



POWER LEADER™

*PMCS 6.14
Interface Toolkit*

**Installation Guide
GEH-6513**

GE Power Management Control System 6.14

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Introduction

Welcome

The PMCS Interface Toolkit is a POWER LEADER Power Management Control System (PMCS) version 6.14 tool that provides a custom toolkit to efficiently create flexible, accurate, and friendly user interfaces to your power management data. With the PMCS Wizards (accurate graphical representations of power management devices and other commonly encountered objects), you can create applications to provide a customized interface that accurately represents physical, electrical, and geographical plant layouts. The wizards can significantly cut new system development time, providing results in less than an hour.

The PMCS Interface Toolkit allows you to create one-line diagrams, elevation views, and floor plans that you can combine with tabular data screens and three-dimensional device wizards to create a virtual representation of your facility and equipment. With this graphical user interface, you actually see and control devices on the screen, without having to make a trip out to the meter or trip unit.

The Toolkit, which consists of the Wonderware InTouch development environment coupled with GE's wizards, is easy to use, taking advantage of state-of-the-art drag-and-drop technology. Wizards are provided for all the devices most commonly used with the PMCS DDE Server. Creating a custom interface is as easy as selecting wizards for the devices installed in a facility and placing them on the screen.

Here's what you'll find in this guide:

- Chapter 2 explains the kinds of PMCS Wizards, their use and configuration – Small Faceplate wizards, Large Faceplate wizards, Tabular Data Screen wizards, One- Line wizards, Elevation wizards, and Floor Plan wizards.
- Chapter 3 illustrates the use of the GE wizards described in Chapter 2 to create animated displays of the facility floor plan, switchgear elevations, and system one- line diagrams.
- Chapter 4 gives an example of application development, using the wizards described in Chapters 2 and 3 to create an actual PMCS application.
- Chapter 5 describes the functions available with each of the GE Large Faceplate wizards. These wizards are accurate graphical representations of power management devices, complete with working

controls that are linked to the corresponding devices in your facility.

- Chapter 6 describes the Tabular Data wizards. These wizards list the data and setpoints of power management devices in a tabular format. Simply point and click to select the appropriate tab of information to display and view the related data.

The examples and references in this guide enable you to create custom interfaces for your PMCS system, and allow you to access power management data in the way that best suits you.

How should I use this manual?

How you use this book depends on your level of expertise with Wonderware InTouch. Consult the table below to determine where you should start.

| If this describes you... | Start here: |
|--|--|
| I've never seen this stuff before! What's Wonderware InTouch? What are "Wizards"? | Refer to the documentation that came with your Wonderware InTouch package. Start with the introduction and tutorial sections, which will teach you about Wonderware InTouch and how to use it to create custom applications. When you understand what wizards are and how to use them, come back here. |
| I've just opened this package – where do I go first? | Go to Chapter 1, Introduction. Chapter 1 explains what the User Screen Configurator is, what it's good for, and where to go after that. |
| I'm familiar with Wonderware InTouch and I'd like to build a custom application for some GE power management devices. | Go to Chapter 1 for installation instructions, then to Chapter 2 for descriptions of the wizards and how to use them. Chapter 4 provides a demo of actual application development. This package contains wizards for the power management devices supported by GE's PMCS 6.14 software. |
| The GE PMCS Wizards are already installed on my system, I'm already experienced with InTouch, and I'm ready to start building custom applications. | Turn to Chapter 2 for information on how to use the GE PMCS Wizards, and Chapter 4 for a quick example of application development. For detailed descriptions of the Large Faceplate wizards or the Tabular Data Screen wizards, refer to Chapters 5 and 6 respectively. |
| Just tell me about the wizards; I'm an old pro and ready to go! | Skim through Chapters 2 and 3 for an overview of what's in the package, then Chapter 4 for a quick example of application development. Chapter 5 describes the GE Large Faceplate wizards and Chapter 6 the associated Tabular Data Screen wizards. |

Conventions

You will find this book easy to use if you look for these simple conventions:

- **Boldface** type indicates the name of an item you need to select.
- Monospace type indicates an example or text that is displayed on the screen.
- UPPERCASE type indicates a file name, command name, or acronym.

About the Interface Toolkit

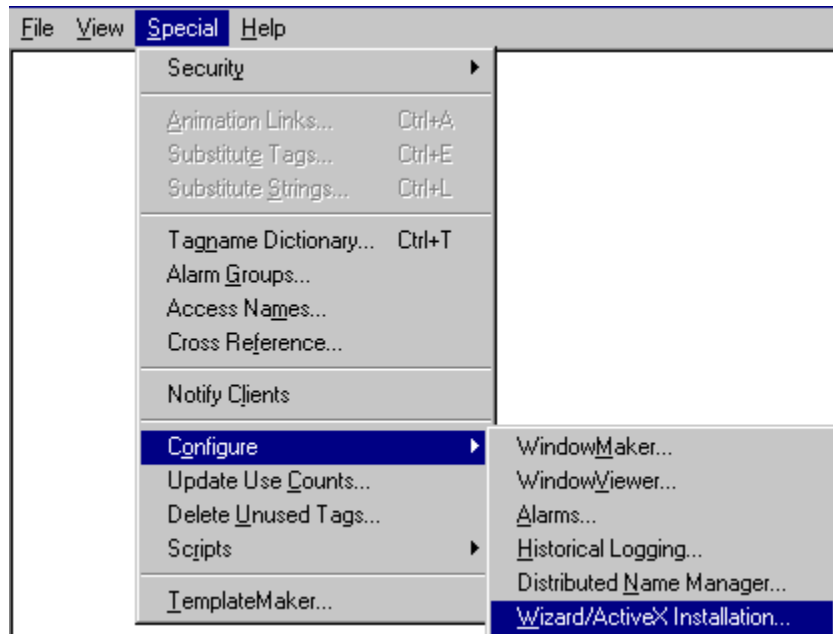
The Interface Toolkit consists of the Wonderware InTouch development environment and a special set of wizards developed for use with the power management devices supported by PMCS.

Installation

To install the Interface Toolkit from the CD-ROM, refer to the instructions provided in GEH-6514, *Read This Book First*.

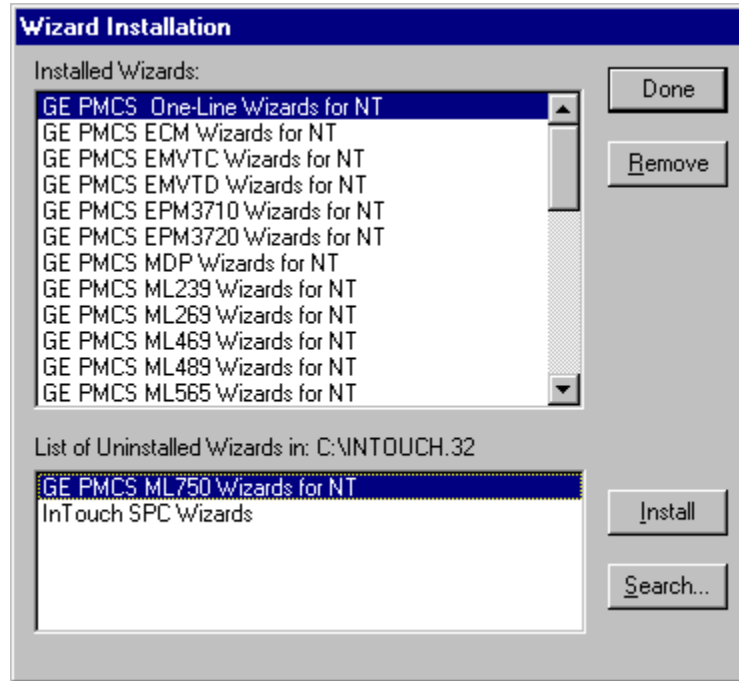
When InTouch is successfully installed, you must add the PMCS wizards to InTouch's library of available wizards.

To add the wizards to InTouch, start InTouch and enter **Development** mode. Pull down the **Special** menu and select **Configure > Wizard**.



From the **InTouch Configuration** menu, select **Install Wizards**.

The **Wizard Installation** dialog displays two list boxes, showing the currently installed wizards and the wizards available for installation. Select the desired wizards from the bottom box and click **Install**. When the installation is complete, click **Done**.



Exit from the InTouch Configuration dialog box by clicking **OK**. The PMCS wizards should now be loaded and ready for use.


Using and Configuring PMCS Wizards

About the Wizards

The wizards contained in the PMCS Interface Toolkit allow you to quickly build accurate and friendly user interfaces with InTouch. In addition to the various wizards standard with InTouch development systems, the Interface Toolkit provides six types of powerful GE wizards:

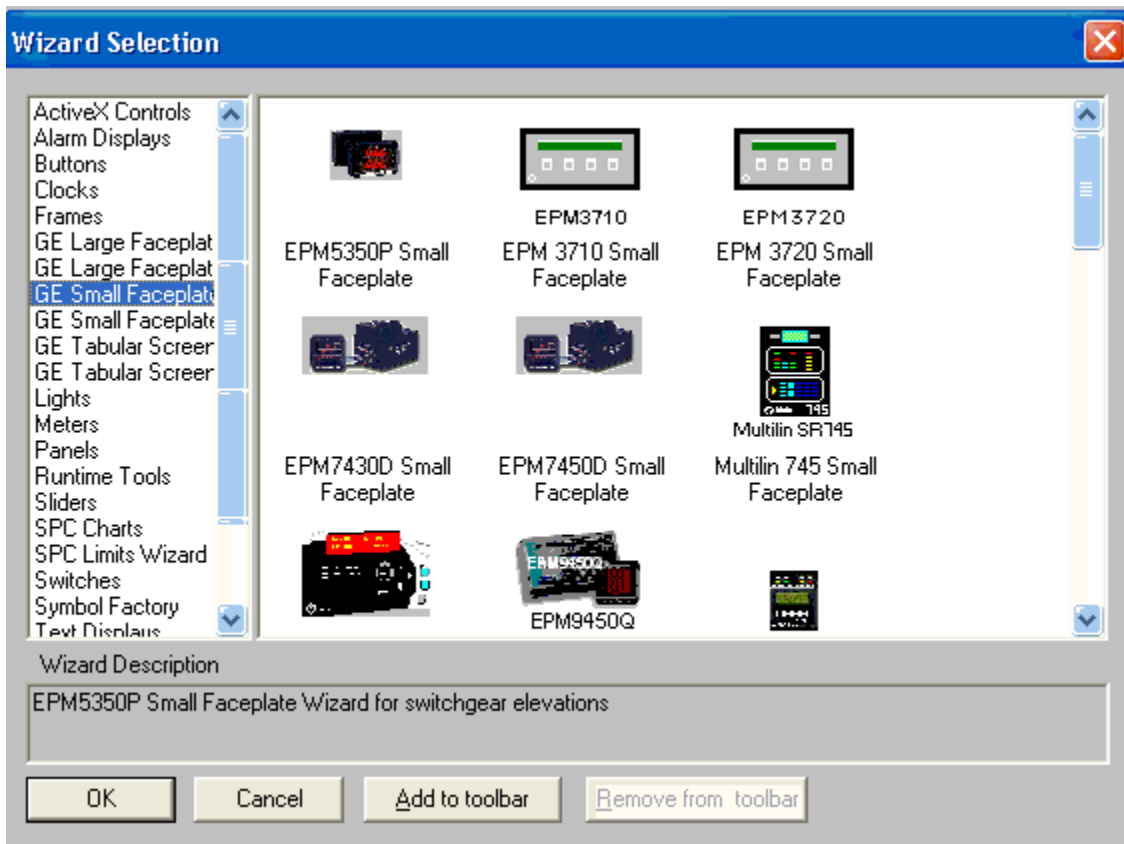
- GE Small Faceplates
- GE Large Faceplates
- GE Tabular Screens
- GE One-Line Tools
- GE Elevation Wizards
- GE Floor Plan Wizards

The five-step procedure below outlines how to use InTouch wizards.

1. From InTouch, either create a new window or open an existing window to modify.
2. Select the **wizards** button  from the floating toolbars. The Wizard Selection dialog box pops up.
3. Select the class of wizard from the list of wizards on the left side of the Wizard Selection dialog. Several classes contain too many devices to fit on one palette and have been broken up into several palettes; for example; Small Faceplates 1 and Small Faceplates 2.
4. Double-click on the desired wizard, then click on the window to place the wizard.
5. Once the wizard has been placed, double-click anywhere on the wizard to open a configuration dialog (if appropriate), and complete any necessary configuration based on the instructions later in this chapter.

The remainder of this chapter is devoted to describing and illustrating the various kinds of wizards included in the PMCS Interface Toolkit.

Small Faceplate Wizards



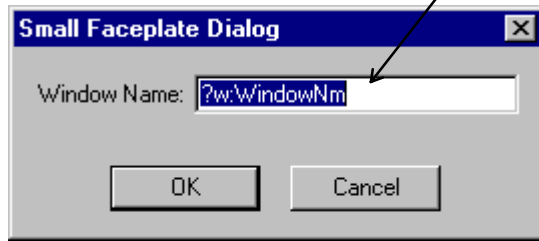
Usage

The Small Faceplate wizards are icon-sized graphics typically used to create accurate elevation views and one-line diagrams. These wizards are provided with logic to open another window, typically either a Large Faceplate or Tabular Data Screen wizard. There are two palettes of Small Faceplates to choose from.

Configuration

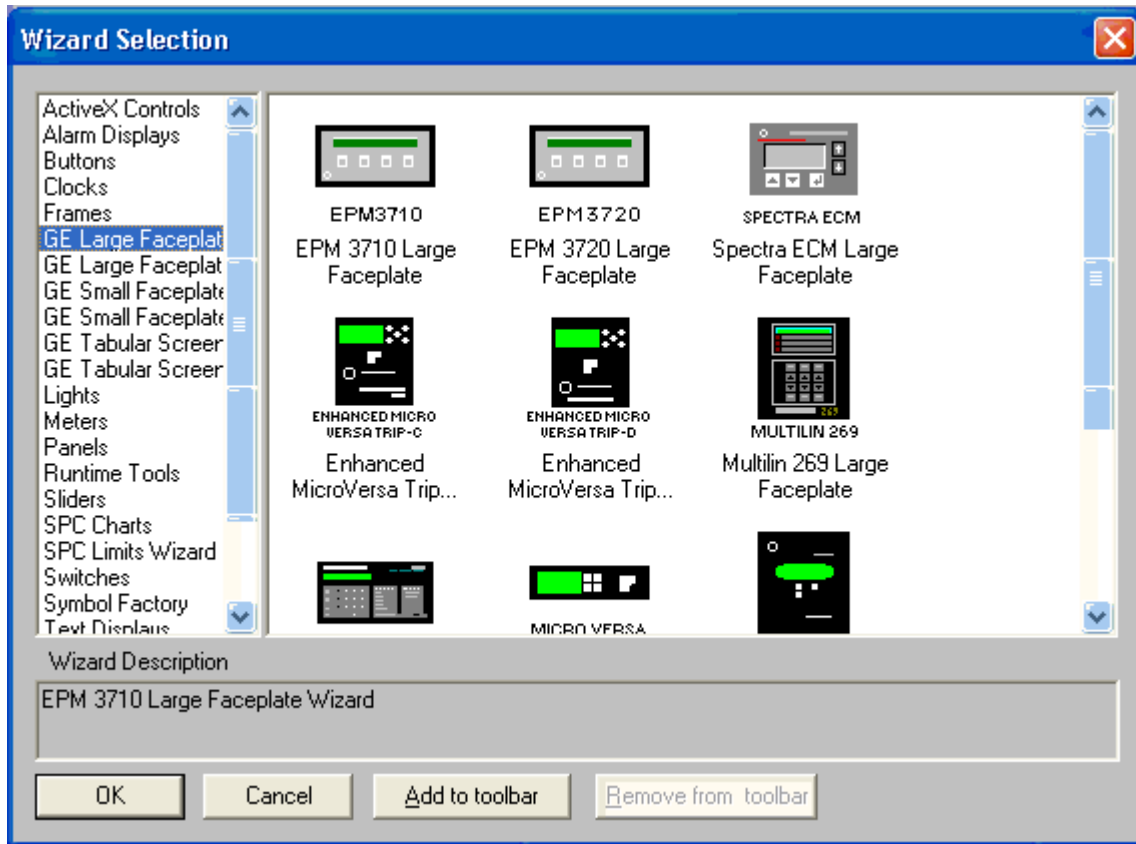
In development mode, after placing the Small Faceplate, double-click on the icon to open the Small Faceplate Dialog box, as illustrated below. Typically, a Small Faceplate wizard is linked to a window containing either a Large Faceplate or a Tabular Data Screen wizard. You can move or resize Small Faceplate wizards in the window as desired.

Enter the name of the window to open when the icon is clicked on during runtime.



