit value.</td>
<td></td>
</tr>
<tr>
<td>6. Enter correct measurement in ‘Calibrate to’ field.</td>
<td></td>
</tr>
</tbody>
</table>
7. On panel boards, you can scroll the circuit display using **NEXT** or **PREVIOUS** button.

### 6.2 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.

**Figure 41 Inline Calibration Procedure**

<table>
<thead>
<tr>
<th>Calibration Step</th>
<th>Screen or Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Display <strong>HOME</strong> screen.</td>
<td>![Image of HOME screen]</td>
</tr>
<tr>
<td>2. Log in (as an administrator).</td>
<td></td>
</tr>
<tr>
<td>3. Touch or click an analog measurement field on the <strong>HOME</strong> screen, such as <strong>V</strong>, <strong>VI</strong>, <strong>I</strong>, or <strong>Panels</strong>. (Output Voltage is used in this example.)</td>
<td>![Image of measurement field calibration]</td>
</tr>
<tr>
<td>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.)</td>
<td>![Image of calibration status]</td>
</tr>
</tbody>
</table>
5. A small screen pops up over the measurement screen that lets you enter any calibrated measurement in the selection.

9. 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.

10. Close pop-up when you are done.

6.3 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 42 CT Fix Positions on Panelboard CT Strip](image)

Replacement split-core CTs have the same monitoring accuracy as the on-strip solid-core CTs.

Use the following procedure to replace a failing panelboard CT.
**Figure 43 Procedure for Replacing a Failed CT**

<table>
<thead>
<tr>
<th>Replacing Failing Panelboard CT Procedure Step</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the failing CT and panelboard CT strip.</td>
<td><img src="image1.png" alt="Image 1" /></td>
</tr>
<tr>
<td>2. Log in to Infinity Monitoring System.</td>
<td><img src="image2.png" alt="Image 2" /></td>
</tr>
<tr>
<td>3. Select the <strong>CT FIX</strong> button to bring up <strong>CT Fix</strong> screen.</td>
<td><img src="image3.png" alt="Image 3" /></td>
</tr>
<tr>
<td>4. Select the CT strip with the failing CT from the drop-down list.</td>
<td><img src="image4.png" alt="Image 4" /></td>
</tr>
<tr>
<td>5. The <strong>CT Fix</strong> screen shows available and assigned CT Fix positions. Three (3) substitute CT positions are available for each panelboard strip.</td>
<td><img src="image5.png" alt="Image 5" /></td>
</tr>
</tbody>
</table>
6. 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.

In this example, a split-core CT will be connected to CT Fix 1 position to substitute for CT2.

7. CT Fix screen shows CT Fix 1 position in use for CT2.

8. Clip a split-core CT over the panelboard circuit wire for CT2.
9. 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)
Bibliography

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

https://www.pdicorp.com/products/monitor/wavestar-infinity-monitoring-system

PDI manufactures a variety of power distribution products. Product documentation for these PDI products can be downloaded from the product page of each product:

https://www.pdicorp.com/products/