A screenshot of a dialog box titled "Small Faceplate Dialog". The dialog has a blue title bar with a close button (X) on the right. Below the title bar, there is a text label "Window Name:" followed by a text input field containing the placeholder text "?w:WindowNm". An arrow points from the text above to this input field. At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

Large Faceplate Wizards



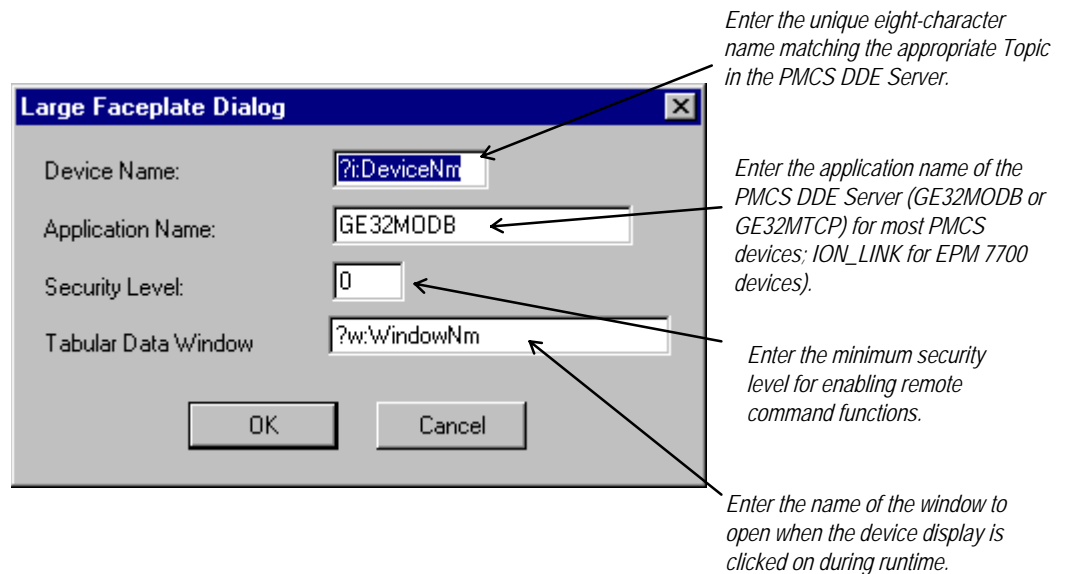
Usage

Large Faceplate wizards are three-dimensional representations of device faceplates that can be used to display data from the device. These three-dimensional wizards include extensive logic that provides an accurate reproduction of the actual display and keys of the device. Large Faceplate wizards are typically placed in overlay windows.

Configuration

Place the Large Faceplate wizard into an open window, then double-click on it to display the Large Faceplate Dialog box. Configure the wizard by entering the appropriate information into each of the boxes.

The figure shown below is the dialog for a typical wizard. Some wizards have additional features which may be configured. See the section titled **Features of GE Large Faceplate Wizards** for more details.



You can move and resize Large Faceplate wizards as desired.

Special Considerations

The button controls on the 3-D representation emulate the controls of the actual device. This may be useful for reducing software training time for personnel already familiar with device operation. The detailed features of each of the Large Faceplate wizards are described in the section titled **Features of GE Large Faceplate Wizards**.

EPM 7700

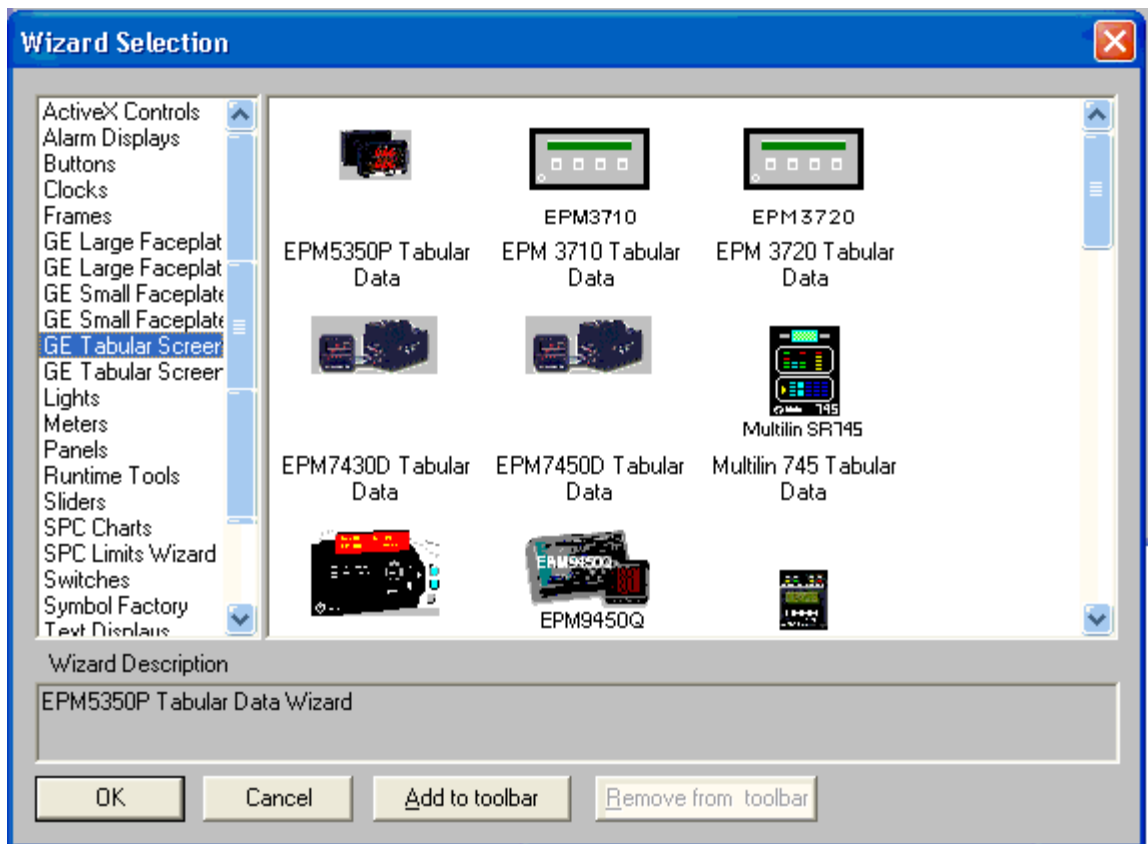
The EPM 7700 Large Faceplate Dialog box contains an extra field, which must be completed during configuration. The *Node Name* field requires that you enter the name of the computer running the Communications Server that connects to this particular device. Depending on the configuration of the EPM7700 network, this can be either the Primary node computer, or a computer setup as a "Full Station" Secondary node. Refer to DEH-40035, the *GE 7700 Gateway Users Guide*, and GEH-6514, *PMCS Read This Book First*, for more information on network configuration. The Node Name field is required because the EPM7700 does not use the same DDE server as the rest of the standard PMCS devices, and the wizard must be directed to the location of the correct Communications Server for proper configuration of DDE topic names.

Also, the Application Name field must be completed as ION_LINK rather than GE32MODB or GE32MTCP for the EPM7700 device. The ION LINK program is installed during initial PMCS 6.14 setup if the EPM7700 software option is selected.

When configuring Wizards on Secondary nodes, the Application Name field entry does not follow the PMCS wizard convention of “\\RemoteComputer\ION_LINK”. EPM7700 Secondary nodes run a local copy of the ION LINK server, thus the application name for EPM7700 Large Faceplate wizards is always “ION_LINK” whether the wizard is installed on the Primary node or a Secondary node. The Node Name entry determines if the wizard is on a Secondary node.

Finally, the EPM 7700 device type requires special InTouch scripting for the large faceplate wizard. Refer to the section at the end of this chapter titled *Special Scripting Considerations for the EPM 7700*.

Tabular Data Screen Wizards



Usage

Tabular Data Screen wizards contain organized, comprehensive, tabular layouts of device parameters including additional configuration and remote control features. Depending on the device, there may be multiple file-tabs beneath the tabular data section. These switch among various pages relating to data and setpoints.

Each Tabular Data Screen wizard contains buttons for activating the help file, trend window, setup window (if applicable), Event Logger, Waveform Capture, and for closing the window.

You can move and resize Tabular Data Screen wizards as desired.

Configuration

In development mode, after placing a wizard into an open window, double-click on it to display the Tabular Data Dialog box. The figure below shows the dialog box for a typical Tabular Data wizard. Some wizards have additional features which may be configured. See the section titled **Features of Tabular Data Screen Wizards** for more details.

Enter the unique eight-character name matching the appropriate Topic in the PMCS DDE Server.

Use the Group Name field to logically group devices, if desired. Enter the name of the group to which the device belongs.

The screenshot shows the 'Tabular Data Dialog' window with the following fields and values:

- Device Name: ?i:DeviceNm
- Group Name: \$System
- Application Name: GE32MODB
- Security Level: 0
- Trend Window Name: ?w:WindowNm
- Setup Window Name: ?w:WindowNm

Buttons: OK, Cancel

Enter the application name of the PMCS DDE Server (GE32MODB or GE32MTCP).

Enter the minimum security level for enabling remote command and setup functions.

Enter the name of the window to be opened when the Trend button is clicked on during runtime.

Enter the name of the window to be opened when the Setup button is clicked on during runtime.

EPM 7700

The EPM 7700 Tabular Data Dialog box is slightly different from the other PMCS device types, containing two extra fields and requiring minor differences in configuration. The Tabular Data Dialog for the EPM 7700 is shown below, followed by the special configuration requirements.

The screenshot shows the 'Tabular Data Dialog' window for the EPM 7700 with the following fields and values:

- Node Name: PRIMARY_NODE
- Device Name: EPM7700
- Group Name: \$System
- Application Name: ION_LINK
- Gateway Name: GE77GTWY
- Security Level: 0
- Trend Window Name: 7700 Trend Window

Buttons: OK, Cancel

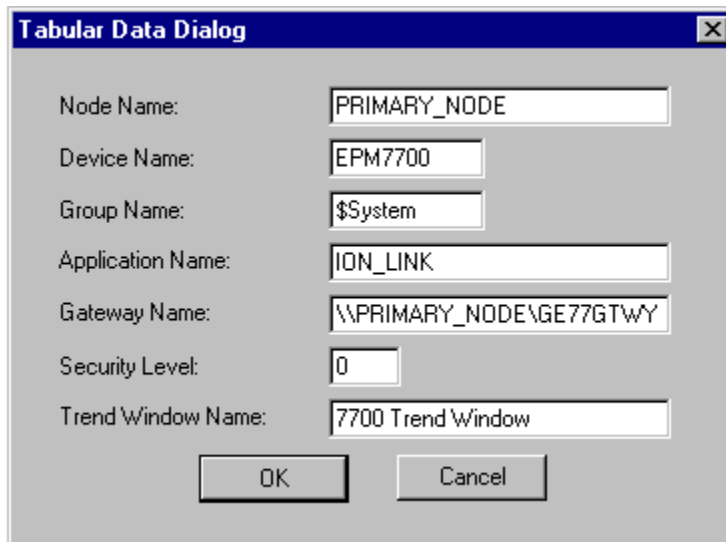
The *Node Name* field requires that you enter the name of the computer running the Communications Server that connects to this particular device. Depending on the configuration of the EPM7700 network, this can be either the Primary node computer, or a computer setup as a “Full Station” Secondary node. Refer to DEH-

40035, the *GE 7700 Gateway Users Guide*, and GEH-6514, *PMCS Read This Book First*, for more information on network configuration. The *Node Name* field is required because the EPM7700 does not use the same DDE server as the rest of the standard PMCS devices, and the wizard must be directed to the location of the correct Communications Server for proper configuration of DDE topic names.

Also, the Application Name field must be completed as ION_LINK rather than GE32MODB or GE32MTCP for the EPM7700 device. The ION LINK program is installed during initial PMCS setup if the EPM7700 software option is selected.

When configuring Wizards on Secondary nodes, the Application Name field entry does not follow the PMCS wizard convention of “\\RemoteComputer\ION_LINK”. EPM7700 Secondary nodes run a local copy of the ION LINK server, thus the application name for EPM7700 Tabular Data Wizards is always “ION_LINK” whether the wizard is installed on the Primary node or a Secondary node. The Node Name entry determines if the wizard is on a Secondary node.

The Gateway Name field must be completed with GE77GTWY, the application name of the GE 7700 Gateway Server program. When configuring the EPM7700 Tabular wizard on a Secondary node, the Gateway Name *does* follow the PMCS wizard convention of “\\RemoteComputer\GE77GTWY” in the Gateway Name field, where ‘RemoteComputer’ is the name of the PC where the GE 7700 Gateway application is running – the Primary Node. The following example shows a Tabular Data Dialog box as it would appear when configuring a Tabular Data wizard on a Secondary node. The Node Name field contains the name of the Primary Node computer, the Application Name field is ION_LINK (as it is for ALL EPM7700 wizards on ANY node) and the Gateway Name field points to the GE 7700 Gateway Server running on the Primary Node PC.



Finally, the EPM 7700 device type requires special InTouch scripting for the tabular data screen wizard. Refer to the section at the end of this chapter titled *Special Scripting Considerations for the EPM 7700*.

Refer to DEH-40035 for information on the Communications Server and 7700 Gateway Server.

369 Motor Management Relay

The 369 Motor Management Relay offers an optional Remote RTD module, which can provide support for up to 12 additional RTDs. Accordingly, the 369 Tabular

Data Dialog box has an extra field for indicating when the RRTD option is installed. Be sure to select the correct RRTD option when completing the 369's Tabular Data Dialog window. If you are not planning to use an RRTD module with your relay, select the "No" button. This minimizes the number of I/O tags created by the wizard, providing better performance.

The image shows a screenshot of a Windows-style dialog box titled "Tabular Data Dialog". The dialog box has a blue title bar with a close button (X) on the right. The main area is light gray and contains several labeled input fields:

- Device Name:
- Group Name:
- Application Name:
- Security Level:
- Trend Window Name:
- Setup Window Name:

Below these fields is a section labeled "RRTD Installed" with two radio buttons: No and Yes. At the bottom of the dialog are two buttons: "OK" and "Cancel".

Universal Relay

The Universal Relay device comes in several different models, and each model supports different capabilities, which are reflected by the various tabs available for each model. When configuring a Universal Relay device, you first select the UR Model, then choose which tabs will be displayed for the particular device.

The UR devices are also capable of communicating with a different type of PMCS DDE Server than the other PMCS Advanced Wizards. By selecting the UCA/MMS checkbox, you indicate that you wish the UR wizard to retrieve its data for display from the MMS Server whose name is entered in the Application Name field.

Complete the Application Name field; typically GE32MODB or GE32MTCP.

Special Note:
The UCA/MMS is not supported in this version. So don't Check this checkbox.

Select the Model of UR which you are configuring. This determines the contents of the Available Tabs list.

Highlight the tabs you wish to display on the Tabular Data Screen wizard. Use the control key to select multiple tabs.

Tabular Data Dialog

Device Name: F60

Group Name: \$System

Application Name: GE32MODB UCA/MMS

Security Level: 0

Trend Window Name: UR TREND WINDOW

Setup Window Name: UR SETUP WINDOW

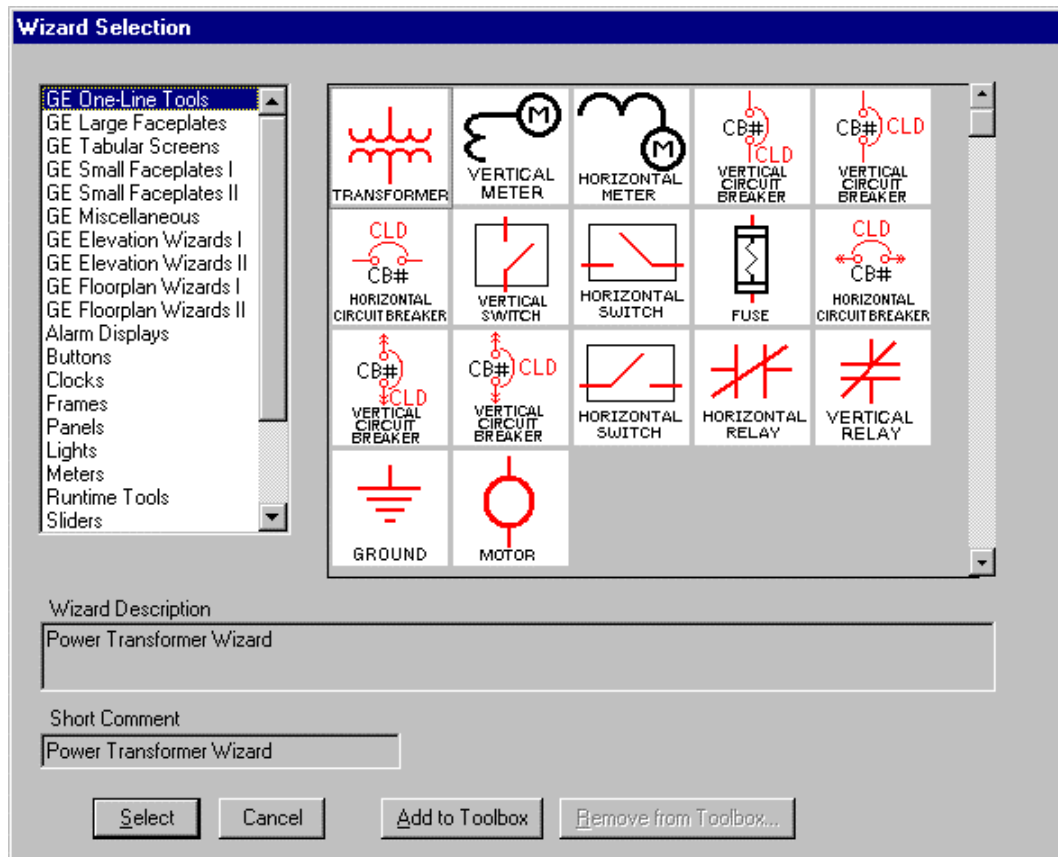
UR Model: F60

Selected Tab Pages: (Maximum of 8 pages)

- F60
- L60
- L90
- T60
- Elements
- Inputs
- Counter
- Power
- Source2
- Source3

OK Cancel

One-Line Wizards



Usage

You can use one-line wizards to create animated one-line diagrams that represent an electrical schematic of the devices monitored by the software. These wizards are provided with logic to either open another window or display device status.

One-Line wizards are divided into five functional groups according to the type of animation:

- Horizontal and Vertical Meter wizards display another window, such as a 3-D faceplate.
- Transformer, Fuse, Ground Symbol, and Motor Symbol wizards have a discrete color-change animation indicating the On/Off state of the device.
- Horizontal and Vertical Relay wizards also have discrete color-change animation indicating the On/Off state of the device.
- Horizontal and Vertical Switch wizards have four discrete animations; two are color changes indicating the On/Off state of the device and two are used for a three-state display (Open, Closed, and Error conditions).

- Circuit Breaker wizards have two discrete color-change animations for On/Off status display and one analog animation for a five-state display (Open, Closed, Out, Trip, and Error conditions).
- Lockout/Tagout symbols have discrete visibility animations for various tags. Refer to the section **Using and Configuring PMCS Wizards: Lockout/Tagout Wizard** for more information.

Configuration

In development mode, after placing the one-line device icon, double-click on the icon to open its configuration dialog box. All one-line wizards have two configuration items in common:

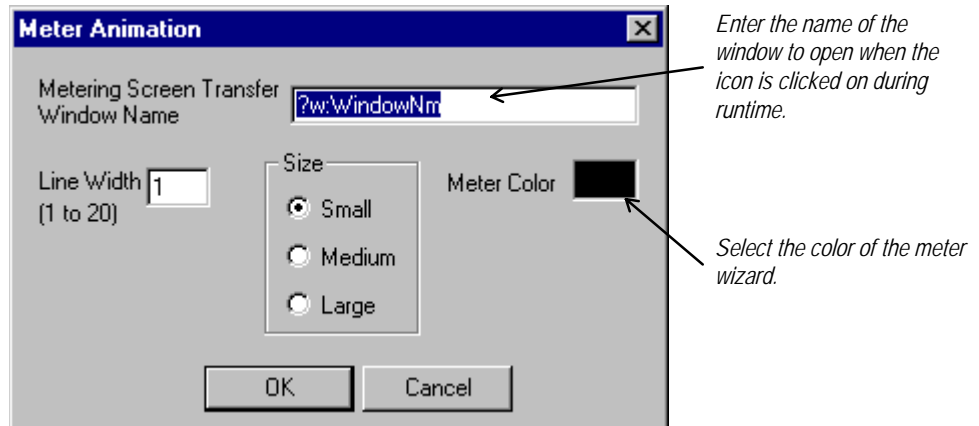
- Line Size is a number between 1 and 20 that sets the pixel width of the lines in the wizard.
- Size configuration consists of three radio buttons (Small, Medium, and Large) that determine the overall size of the wizard on the screen.

Use the snap-to-grid feature in InTouch to quickly align One-Line wizards.

Configuration of each of the five classes of One-Line wizards is described below.

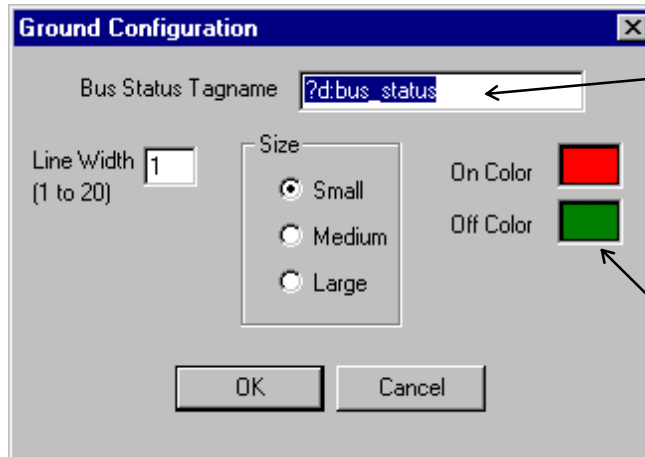
Meter One-Line Wizards

After placing a meter wizard in a window, double-click on it to display the dialog box shown below. Configure the wizard by entering the appropriate information into each of the boxes.



Transformer, Fuse, Ground, and Motor One-Line Wizards

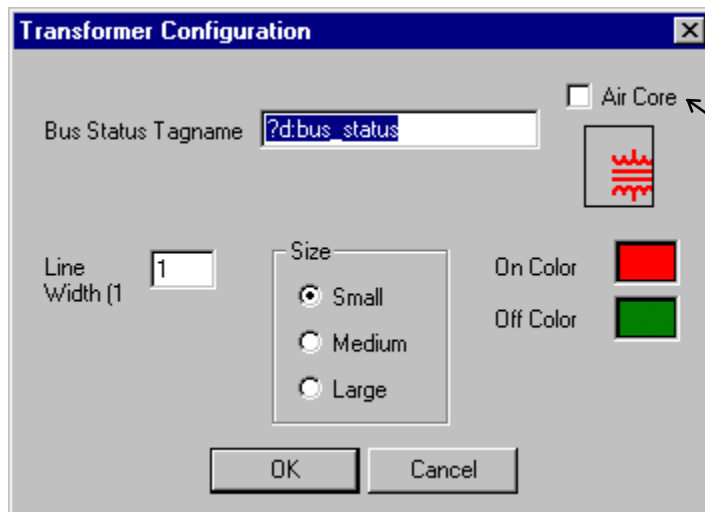
After placing a Fuse, Ground, or Motor wizard in a window, double-click on it to display the dialog box shown below. Configure the wizard by entering the appropriate information into each of the boxes.



Enter the name of the InTouch discrete tag that determines the state of the line colors during runtime.

Specify the colors of the lines when the Bus Status is On and Off. The wizard is displayed in the On Color when the Bus Status Tagname = 1, Off Color when the Bus Status Tagname = 0.

The dialog box for the Transformer wizard has an extra check box that specifies either an air-core or iron-core transformer, as shown below.



Click on the check box to specify an air-core transformer.

Horizontal and Vertical Relay One-Line Wizards

After placing a Horizontal or Vertical Relay wizard in a window, double-click on it to display the dialog box shown below. Configure the wizard by entering the appropriate information into each of the boxes.

Enter the name of the InTouch discrete tag that determines the color of the line to the right (or top) of the relay symbol during runtime.

Enter the name of the InTouch discrete tag that determines the color of the line to the left (or bottom) of the relay symbol during runtime.

Horizontal Relay Configuration

Right Connection Tagname ?d:right_connection

Left Connection Tagname ?d:left_connection

Contact Status Tagname ?d:contact_status

Line Width (1 to 20) 1

Size

Small

Medium

Large

Diagonal

On Color

Off Color

OK Cancel

Click the check box to display a slash through the contacts (normally closed contact).

Specify the colors of the wizard elements when the contact status and connection discrete tags are On or Off.

Enter the name of the InTouch discrete tag that determines the color of the relay symbol during runtime.

Horizontal and Vertical Switch One-Line Wizards

After placing a Horizontal or Vertical Switch wizard in a window, double-click on it to display the dialog box shown below. Configure the wizard by entering the appropriate information into each of the boxes.

Enter the name of the InTouch discrete tag that determines the color of the line to the right (or top) of the switch symbol during runtime.

Enter the name of the InTouch discrete tag that determines the color of the line to the left (or bottom) of the switch symbol during runtime.

Enter the names of the InTouch discrete tags that determine the state of the switch during runtime.

Specify the colors of the wizard elements when the connection and switch discrete tags are On and Off and when there is an Error condition. The switch symbol color is determined by the following logic:

| SwOpen | SwClosed | Color |
|--------|----------|-------|
| 0 | 0 | error |
| 0 | 1 | on |
| 1 | 0 | off |
| 1 | 1 | error |

Circuit Breaker One-Line Wizards

After placing a Horizontal or Vertical Circuit Breaker wizard in a window, double-click on it to display the dialog box shown below. Configure the wizard by entering the appropriate information into each of the boxes.

The dialog box, titled "Horizontal Circuit Breaker Configuration", contains the following fields and options:

- Circuit Breaker Number:** A text box containing "CB #".
- Right Connection Tagname:** A text box containing "?d:cb_right_connection".
- Left Connection Tagname:** A text box containing "?d:cb_left_connection".
- Circuit Breaker Status Tagname:** A text box containing "?i:cb_status".
- Line (1 to 20):** A numeric input box containing "1".
- Size:** Radio buttons for "Small" (selected), "Medium", and "Large".
- Color Selection:** Five color swatches: "On Color" (Red), "Off Color" (Green), "Out Color" (Green), "Error Color" (Red), and "Trip Color" (Yellow).
- Buttons:** "OK" and "Cancel".

Annotations with arrows point to the following fields:

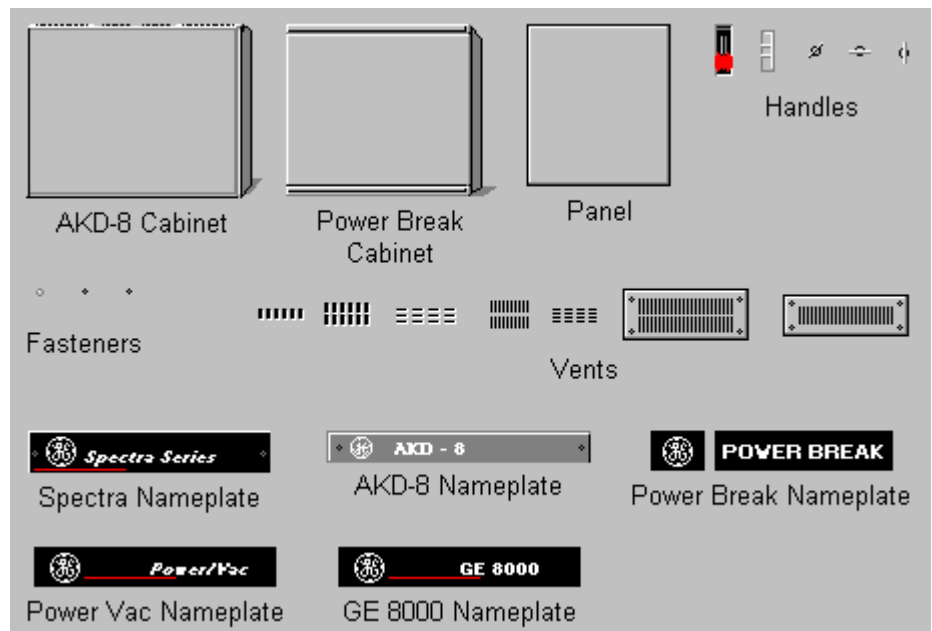
- Annotation 1: "Enter text to display next to the breaker graphic during runtime (optional)." points to the "Circuit Breaker Number" field.
- Annotation 2: "Enter the name of the InTouch discrete tag that determines the color of the line to the right (or top) of the breaker symbol during runtime." points to the "Right Connection Tagname" field.
- Annotation 3: "Enter the name of the InTouch discrete tag that determines the color of the line to the left (or bottom) of the breaker symbol during runtime." points to the "Left Connection Tagname" field.
- Annotation 4: "Enter the name of the InTouch analog tag that determines the color of the circuit breaker symbol, the state of the breaker, and the status text displayed next to the breaker icon during runtime." points to the "Circuit Breaker Status Tagname" field.
- Annotation 5: "Specify the colors of the wizard elements and status text for the breaker states during runtime. See the table below for default status/color mappings." points to the color selection area.

The breaker status values and the associated default colors are listed in the table below. Error status indicates that the breaker status inputs create an indeterminate state for the breaker.

| Breaker Status | Value | Text | Default Color |
|----------------|-------|------|---------------|
| Open | 1 | OPN | Green |
| Closed | 3 | CLD | Red |
| Drawn Out | 5 | OUT | Green |
| Tripped | 7 | TRP | Yellow |
| Error | 9 | ERR | Flashing Red |

Breaker status values & display colors.

Elevation Wizards



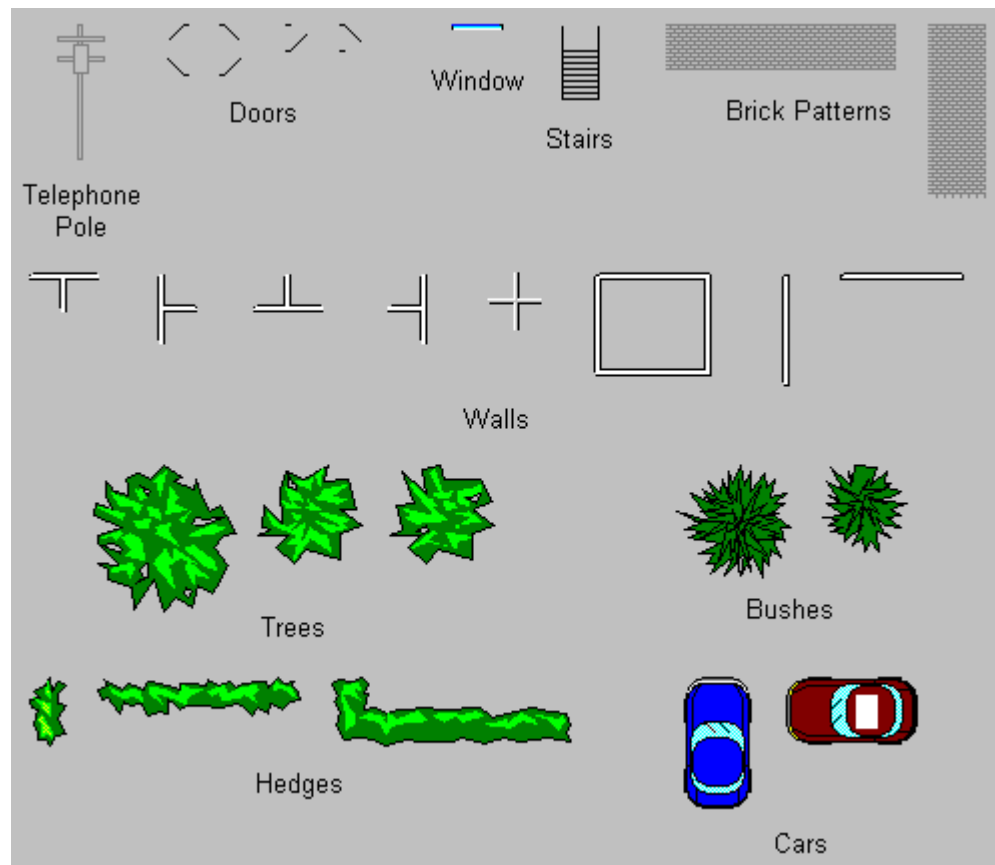
Usage

Elevation wizards are graphical elements that represent switchgear components useful for creating 3-D elevation views. These wizards are not associated with any logic or animation, but are provided to create more visually accurate screens and representations of equipment. Device icon wizards are typically placed on the Elevation wizards to show the breakers, trip units, and meters and provide navigation to device 3-D wizards, tabular displays, or arbitrary windows.

Configuration

After placing an Elevation wizard in an open window, it may be moved or resized, but no other configuration is possible. Elevation wizards are not provided with logic for opening another window.

Floor Plan Wizards



Usage

Floor Plan wizards are graphical elements that are useful for creating accurate representations of a facility layout. You can use a floor layout as an overview display of an entire plant, with animated areas for navigation to various switchgear elevation views or one-line diagrams. You can paste miniature elevation views as bitmap objects onto the floor layout, sized to fit, and then animate them as push buttons to display elevation views or one-line diagrams (see Chapter 3).

Configuration

After placing a Floor Plan wizard in an open window, it may be moved or resized, but no other configuration is possible. Floor Plan wizards are not provided with logic for opening another window.

Toolbar Wizard



Usage

The Toolbar wizard is a navigational tool which allows the user to move between recently-used or frequently-used windows, and provides a clock for quick reference.

The first/last arrows jump to the first or last window in the windows list (see Configuration below); the inner forward and back arrows move to the next or previous window in the list. The window buttons to the right of the arrows provide quick access to the windows assigned to each button.

Configuration

The arrow buttons on the Toolbar wizard operate by maintaining a list of windows for access by the toolbar navigational controls. To allow a window to be added to the windows list when viewed by a user, a call to `WLAddWindow()` must be placed in the `OnShow` window script. This call must be placed in each window that you want to have on the window list.

The eight hot buttons are configured by double clicking on the wizard, and completing the Toolbar Wizard Edit dialog box:



For each button, you can set the top and bottom caption, and specify the window to be opened when that button is clicked.

Annunciator Panel Wizard

| | | | | | |
|--|---------------------------------------|---------------------------------------|--------------------------------------|------------------------------------|------------------------------------|
| 235 BREAKER TROUBLE | 255 BREAKER TROUBLE | 455 BREAKER TROUBLE | 145 BREAKER TROUBLE | TRANSFORMER #1 GENERAL | TRANSFORMER #2 GENERAL |
| BUS-1 MAIN BREAKER TROUBLE | BUS-2 MAIN BREAKER TROUBLE | | | | |
| 6648 LINE PRIMARY RELAY TROUBLE | 6653 LINE PRIMARY RELAY TROUBLE | 6682 LINE PRIMARY RELAY TROUBLE | BUS-1 FEEDER BREAKER OPERATION | TRANSFORMER #1 RELAY TROUBLE | TRANSFORMER #2 RELAY TROUBLE |
| | | | | | |
| DC BUS LOW VOLTAGE | | | | TIE-BREAKER OPERATION | RELAY TROUBLE |
| | | | | | |
| | | | | | |
| | | | | | |
| <input type="button" value="RESET"/> <input type="button" value="ACKNOWLEDGE ALL"/> <input type="button" value="ALARM SUMMARY"/> | | | | | |

Usage

The Annunciator Panel wizard provides an industrial-style annunciator display panel, consisting of a bank of 48 indicator lights which change colors and blink to indicate various device conditions. For instance, a circuit breaker could be associated with an annunciator panel wizard to display grey when closed and change to red if it trips.

This wizard requires the PMCS Event Logger software to be installed and properly configured before it can be used, because it operates by monitoring special DDE tags which change state based on alarms or events recorded by the Event Logger.

The panel consists of an array of 48 buttons (six columns by eight rows), each of which may be labeled with up to three lines of text, and each of which is associated with a particular device (topic) at the PMCS DDE Server.

The annunciator panel wizard provides buttons for acknowledging alarms, resetting acknowledged alarms, and for viewing an alarm summary via the PMCS Event Logger.

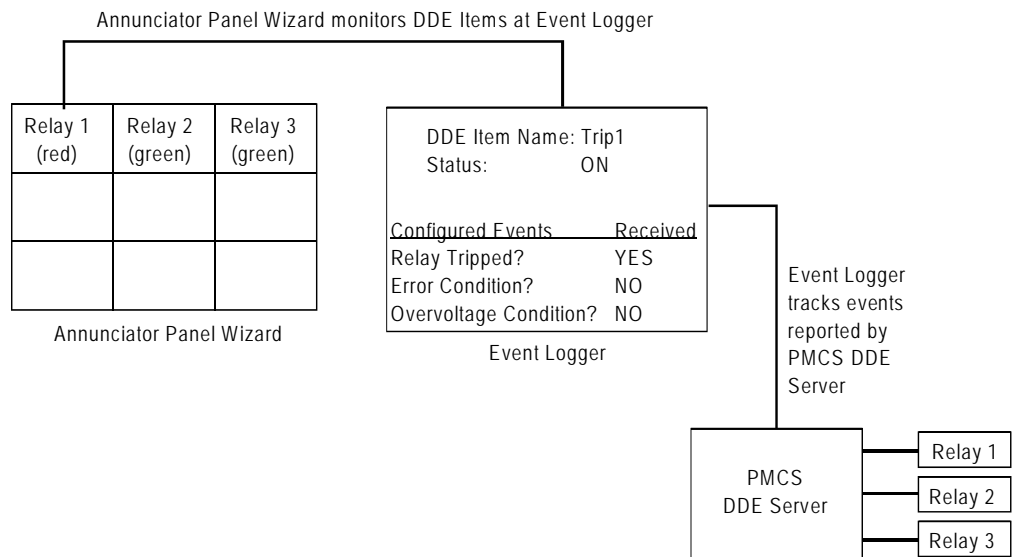
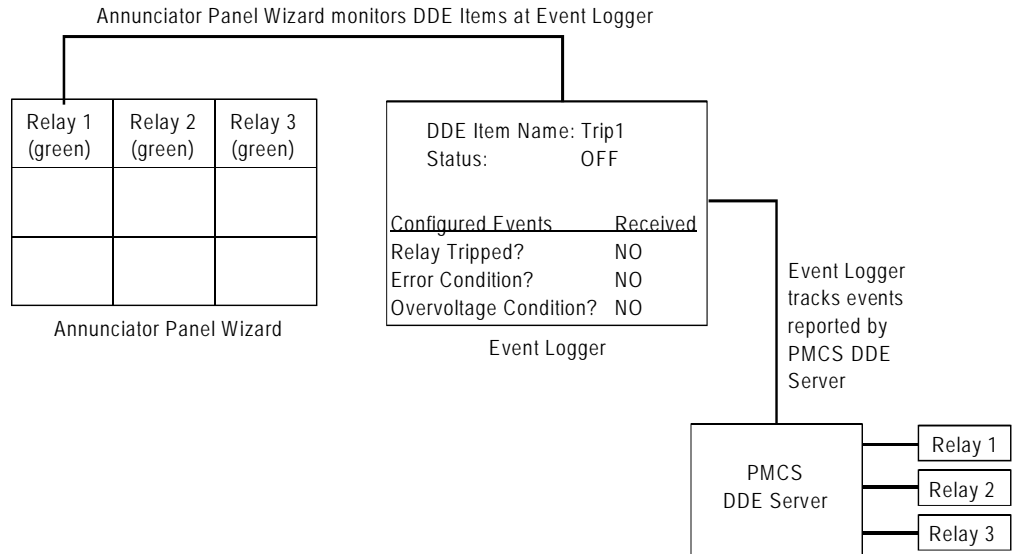
Annunciator Panel Theory of Operation

The Annunciator Panel wizard provides a screen full of indicator tiles, each relating to a particular device, event, or group of events. These tiles are displayed in different colors to indicate different alarm conditions. The Annunciator Panel wizard monitors selected DDE items in the Event Logger and responds to changes of state in these items by changing the colors of individual indicator tiles. For example, you might configure a relay trip event to have a tile in the Annunciator Panel wizard. The wizard monitors a DDE tag at the Event Logger corresponding to the trip status of the relay and displays a grey indicator if the relay is operating properly, and a red indicator if the relay has tripped.

From the Event Logger's perspective, there are two parts to configuring the Annunciator Panel. First, each DDE Item that will be displayed on the Annunciator Panel wizard must be added (using the Add Items dialog). For the example we're discussing, we'll assume you've created a DDE Item named Trip1. Each DDE item will connect to an individual tile in the Annunciator Panel wizard.

The second part consists of defining events which will turn individual DDE items ON or OFF. Each DDE item (or Annunciator Panel tile) can be turned on or off by any number of device events you define. The events are logically ORed together to determine ON or OFF conditions; i.e., if any of the events occurs, the DDE item is ON; if none of the events have occurred, the DDE item remains OFF.

We'll continue the relay example we began above. For example, you might configure the Trip1 DDE Item to be ON if any of the following events occurs: the relay is tripped, or the relay reports an error condition, or the relay senses an overvoltage condition. The Annunciator Panel wizard displays a grey indicator tile for the relay for as long as the DDE item remains in the OFF condition. If the Annunciator Panel wizard sees the DDE Item change from OFF to ON, it reacts by changing the indicator tile from grey to red. The Event Logger Annunciator Panel logic will also change the state of a DDE Item in response to actions performed at the Annunciator Panel Wizard. The user can both acknowledge and reset individual Annunciator DDE Items. The following diagram shows the relationship of the Annunciator Panel wizard, the Event Logger, and the PMCS DDE Server.



In the upper illustration, the Event Logger watches for any of the three events configured to cause a change of state to the Trip 1 DDE Item. None of these three events have occurred, so the status of the Trip 1 DDE Item is at OFF. The Annunciator Panel wizard is monitoring the configured DDE Items at the Event Logger, but all DDE Items are “OFF” so the Annunciator Panel displays green indicator tiles.

In the lower illustration, the Event Logger has recorded a “Trip” event for the unit in question, and changed the state of the Trip 1 DDE Item to “ON”. The Annunciator Panel wizard sees this change, and responds by changing the color of the annunciator panel tile for Relay 1 to red.

Each "Alarm indicator" as defined by the Event Logger will appear to InTouch as a DDE Integer item which can have the following values/states:

| State | Tag Value | Default Color |
|---|------------------|----------------------|
| Normal (no alarm) | 10 - 19 | Solid Gray |
| Alarm Active - Unacknowledged | 20 - 29 | Red Blinking |
| Alarm Active - Acknowledged | 30 - 39 | Solid Red |
| Alarm Reset - Unacknowledged (alarm occurred but later went off before being acknowledged) | 40 - 49 | Solid Yellow |
| Alarm Disabled (Event Logger has disabled this alarm indicator) | 0 | Dark Gray |

Each panel button displays one of five different colors, based on the states defined above. A fill color animation link controlled by an indirect integer tag is used to change colors. The fill color link is set as follows:

<= 9: Dark Grey

10 -> 19: Grey

20-> 29: Grey (will also have a flashing Red animation link)

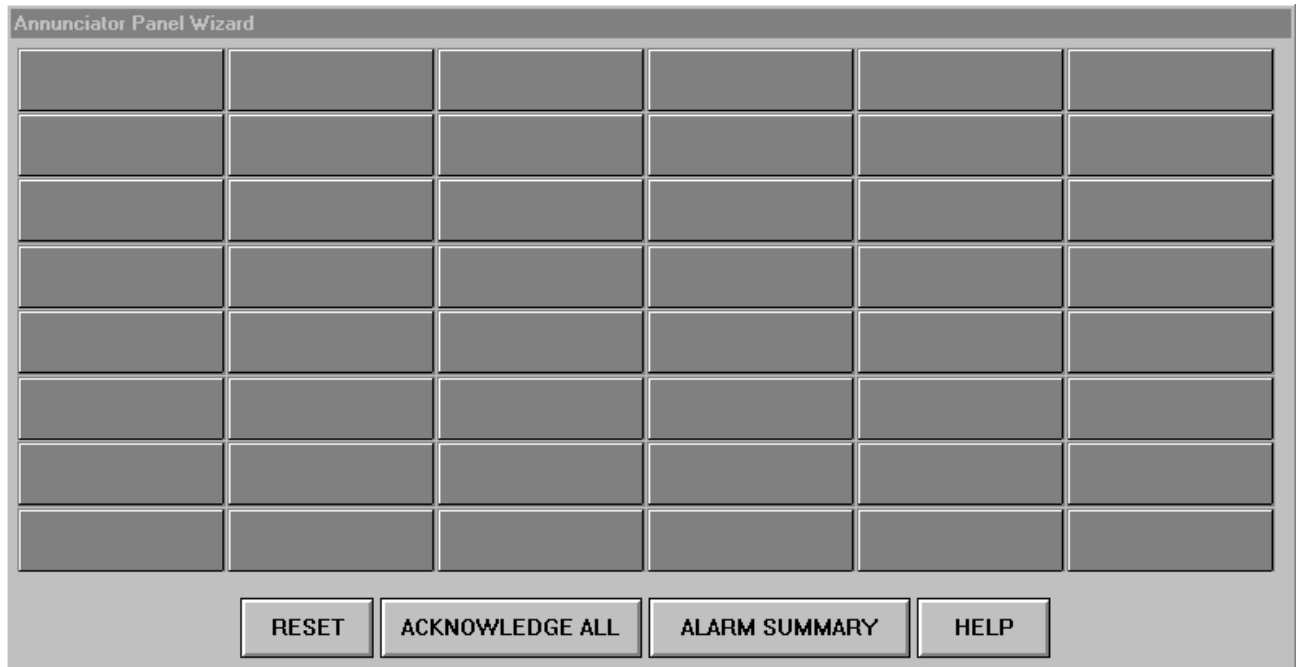
30 -> 39: Red

>= 40: Yellow

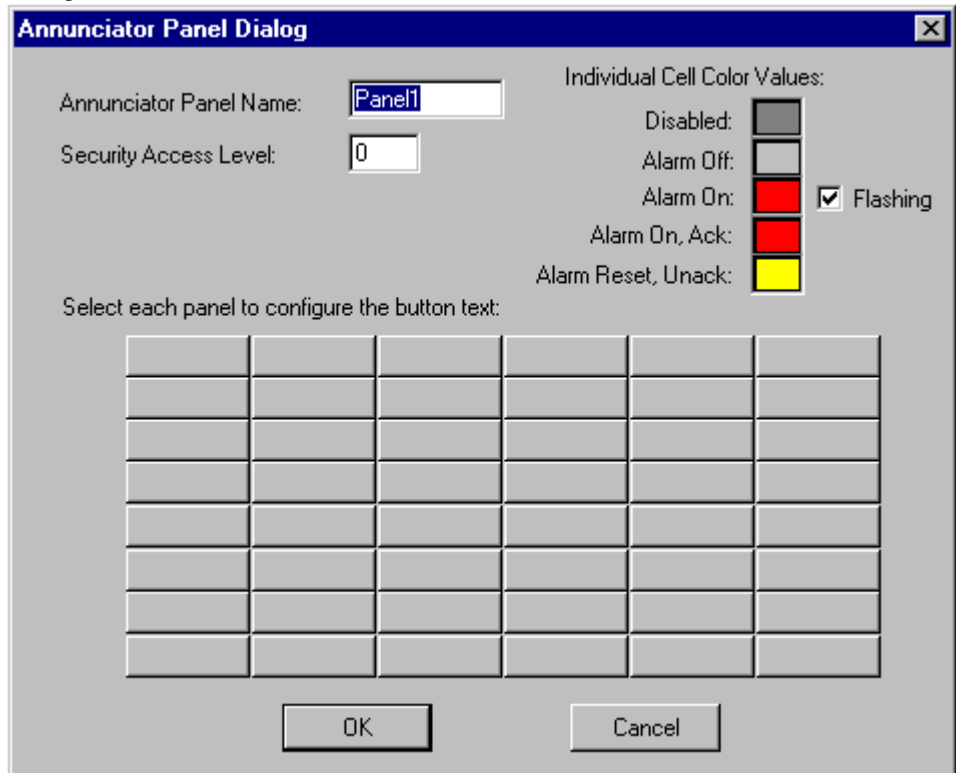
Configuration

Note: Prior to configuring an Annunciator Panel Wizard, you should have completed configuration of the Annunciator Panel Items at the PMCS Event Logger. Refer to GEH-6512, *PMCS Event Logger Users Guide*, for details.

When the Annunciator Panel wizard is dropped, it appears as a blank panel of 48 indicators:



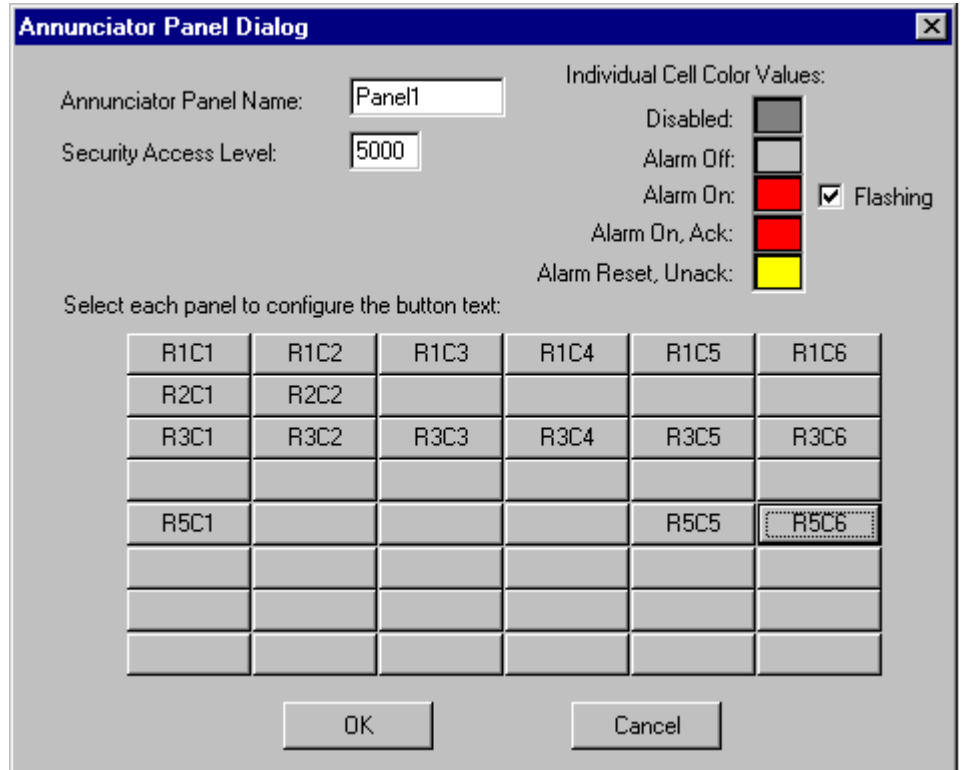
Double-click on the wizard to display the Annunciator Panel Dialog:



Complete the Annunciator Panel Name field (up to 8 characters), and the Security Access Level (level of security required to Reset any Acknowledged alarms. The color codes for different alarm states can be modified by clicking on each color. Note that the color codes apply to all 48 indicators on the annunciator panel wizard. Finally, click on an indicator to display the configuration dialog for that individual button:

Enter the text to display on any of the three lines available for the selected button. It is not necessary to enter text on all three lines. Click OK when you have finished assigning text labels to the button.

As each annunciator panel button is labeled, the Annunciator Panel Dialog reflects these changes by showing the Row/Column coordinates of the labeled buttons:



When you have finished labeling your annunciator panel buttons, click OK to close the Annunciator Panel Dialog box. When you close this dialog box, InTouch automatically creates indirect analog tags for each panel button. These tags are named xxx_R1C1 through xxx_R8C6, where xxx is the name assigned to the wizard (for example, Panel1), and R1C1 indicates the row and column position on the annunciator panel.

| Annunciator Panel Wizard | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|------------------------------------|------------------------------------|
| 235 BREAKER TROUBLE | 255 BREAKER TROUBLE | 455 BREAKER TROUBLE | 145 BREAKER TROUBLE | TRANSFORMER #1 GENERAL | TRANSFORMER #2 GENERAL |
| BUS-1 MAIN BREAKER TROUBLE | BUS-2 MAIN BREAKER TROUBLE | | | | |
| 6648 LINE PRIMARY RELAY TROUBLE | 6653 LINE PRIMARY RELAY TROUBLE | 6682 LINE PRIMARY RELAY TROUBLE | BUS-1 FEEDER BREAKER OPERATION | TRANSFORMER #1 RELAY TROUBLE | TRANSFORMER #2 RELAY TROUBLE |
| | | | | | |
| DC BUS VOLTAGE | | | | TIE-BREAKER OPERATION | RELAY TROUBLE |
| | | | | | |
| | | | | | |
| | | | | | |

Two steps remain after the wizard has been configured.

First, InTouch DDE Integer tags must be created for the DDE items configured in the Event Logger corresponding to the Alarm Panels. Make sure the DDE Item names created in InTouch match the DDE Item names configured in Event Logger. (If you are unsure of how to create DDE tags in InTouch, please refer to WonderWare's documentation.) The DDE Access name for the Event Logger should be configured in InTouch as follows:

Modify Access Name

Access Name:

Node Name:

Application Name:

Topic Name:

Which protocol to use

DDE SuiteLink

When to advise server

Advise all items Advise only active items

Second, an InTouch script must be written to associate the InTouch indirect tags created by the wizard with the InTouch DDE tags created for DDE Items in Event Logger. Typically, this script is placed in the InTouch "On Startup" application script.

An example of a simple script is shown below:

```
Panel1_R1C1.Name = ANN_P_1A.Name;  
Panel1_R1C2.Name = ANN_P_1B.Name;  
Panel1_R1C3.Name = ANN_P_2A.Name;
```

At run-time, InTouch will receive DDE data from the Event Logger which will control the colors of all indicators that have been configured properly.

Troubleshooting Tips for the Annunciator Panel Wizard

- Make sure that all DDE Items associated with the annunciator panel have been created in the Event Logger.
- You must create associated InTouch DDE Integer Tags by hand in the InTouch tagname database. The DDE Access name for the tags should use “EVENTLOG” for the Application Name and “SYSTEM” for the Topic Name. Make sure the “Request Initial Data” option is selected for this DDE Access name.
- Check the WWLogger at runtime for possible DDE errors.
- Make sure your application script is mapping the proper DDE tags with the proper indirect tags.
- Make sure the Event Logger is running before starting InTouch Windowviewer.

Custom Table Wizard

| Line1_760_X3: Cell 3 Corner device, near Fred's desk | | |
|--|----------|--------|
| Phase A Current | ####.### | Amps |
| Phase B Current | ####.### | Amps |
| Power Factor | ####.### | LdLag |
| Phase N Current | ####.# | Amps |
| Phase G Current | ####.# | Amps |
| Line Voltage A-N | ####.# | kVolts |
| Line Voltage B-N | ####.# | kVolts |
| Line Voltage C-N | ####.# | kVolts |
| Phase Voltage A-N | ####.# | kVolts |
| Phase Voltage B-N | ####.# | kVolts |
| Phase Voltage C-N | ####.# | kVolts |

Usage

The Tabular Data Screen wizards provide the ability to view extensive device data in tabular form. However, they do not allow you to select the data to view - you must view all the data presented and locate the particular data points you are interested in.

The Custom Table wizard differs from the Tabular Data wizards by providing an easy-to-use, highly-flexible way to view a limited number of registers for a particular device. It presents only the data you are interested in, displaying it in a convenient table format as shown above. Each table consists of 1 to 12 rows of information, one register per row.

Each table takes up approximately one-quarter of an average display, so up to four Custom Table wizards may be placed on a screen.

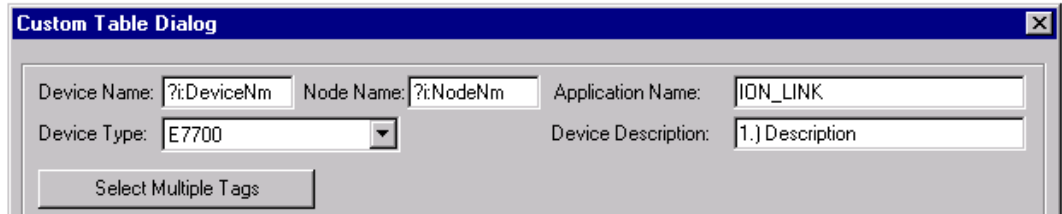
Configuration

When the Custom Table wizard is dropped, it appears as a blank screen. Double-click on the wizard to display the Custom Table Dialog:

Begin configuring the Custom Table by completing the following fields:

| Field | Description |
|--------------------|--|
| Device Name | Enter the name of the device (topic). Must exactly match the topic name at the DDE Server. |
| DDE Server Name | Enter the name of the PMCS DDE Server. |
| Device Description | Optionally, enter a brief description of this device, up to 32 characters maximum. |
| Device Type | Select the device type corresponding to this topic. |

EPM 7700 Users Only: When the EPM 7700 device type is selected, an additional field appears in the Custom Table Dialog box, adjacent to the Device Name (shown below).



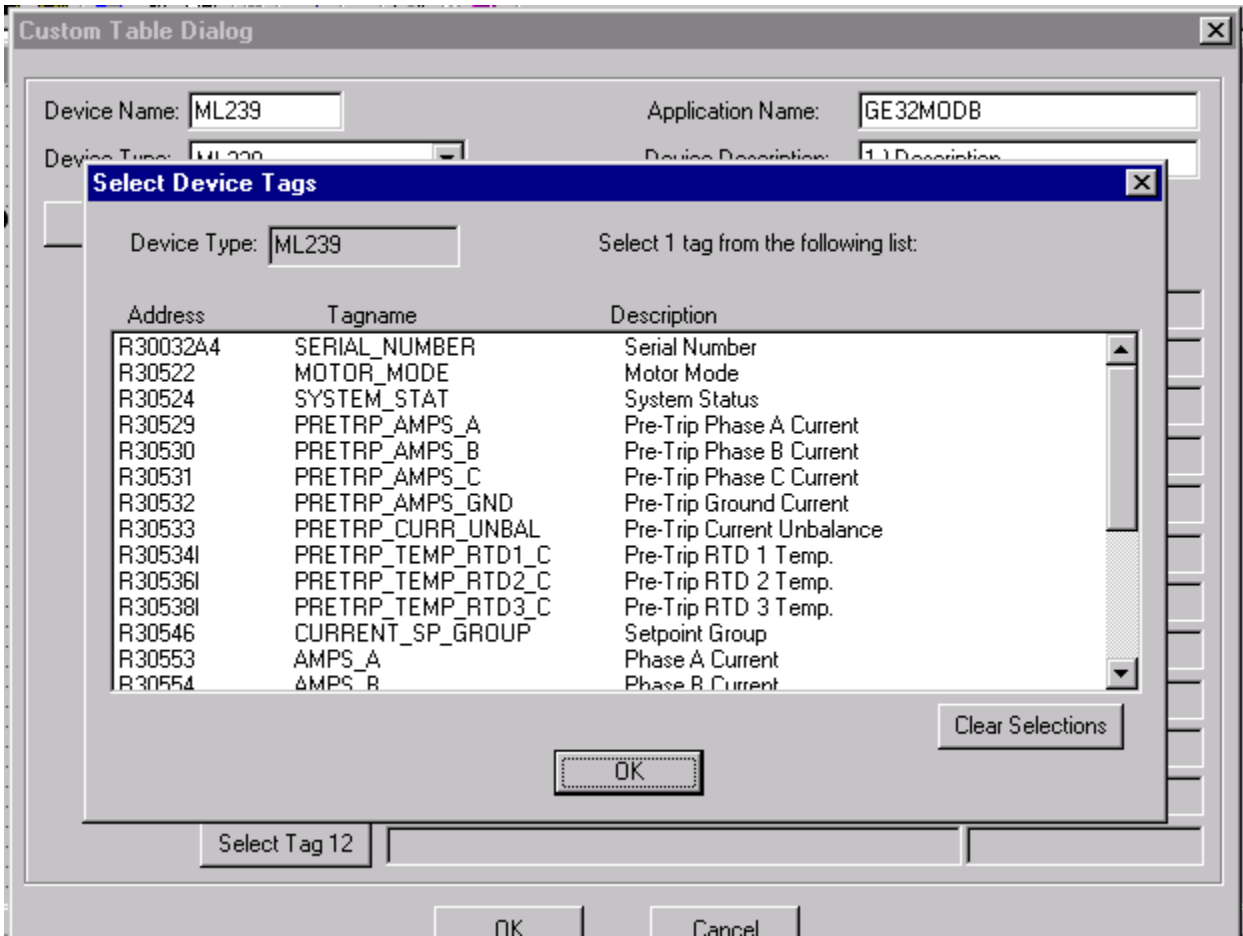
The Node Name field requires that you enter the name of the computer on which the meter's Communications Server is located, either the Primary Node or a Full Station Secondary Node. This field is required because the EPM 7700 does not use the same DDE Server as the rest of the standard PMCS devices, and the wizard must be directed to the location of the correct Communications Server for proper configuration of DDE topic names. For more information on configuring EPM7700 networks, refer to DEH-40035, the *GE 7700 Gateway Users Guide*, and GEH-6514, *PMCS Read This Book First*.

Also, the Application name field must be completed as ION_LINK rather than GE32MODB or GE32MTCP for the EPM7700 device. The ION LINK program is installed during initial PMCS setup if the EPM7700 software option is selected.

When configuring Custom Tabular wizards on Secondary nodes, the Application Name field entry does not follow the PMCS wizard convention of "\\RemoteComputer\ION_LINK". EPM7700 Secondary nodes run a local copy of the ION LINK server; thus the application name is always "ION_LINK" whether the wizard is installed on the Primary node or a Secondary node.

Finally, the EPM 7700 device type requires special InTouch scripting for the custom tabular wizard. Refer to the section at the end of this chapter titled *Special Scripting Considerations for the EPM 7700*.

When these fields are completed, click the Select Multiple Tags button to select several tags at once, or click the Select Tag X button to assign tags one at a time. The Select Device Tags dialog appears:



The Select Device Tags dialog shows a list of all the pre-configured tags which the Custom Table wizard supports for the selected device type, sorted by address, and displaying the tagname and description. Most tags are metering value registers.

Select up to twelve tags from the list by clicking (high-lighting) each one. To de-select a tag, simply click it a second time. When you have selected up to 12 tags, click OK to return to the Custom Table dialog box. The selected tags will now be displayed as shown in the following example:

Custom Table Dialog [X]

Device Name: Application Name:

Device Type: Device Description:

| | Tag Descriptions | Units |
|--|-------------------|-------|
| <input type="button" value="Select Tag 1"/> | Phase A Current | Amps |
| <input type="button" value="Select Tag 2"/> | Phase B Current | Amps |
| <input type="button" value="Select Tag 3"/> | Phase C Current | Amps |
| <input type="button" value="Select Tag 4"/> | Neutral Current | Amps |
| <input type="button" value="Select Tag 5"/> | Phase A-B Voltage | Volts |
| <input type="button" value="Select Tag 6"/> | Phase B-C Voltage | Volts |
| <input type="button" value="Select Tag 7"/> | Phase C-A Voltage | Volts |
| <input type="button" value="Select Tag 8"/> | Real Power | MW |
| <input type="button" value="Select Tag 9"/> | Reactive Power | MVA |
| <input type="button" value="Select Tag 10"/> | Apparent Power | MVAR |
| <input type="button" value="Select Tag 11"/> | | |
| <input type="button" value="Select Tag 12"/> | | |

You may select OK to select this table configuration, or you may edit the tags one at a time using the Select Tag X buttons (for instance, if you wish to change the order the tags appear in).

The tag descriptions and units may also be edited (useful for non-English applications), but caution is urged when modifying descriptions or units; it may be difficult to remember what they were originally if needed.

Note for users of the MDP device type: This device uses a memory tag to scale many of the data values displayed in the wizard.: "DeviceName_CTRatio" (where DeviceName is the name entered for the device within the wizard). The wizard creates this tag within InTouch (memory tag with a format type of "Real"). The InTouch application must provide a value for this tag (usually entered by the user at run-time). If no value is entered at runtime, a value of zero will be used as the default value for this tag, and many of the metering data registers (AMPS A, B, C, etc) on this device type will appear as zero as well. See the MDP Tabular Data wizard for additional information. If the application has a Tabular Data Screen Wizard with the same device name as this wizard, then the end user can set the CTRatio tag value via the MDP Tabular Data Screen wizard.

Note for users of the EPM7300 device type: The custom table wizard will display N/A for certain metering values when the PM Volts Mode parameter is set to **Demo** in the device. Please use the EPM 7300 Tabular Data Wizard to view these values when the device is in Demo mode.

System Statistics Wizard

| System Statistics | | | | | | |
|---|---|---|-------------------|--|--------------------|------------------|
| Port Stats. | | | | Server Version: 5.2 | | |
| DDE Server: | <input type="text" value="\\Node_xyz\AGE32MODB"/> | | | | | |
| | <u>Transmits</u> | <u>Receives</u> | <u>CRC Errors</u> | <u>Timeouts</u> | <u>Port Errors</u> | <u>Err. Rate</u> |
| COM 9: | 15234 | 51230 | 16 | 14 | 0 | 0.2% |
| COM 10: | 18572 | 18569 | 0 | 3 | 0 | 0.0% |
| COM 11: | | | | | | |
| COM 12: | | | | | | |
| COM 13: | | | | | | |
| COM 14: | | | | | | |
| COM 15: | | | | | | |
| COM 16: | | | | | | |
| <input type="button" value="Prev 8 Ports"/> | | <input type="button" value="Next 8 Ports"/> | | <input type="button" value="Refresh"/> | | |
| Disk Information | | <u>Free Space</u> | <u>% Used</u> | | | |
| Drive: <input type="text" value="D"/> | | 205.6 MB | 90 % | | | |

Usage

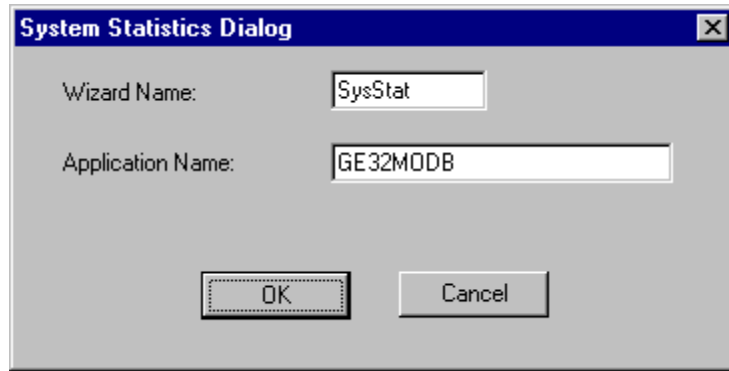
The System Statistics wizard is an informational tool which allows the user to view detailed statistics about the system, including port information from the DDE Server and disk information.

The wizard consists of a single screen displaying Port Statistics on the top portion and disk information on the bottom. Statistics on up to eight COM ports are displayed. The user may page forward or backward eight ports at a time by clicking the Prev 8 Ports or Next 8 Ports button.

Whenever a new DDE Server name is entered, the user must click the Refresh button to update the DDE links to correspond to the new parameters.

Configuration

When the wizard is dropped, the following dialog box appears:

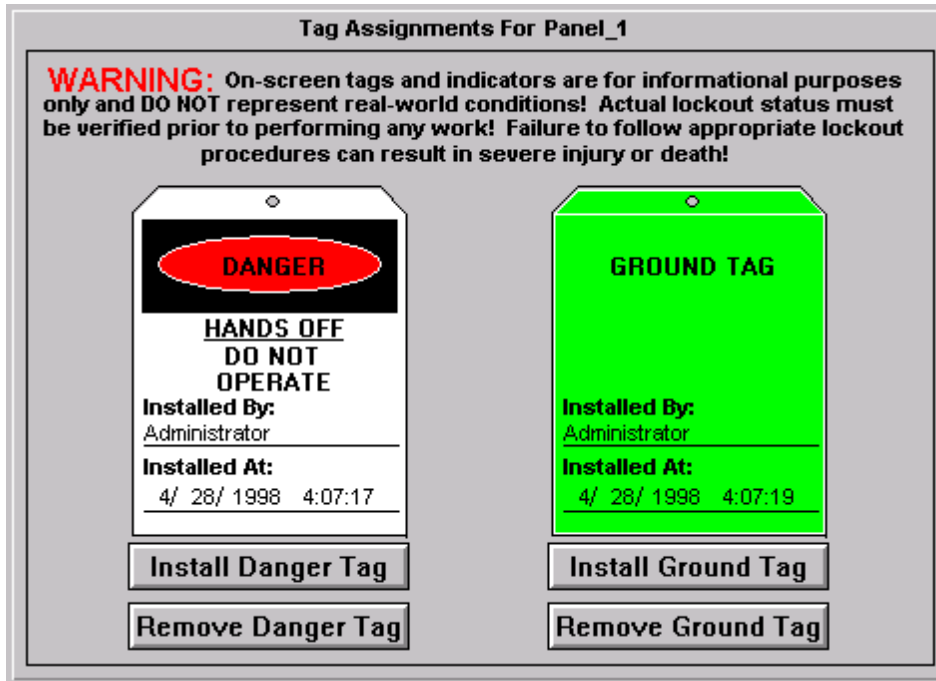


The System Statistics wizard requires a name itself, and also the name of a DDE Server to access.

By default, the System Statistics wizard assumes that the DDE Server is located locally and is named GE32MODB. You may change this to access a DDE Server located on a networked PC by entering the name as \\NODENAME\SERVER, where NODENAME is the name of the host PC and SERVER is the name of the PMCS DDE Server, which will be GE32MODB.

During runtime, the default drive letter is C, corresponding to the local hard drive. You may change this value to any valid drive letter corresponding to either a fixed local drive or a mapped network drive.

Lockout/Tagout Wizard



Usage

The Lockout/Tagout provides a method for assigning danger or ground tag graphics to various one-line diagrams or wizards.

⚡ WARNING! ⚡

On-screen tags and indicators are for informational purposes only and DO NOT represent real-world conditions! Actual lockout status must be verified prior to performing any work. Failure to follow appropriate lockout procedures can result in SEVERE INJURY or DEATH!

⚡ WARNING! ⚡

The Wizard consists of a single screen (shown above) displaying the presence or absence of danger and ground tags for a particular device. The user installs or removes Danger and/or Ground Tags using the Install/Remove buttons on the Tag Assignment window shown above. Any wizards belonging to the same Status Group will display Danger and/or Ground Tag indicators mirroring the tags installed in the Tag Assignment window.

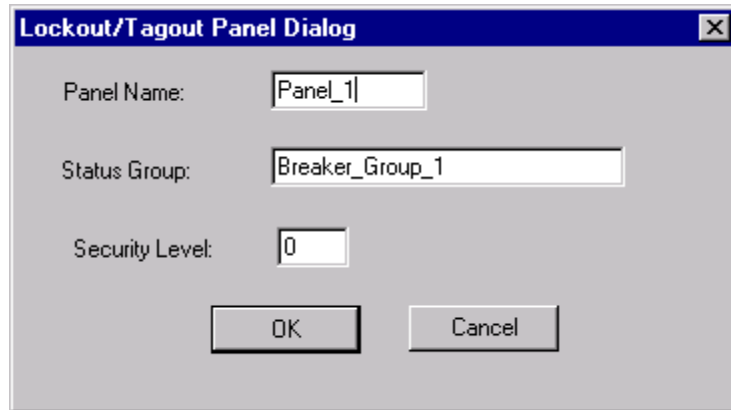
Supported Devices

Several PMCS breaker management devices support the Lockout/Tagout Wizard in their Large Faceplate and Tabular Data Screen wizards. These devices are:

- 750 / 760 Feeder Management Relay

Configuration

When Lockout/Tagout wizard is dropped and double-clicked, the following dialog box appears:

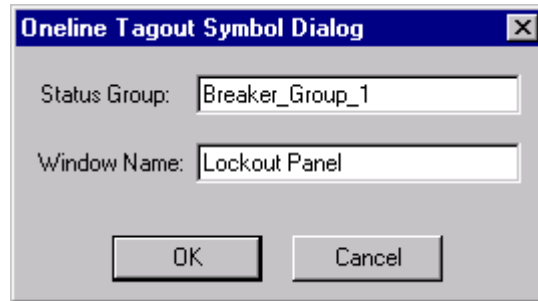


Complete the following fields to configure the Lockout/Tagout Panel Display:

- Enter a name for this panel. The Panel Name is used to distinguish the tags used internally by a particular instance of a panel from other panels within an application. Each panel within an application should have a unique Panel Name.
- Enter the name of the Status Group associated with this Lockout/Tagout Panel. The Status Group is the name that links this panel to Lockout/Tagout Online Symbols and the breaker management device wizards that can support it. It is important to remember the Status Group assignment since it must be used to configure the associated Oneline Symbols and IED wizards.
- Enter the minimum Security Level required to add and remove Danger or Ground tag symbols within the application.

The second part of the Lockout/Tagout wizard that can be configured is the Oneline Tagout Symbol.

The Oneline Tagout Symbol is a small wizard for placement in oneline diagrams, to be associated with a circuit breaker. It displays the presence or absence of any Danger or Ground tag symbols assigned to the breaker symbol by the PMCS user. After dropping the Oneline Tagout Symbol wizard onto an oneline diagram, associate it with a particular circuit breaker and any other devices you wish to have the tags displayed at by making it a member of a Status Group. The Oneline Tagout Symbol Dialog box is displayed when you double-click the wizard:



Complete the following fields:

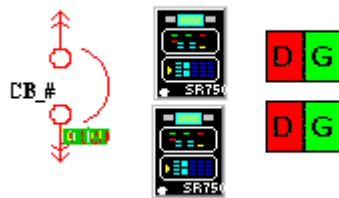
- Enter the name of the Status Group associated with this Lockout/Tagout symbol. The Status Group is the name that links this symbol to the Lockout/Tagout panel and the breaker management device wizards that can support it. It is important to remember the Status Group assignment since it must be used to configure the associated panel and IED wizards.
- Enter the name of the window to open when the Online Tagout Symbol wizard is clicked on during runtime. It should be the name of the window in which the Lockout/Tagout Panel is located.

Example of Lockout/Tagout Wizard

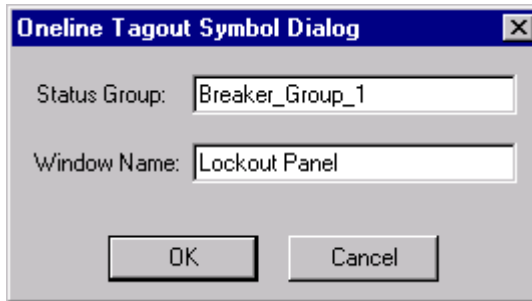
The following example may help clarify the use of the Lockout/Tagout wizard.

Suppose that we have a breaker being monitored by a redundant pair of ML 750/760 devices in our system. We wish to be able to display Lockout/Tagout symbols for this breaker.

We create a oneline diagram in InTouch which represents this configuration, placing the circuit breaker wizard, then each of the ML 750/760 small faceplate wizards, then a Lockout/Tagout wizard for each ML 750/760 device. It looks like this:

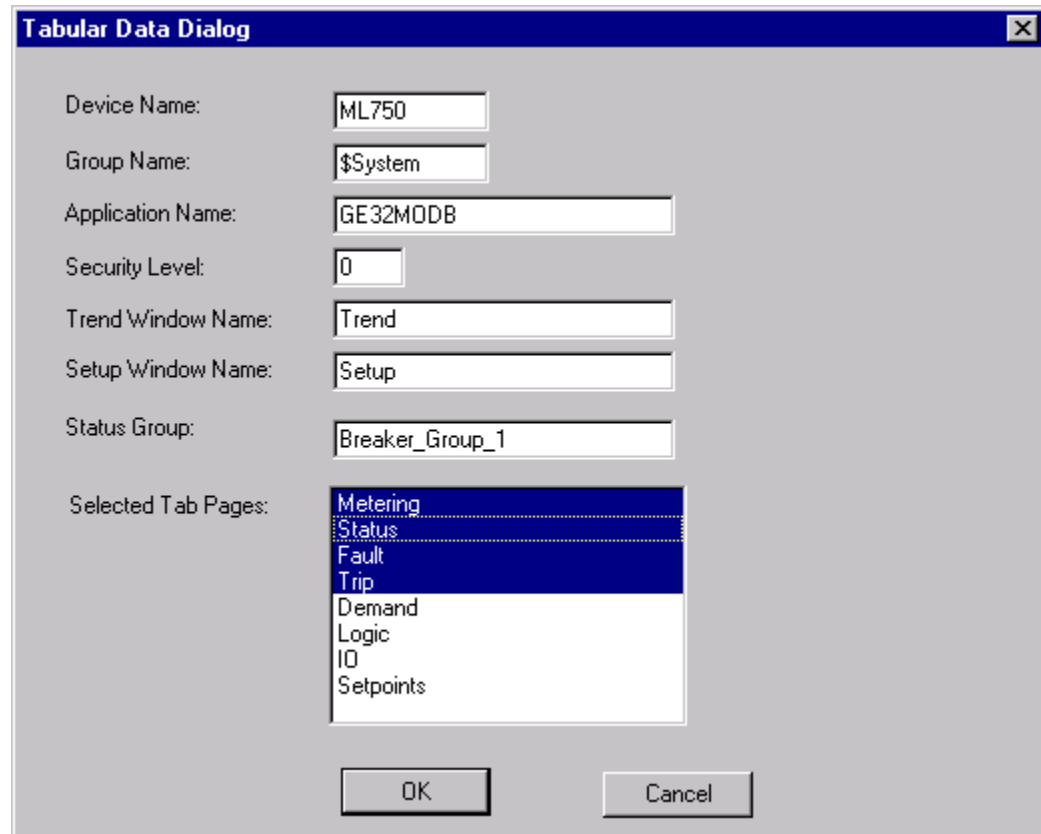


When configuring the Lockout/Tagout wizard in the oneline diagram, we complete the Online Tagout Symbol dialog as follows:

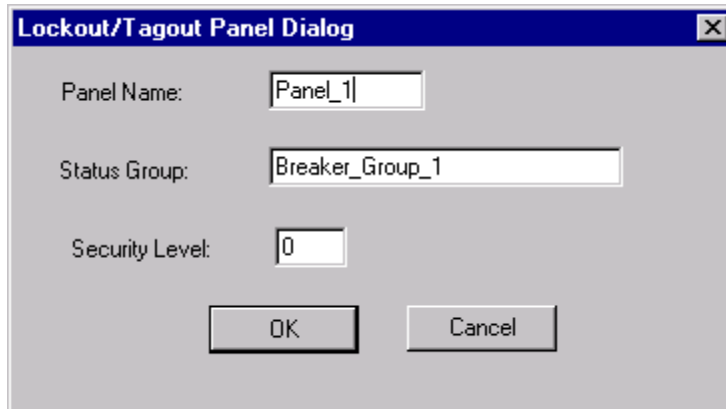


Breaker_Group_1 is the name of the Status Group we'll assign to all wizards associated with this breaker; Tag Window is the name of the window we want to appear when someone clicks on the Online Tagout wizard during runtime.

Next, we create separate screens containing Large Faceplate wizards and Tabular Data screen wizards for each ML 750/760 device. While configuring each wizard, we make sure that each one is given the Status Group "Breaker_Group_1". This ensures that any Danger or Ground tag symbols present will be shown on any large faceplate, tabular data screen, or online wizards associated with this group. An example of the Tabular Data configuration dialog box is shown below; note that the Status Group field is assigned to Breaker_Group_1, the same Status Group as our Online Tagout Symbol wizard. Do not confuse the Status Group parameter with the Group Name parameter. The Group Name parameter is not used for configuring Lockout/Tagout Status Groups.

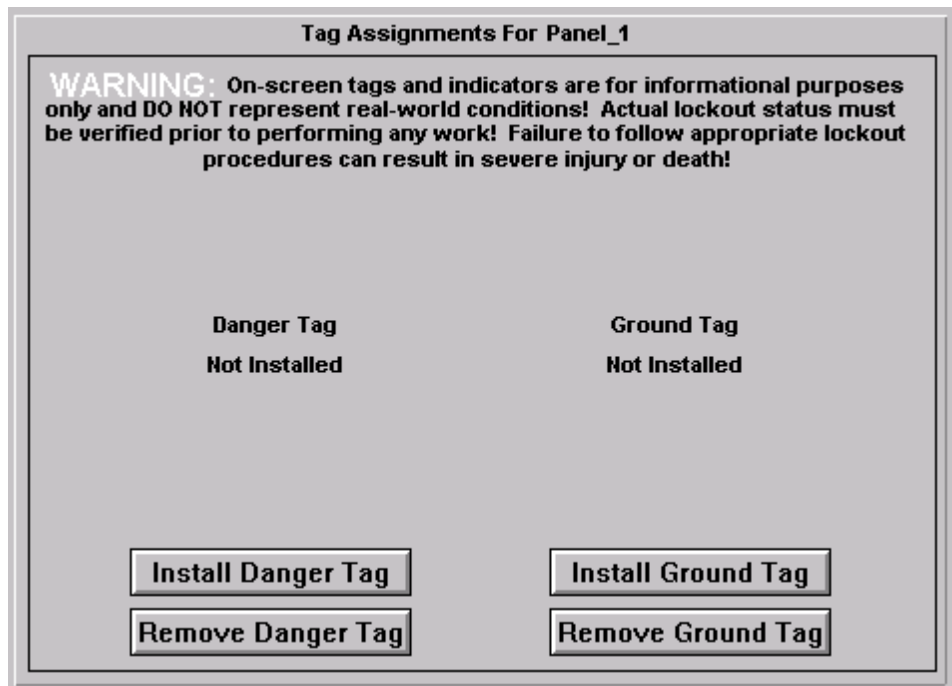


We drop and configure our Lockout/Tagout Wizard next; double clicking this wizard, the Lockout/Tagout Panel dialog appears:

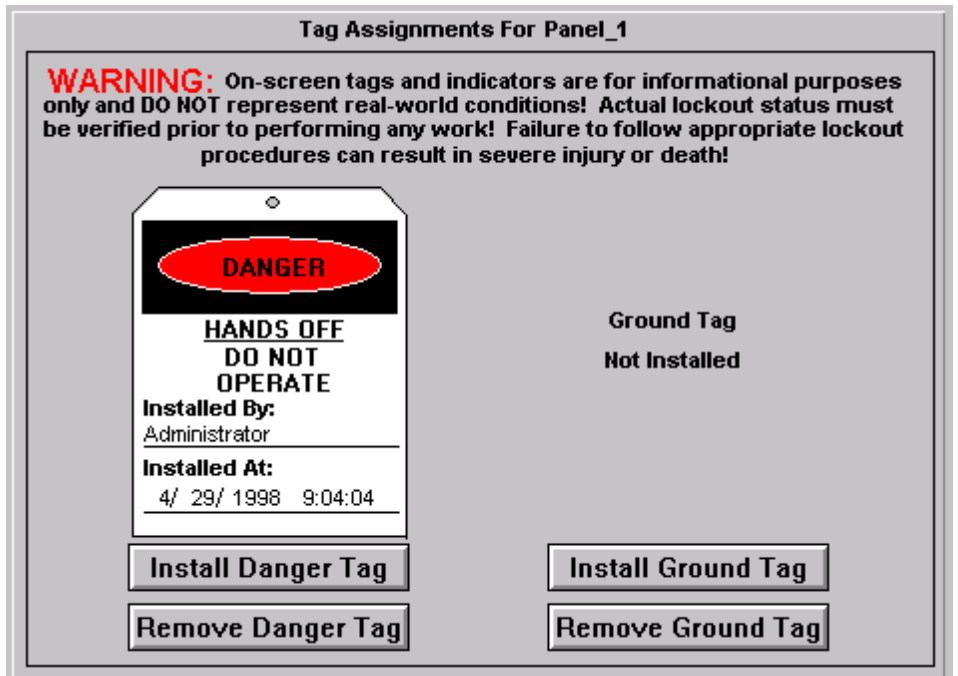


We name the Lockout/Tagout panel Panel_1. We associate the Panel with the same Status Group as our other wizards, Breaker_Group_1. Finally, we set the minimum security level required to add or remove tags.

Now in Runtime mode, when the Tag Assignments dialog is displayed, it appears as follows:



Clicking Install Danger Tag checks our security level, and if we have sufficient access, displays a Danger Tag for the breaker as follows:



The Installed By field on the tag shows the name of the current operator who installed the tag; the Installed At field shows the time and date stamp of the tag's installation.

When we view a wizard which belongs to this group, for example the Large Faceplate wizard of one of our ALPS devices, the Danger tag shows up as a red indicator with a "D" in it, as shown below:



Special Scripting Considerations for the EPM 7700

This section describes the special InTouch scripting which is required for the EPM 7700 device's Large Faceplate, Tabular Data Screen, and Custom Tabular wizards. The EPM 7700 is a powerful and highly flexible device, supporting hundreds of discrete data items. This scripting is required due to the large number of DDE items available for this device type. For performance reasons, not all DDE items are kept active simultaneously by the EPM 7700 Tabular Data Screen wizard; at any given moment, DDE items which are not used may be disconnected to save the Server the additional overhead of monitoring unused items. The scripts described in this section automatically configure the DDE links used by the Tabular Data Screen wizard when it is displayed, and enable the Large Faceplate wizard to re-connect to items which may have been disabled by the Tabular Data Screen wizard.

NOTE: Failure to install these scripts for the Large Faceplate and Tabular Data Screen wizards may result in faulty behavior of the wizard!

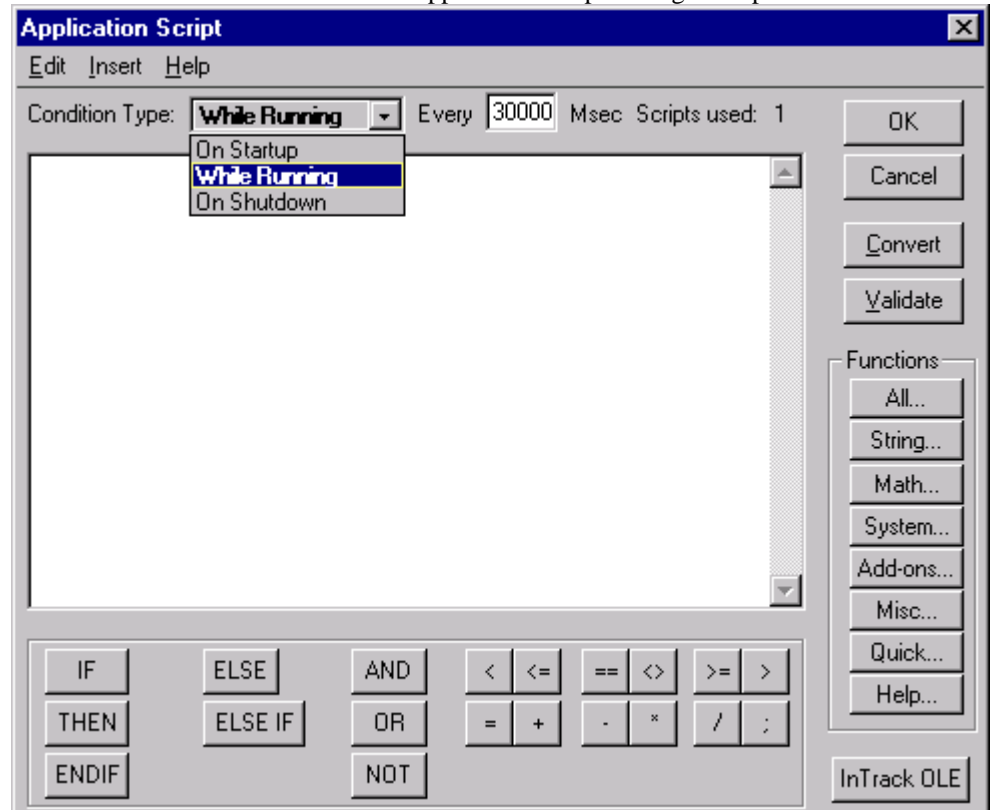
Templates for the required scripts are automatically installed in the InTouch directory when PMCS is installed with the EPM 7700 Software Components option selected. You may use the Notepad accessory program to open the files, then copy the text from the file to InTouch when appropriate.

There are three scripts described in this section. The first script is an InTouch *Application Script* that is required whenever a Large Faceplate or Tabular Data Screen wizard is installed for a given device. The purpose of this script is to provide communication status indication on the wizard. If the application script is not installed, the "Communications Failed" indicator on the Large Faceplate and Tabular Data wizards will not function. The second script, the EPM 7700 Large Faceplate/Custom Table Script, is an InTouch *Window Script* that must be applied to each Large Faceplate and Custom Tabular wizard window. This script ensures that any tags which were disabled by the Tabular Data wizard are properly restored when switching to a Large Faceplate or Custom Table screen. The third script, the Tabular Data Screen Script, also an InTouch *Window Script*, applies only to the EPM 7700 Tabular Data Screen wizard. Its purpose is to automatically initialize the wizard for optimum performance whenever its window is displayed.

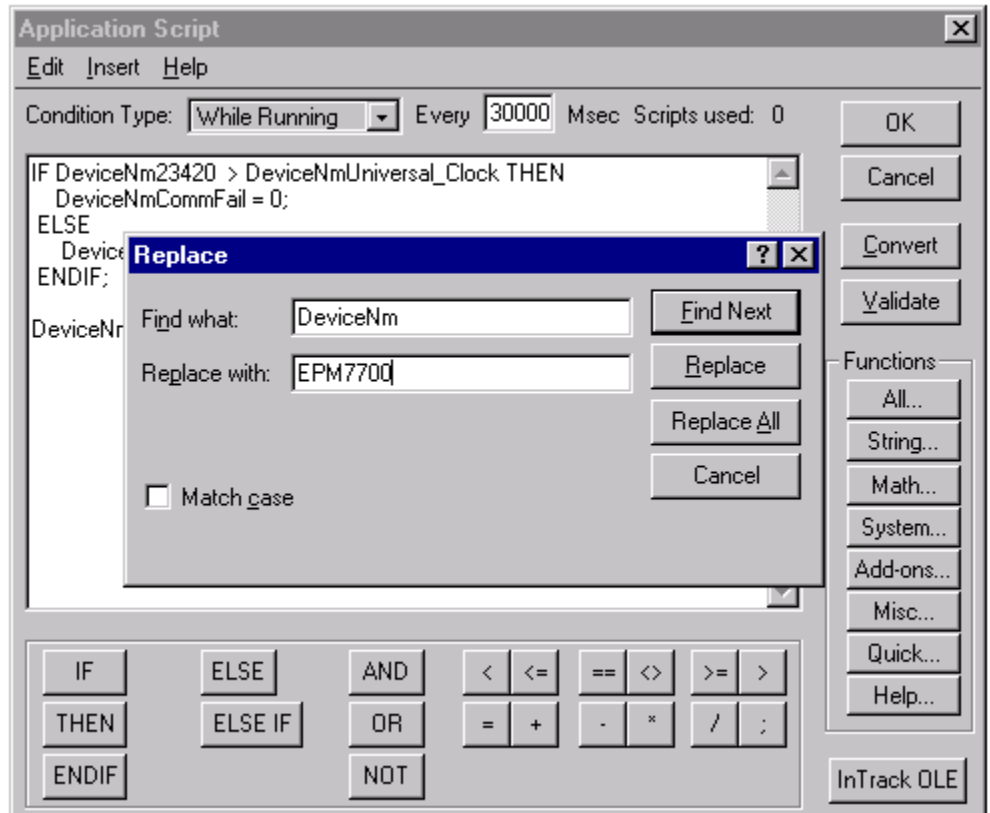
Note that the application script is *required* whenever a Large Faceplate or Tabular wizard is installed. The Windows scripts are *required* whenever your application uses Tabular Data wizards.

Installing the Application Script

1. After configuring the EPM 7700 Large Faceplate wizard or Tabular Data Screen wizard, select “Special \ Scripts \ Application Scripts...” from the WindowMaker main menu. The Application Script Dialog box opens:



2. Select “While Running” from the Condition Type drop down list, and enter “30000” in the “Every ... Msec” text box next to the Condition Type drop down list.
3. Use Notepad.exe to open the file “EPM7700 Application Script.txt”, located in the Intouch directory of the PC. Select (highlight) all the file text and copy it to the clipboard using the CTRL-C keyboard command.
4. Switch back to WindowMaker and paste the clipboard contents into the Application Script dialog text box, using the CTRL-V keyboard command.
5. From the dialog box menu, select Edit \ Find... to bring up the Replace dialog box as shown in the example below. In the “Find What” field, type in “DeviceNm”. In the “Replace With” field type in the Device Name used to configure the Large Faceplate wizard. Click the “Replace All” button to modify the text, then click the Cancel button to close the Replace dialog.



1. Click the OK button to close the Application Script Dialog.

NOTE: The application script text is only needed once for each configured device. If you are installing more than one wizard for a particular EPM7700 device (for example, a Large Faceplate and a Tabular Wizard), you only need to copy the application script once. If you are installing more than one EPM7700 device in your InTouch application, the application script window must contain a copy of the application script text for each configured device. See the example below:

Application Script text for METERA device.

Application Script text for METERB device.

Application Script [X]

Edit Insert Help

Condition Type: **While Running** Every Msec Scripts used: 1

OK
Cancel
Convert
Validate

```
IF METERA_23420 > METERA_Universal_Clock THEN
  METERA_CommFail = 0;
ELSE
  METERA_CommFail = 1;
ENDIF;

METERA_Universal_Clock = METERA_23420;

IF METERB_23420 > METERB_Universal_Clock THEN
  METERB_CommFail = 0;
ELSE
  METERB_CommFail = 1;
ENDIF;

METERB_Universal_Clock = METERB_23420;
```

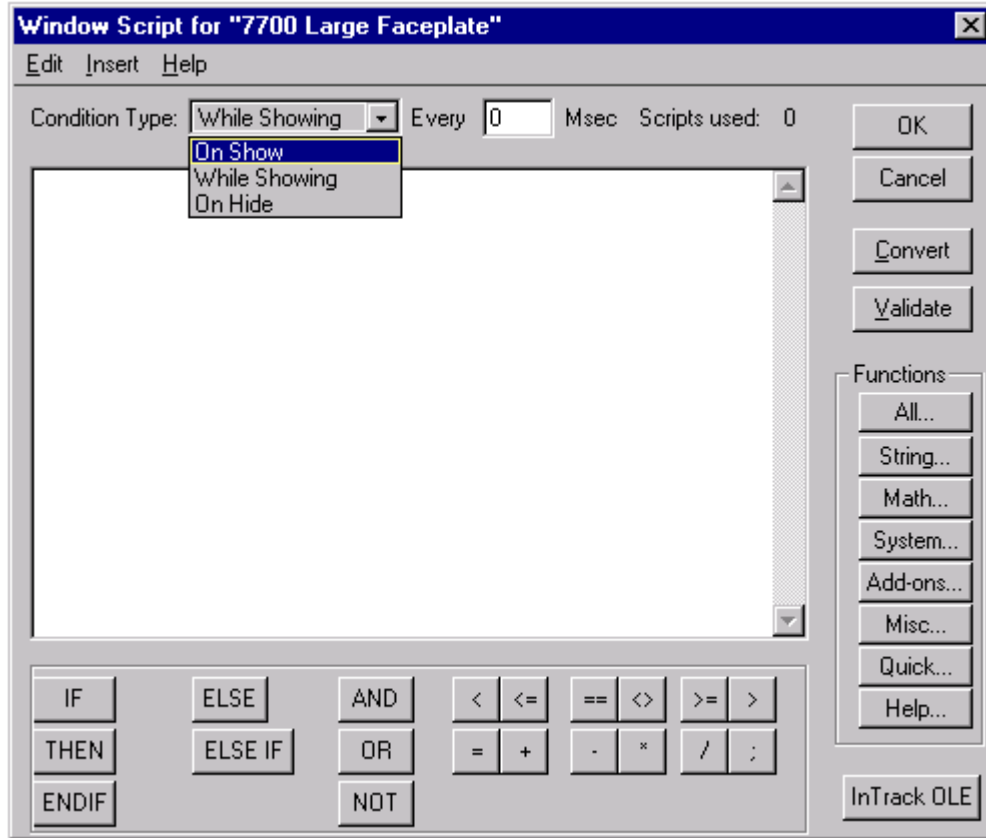
Functions
All...
String...
Math...
System...
Add-ons...
Misc...
Quick...
Help...

InTrack OLE

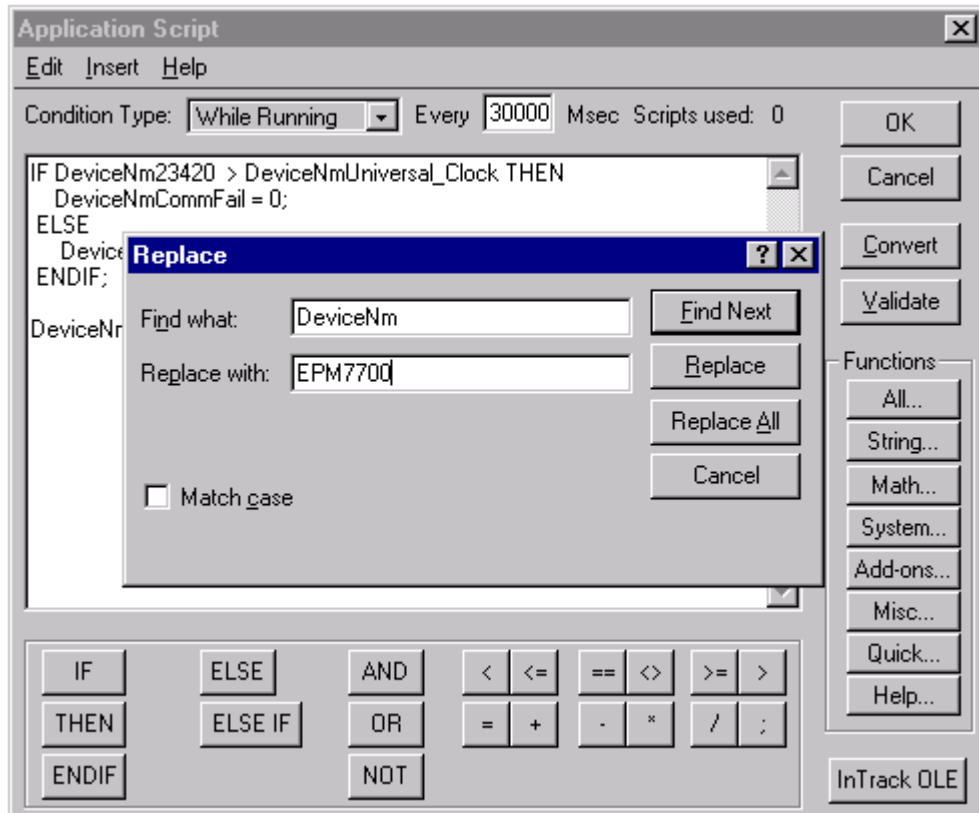
IF ELSE AND < <= == <> >= >
THEN ELSE IF OR = + - * / ;
ENDIF NOT

Configuring the Large Faceplate/Custom Table Script

1. After configuring the Large Faceplate or Custom Table wizard, and with its window displayed, select “Special \ Scripts \ Window Scripts...” from the WindowMaker main menu. The Window Script Dialog box opens:



2. Select "On Show" from the Condition Type drop down list.
3. Use Notepad.exe to open the file “EPM7700 Non-Tabular Window Script.txt”, located in the Intouch directory of the PC.
4. Select (highlight) all the file text and copy it to the clipboard using the CTRL-C keyboard command.
5. Switch to WindowMaker and paste the clipboard contents into the Window Script dialog text box, using the CTRL-V keyboard command.
6. From the dialog box menu, select Edit \ Find... to bring up the Replace dialog box as shown in the following example. In the “Find What” field, type in “DeviceNm”. In the “Replace With” field, enter the Device Name used to configure the Large Faceplate wizard. Click the “Replace All” button to modify the text. Click the Cancel button to close the Replace dialog. Click the OK button to close the Window Scripts Dialog.

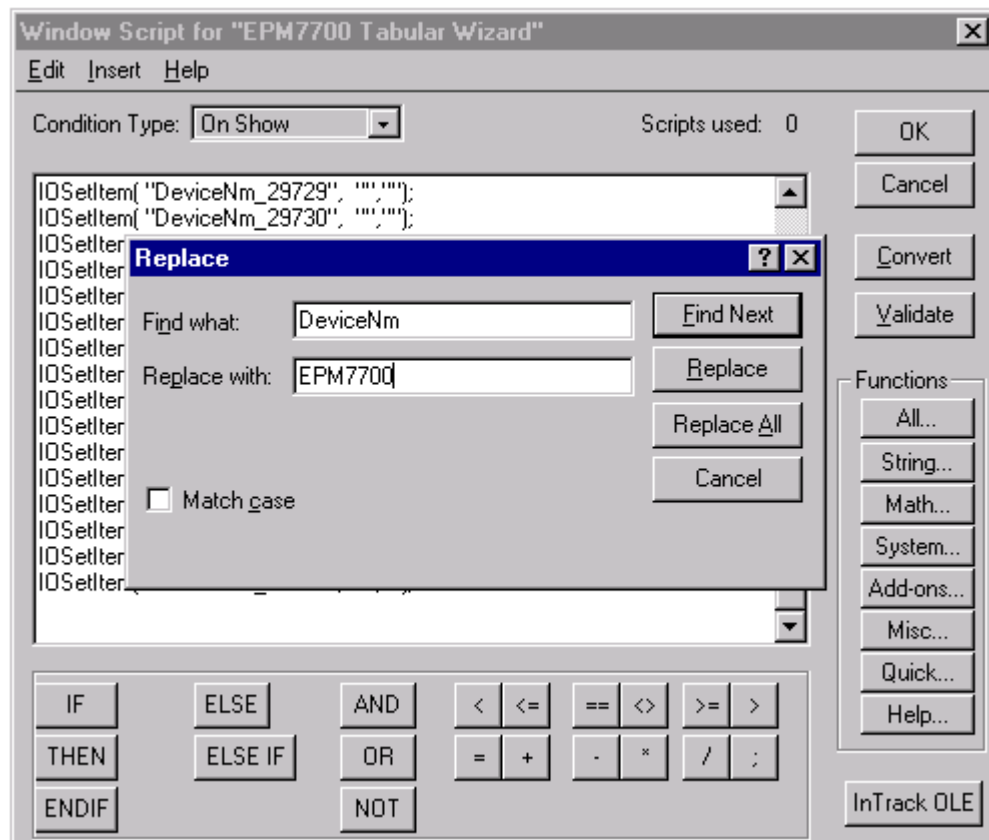


EPM 7700 Tabular Data Screen Scripting

All EPM7700 Tabular wizards require the creation of a Window Script in InTouch. The Window Script automatically configures DDE Links used by the Tabular Wizard when it is displayed. The script must first be configured, then installed, per the following procedures.

Configuring the Tabular Data Screen Script

1. After configuring the Tabular wizard, and with its window displayed, select "Special \ Scripts \ Window Scripts..." from the WindowMaker main menu. The Window Script Dialog box opens.
2. Select "On Show" from the Condition Type drop down list.
3. Use the Notepad.exe accessory program to open the file "EPM7700 Tabular Window Script.txt", located in the Intouch directory of the PC. Select (highlight) all the file text and copy it to the clipboard using the CTRL-C keyboard command.
4. Switch back to WindowMaker and paste the clipboard contents into the Window Script dialog text box, using the CTRL-V keyboard command.
5. From the dialog box menu, select Edit \ Find... to bring up the Replace dialog box, as shown in the example below. In the "Find What" field, type in "DeviceNm". In the "Replace With" field type in the Device Name used to configure the Tabular wizard. Click the "Replace All" button to modify the text. Click the Cancel button to close the Replace dialog. Click the OK button to close the Window Scripts Dialog.



Creating Floor Plans, Elevation Views, and One-Line Diagrams

Introduction

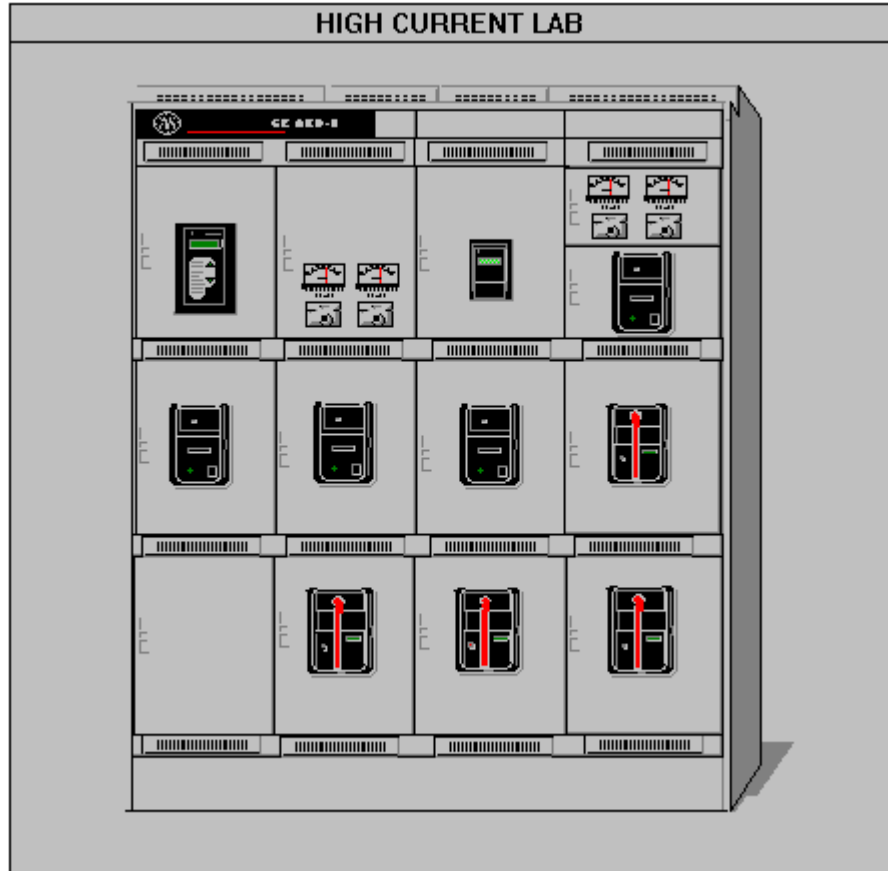
This chapter illustrates how to use the GE wizards described in Chapter 2 to create animated displays of the facility floor plan, switchgear elevations, and system one-line diagrams. These examples are typical, but are not intended to display the limits of creative system design.

Elevation Views

Elevation views of switchgear and switchboards are typically created first, because miniature bitmaps of the elevations can be conveniently placed in floor plans as navigation items.

To build an elevation view, place GE Elevation and Small Faceplate wizards into the window, as follows:

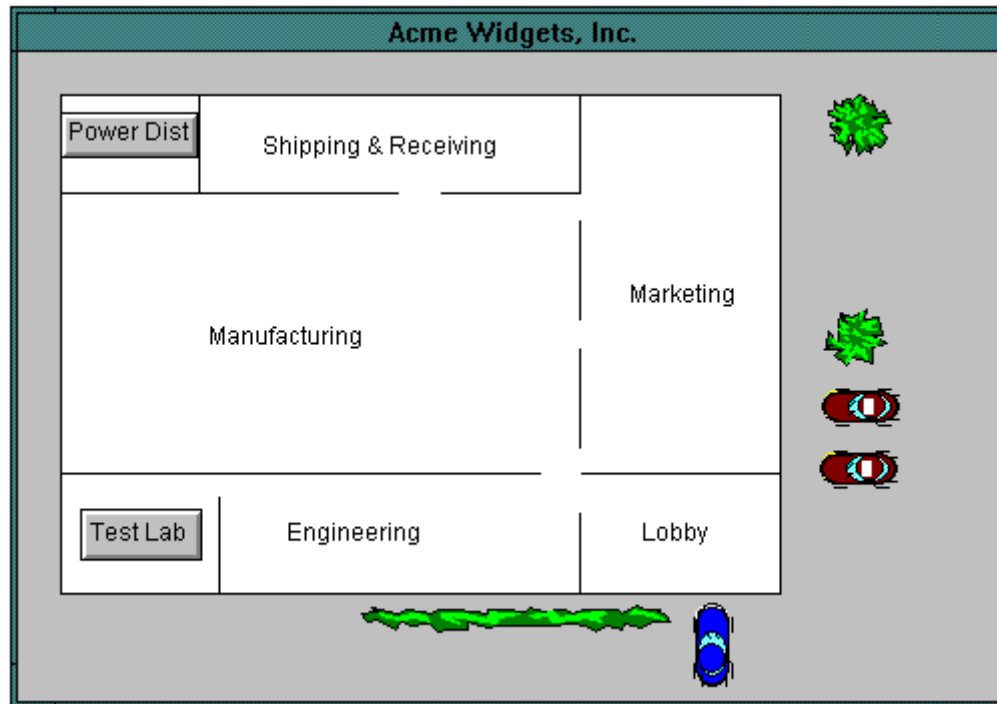
1. Place the appropriate cabinet.
2. Place panels onto the cabinet.
3. Add nameplates, louvers, handles, and fasteners to create the desired level of detail.
4. Place GE Small Faceplate wizards representing the components installed in the equipment on top of the elevation wizards, as shown in the figure on the following page.
5. Configure each of the Small Faceplate wizards to open a window containing an appropriate Large Faceplate or Tabular Data Screen for the device.



6. You can add additional navigation buttons (using standard InTouch controls) to open windows containing one-line views or other information.
7. If the switchgear shown in the elevation view is fed from or feeds another lineup, you can add buttons to navigate to elevation views representing those lineups.

Floor Plans

A floor plan should be a recognizable overhead representation of a facility. These windows are built using the GE Floor Plan wizards, described in Chapter 2. They can be made as detailed or as simple as desired. The example below shows an overview of a facility, showing all of the areas containing equipment.



You can link each of these areas in the main window to a more detailed window by adding a labeled navigation button (using standard InTouch controls) that is configured to show that window. In this way, you can provide paths to move up and down through a complete floor plan hierarchy.

Floor plans may be as detailed as you desire and may include miniature bitmaps of equipment elevations. The procedure for creating a miniature bitmap in a floor plan view is as follows:

1. In the floor plan window, use the toolbox to create a bitmap object with the desired size of the miniature switchgear.
2. Switch to the desired elevation window.
3. Select and copy the elevation view.
4. Switch back to the floor plan window.
5. In the floor plan window, use the Paste Bitmap command to insert the elevation view into the bitmap object.
6. Double-click on the miniature elevation bitmap to configure a link to the full-sized elevation view window.
7. You can add additional buttons, using standard InTouch controls, to navigate to windows containing one-line views of the switchgear or other information.

Electrical One-Line Diagrams

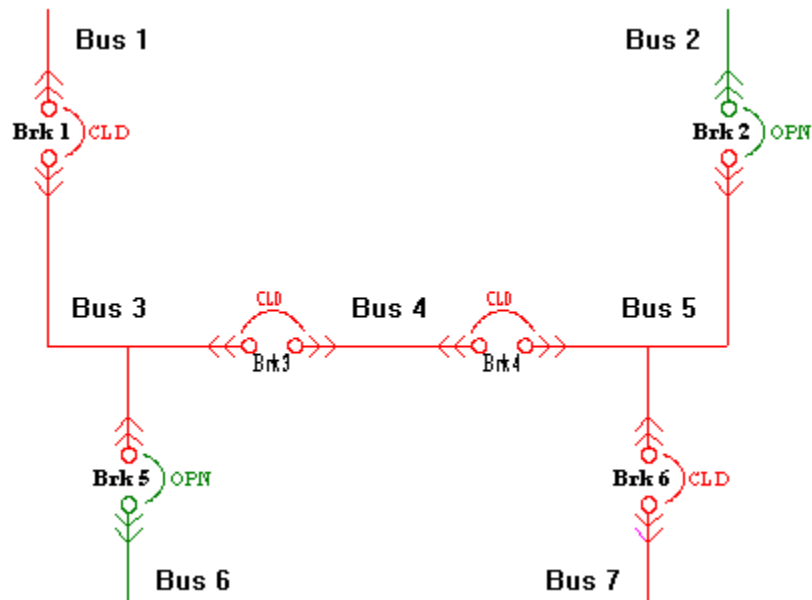
One-line diagrams are built by placing and linking circuit elements using the One-Line wizards, then creating scripts to provide animation for those wizards whose status can be determined or controlled, such as breakers and switches.

A one-line diagram is drawn by placing GE One-Line wizards into a window. All animated One-Line wizards have at least one discrete tag to indicate the status of the bus feed to the device, while others may have tags for in and out connections and for device status. If you do not require animation, link the wizard's discrete tags to a constant tag with a value of true.

After the device wizards have been placed and configured, they may be connected by standard InTouch line graphics. Double-click on lines to configure them for animation. You can link a line to a discrete variable, with the colors set to indicate on (typically green) and off (typically red). If several lines are used to indicate one section of bus, animate them together with the **Make Symbol** toolbox selection.

When a one-line diagram is too large to comfortably fit into a single window, place navigation buttons with links to other windows near each bus line that continues to another screen. This allows intuitive navigation up and down a distribution system hierarchy.

To accurately animate your one-line diagram once all the graphics are in place, *condition scripts* must be written with the logic for the distribution system. See the InTouch documentation for details of the scripting language. The following example shows a simple double-ended substation with a tie breaker and the scripting that animates it.



An example of the scripting for this one-line diagram is shown below:

```
{ Set values of local discrete variables based
on state of integer status of breaker. This
section sets the breaker status memory
discretes to true if the breaker's analog
status value is 3 (closed).}
```

```
brk1_s = (brk1 == 3 OR brk1 ==9);
brk2_s = (brk2 == 3 OR brk1 ==9);
brk3_s = (brk3 == 3 OR brk1 ==9);
brk4_s = (brk4 == 3 OR brk1 ==9);
brk5_s = (brk5 == 3 OR brk1 ==9);
brk6_s = (brk6 == 3 OR brk1 ==9);
```

← Sets the breaker status memory discretes to true if the breaker's analog status value is 3 (closed).

```
{ set the bus status for the incoming feeds to
the dependent bus above in the
distribution hierarchy. This section sets the
dependencies of the bus pieces to other
sections of the one-line diagram and resets
pieces of the bus located entirely on this
screen to false.}
```

```
bus1 = feed1;
bus2 = feed2;
```

← Sets the dependencies of the bus pieces to other sections of the one-line diagram and resets the pieces of the bus located entirely on this screen to false.

```
{ set the bus status for the incoming feeds to
the dependent bus above in the
distribution hierarchy. This section sets the
dependencies of the bus pieces to other
sections of the one-line diagram and resets
pieces of the bus located entirely on this
screen to false.}
```

```
bus1 = feed1;
bus2 = feed2;
```

```
{ reset internal bus pieces to off for
computations }
```

```
bus3 = 0;
bus4 = 0;
bus5 = 0;
```

```
{ set the bus status for the incoming feeds to
the dependent bus above in the
distribution hierarchy. This section sets the
dependencies of the bus pieces to other
sections of the one-line diagram and resets
pieces of the bus located entirely on this
screen to false.}
```

```
bus1 = feed1;
bus2 = feed2;
```

← IF...THEN statements traverse the hierarchy from top to bottom, left to right, and then bottom to top, right to left.

```
{ reset internal bus pieces to off for
computations }
```

```
bus3 = 0;
bus4 = 0;
bus5 = 0;
```

```

{ set the bus status for the incoming feeds to
the dependent bus below in the
distribution hierarchy. The IF_THEN
statements in this section traverse the
hierarchy from top to bottom, left to right,
and then bottom to top, right to left.}
bus6 = 0;
bus7 = 0;

{ two main feeds }
IF (bus1 AND brk1_s) THEN
    bus3 = 1;
ENDIF;
IF (bus2 AND brk2_s) THEN
    bus4 = 1;
ENDIF;

{ left to right across tie breaker }
IF (bus3 AND brk3_s) THEN
    bus4 = 1;
ENDIF;
IF (bus4 AND brk4_s) THEN
    bus5 = 1;
ENDIF;

{ two outgoing feeders }
IF (bus3 AND brk5_s) THEN
    bus6 = 1;
ENDIF;
IF (bus5 AND brk6_s) THEN
    bus7 = 1;
ENDIF;

{ back feed from two outgoing feeds }
IF (bus7 AND brk6_s) THEN
    bus5 = 1;
ENDIF;
IF (bus6 AND brk5_s) THEN
    bus3 = 1;
ENDIF;

{ right to left across tie breaker }
IF (bus5 AND brk4_s) THEN
    bus4 = 1;
ENDIF;
IF (bus4 AND brk3_s) THEN
    bus3 = 1;
ENDIF;

{ two incoming feeds }
IF (bus5 AND brk2_s) THEN
    bus2 = 1;
ENDIF;
IF (bus3 AND brk1_s) THEN
    bus1 = 1;
ENDIF;

```

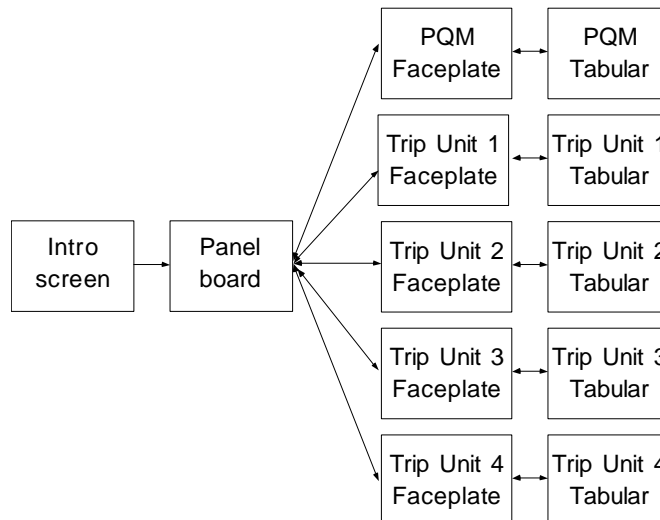
Sample Application

Creating a basic interface

We've learned about the various parts and pieces of the Interface Toolkit; now let's put it to work.

Suppose we have a very basic power management system installed at our corporate home office. The system consists of four trip units and a PQM (Power Quality Meter). We'd like to set up a computer in the front office to provide a front end to this system, allowing us to monitor all these devices at one station without having to walk back to the individual devices on the plant floor.

We plan the application on paper first so that we know how many screens to create and what each screen will look like. This will help us save time when in development by providing a starting point and a map of what we're trying to create. This 'storyboard' for our application looks something like this:



As shown above, for this basic application, we'll need 12 screens — an introduction screen, a shot of the panelboard showing all five of our power management devices, and then a large faceplate and tabular screen for each device. We'll link the Large Faceplate screen for each unit to the Small Faceplate wizard shown on the Panelboard screen, and, from the Large Faceplate, we can click on the device's display to jump to the Tabular data screen for that device. To make it easier to

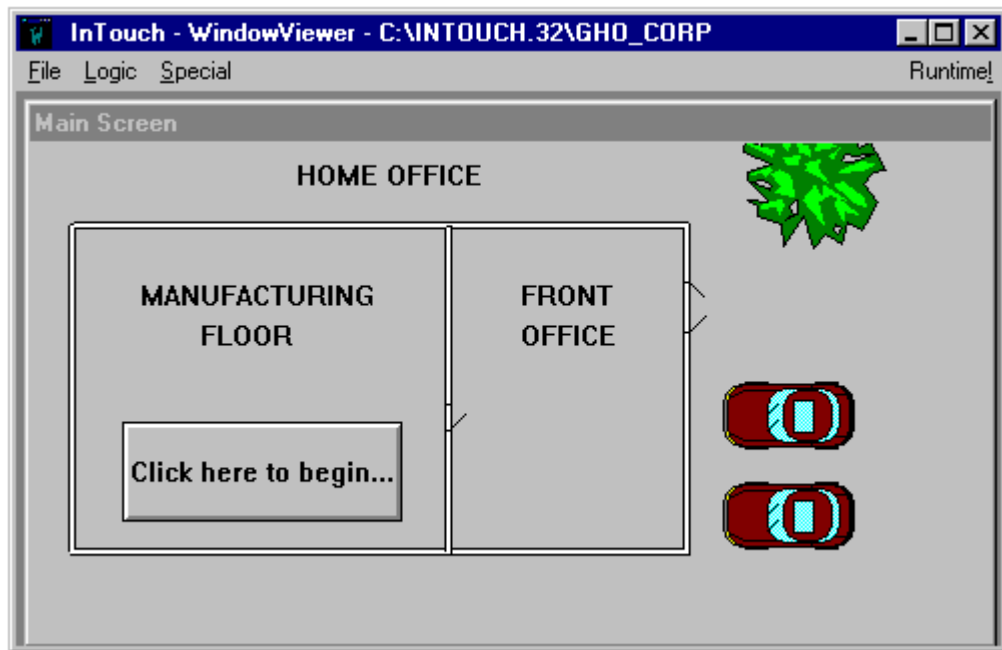
navigate the screens, we'll create extra buttons on the bottom of the Faceplate and Tabular screens that will jump back to the Panelboard screen.

With our plan in hand, and after completing the installation procedures described in Chapter 1, we're ready to begin development. Launch InTouch and select the button to create a new file, then click the Development button.

First, we'll create all our new windows and name them, then we'll go back and flesh them out with their contents and add links between them. Create the following twelve windows:

- Main Screen
- Panelboard
- PQM_Face
- PQM_Tab
- Trip1_Face
- Trip1_Tab
- Trip2_Face
- Trip2_Tab
- Trip3_Face
- Trip3_Tab
- Trip4_Face
- Trip4_Tab

Select the window named Main Screen, and use the Wonderware tools to sketch a floorplan of the facility, as shown below.



In the Manufacturing Floor area, we place a button labeled “Click here to begin...,” and give it an animation link to the window named Panelboard.

Select the Panelboard window. Use the PMCS Elevation wizards to create a mock-up of the panelboard, then use the PMCS Small Faceplate wizards to populate the panelboard with our PQM meter and the four trip units. The Panelboard screen should look like this:

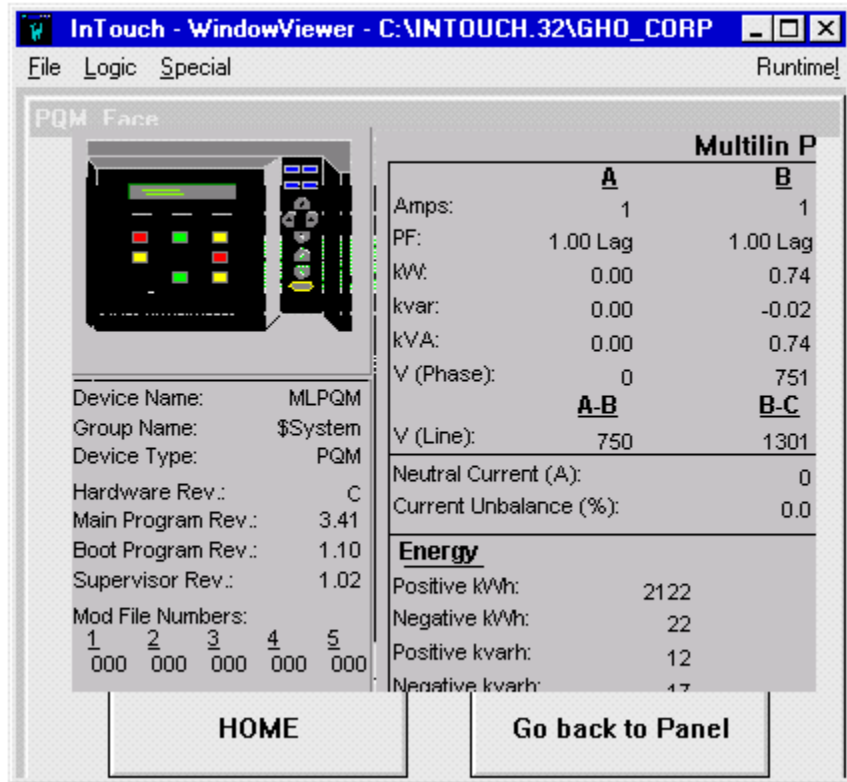


We'll include a note about the panelboard's location, describing where to find the real panel, and also a note of instruction: "Click a device to see the large faceplate screen."

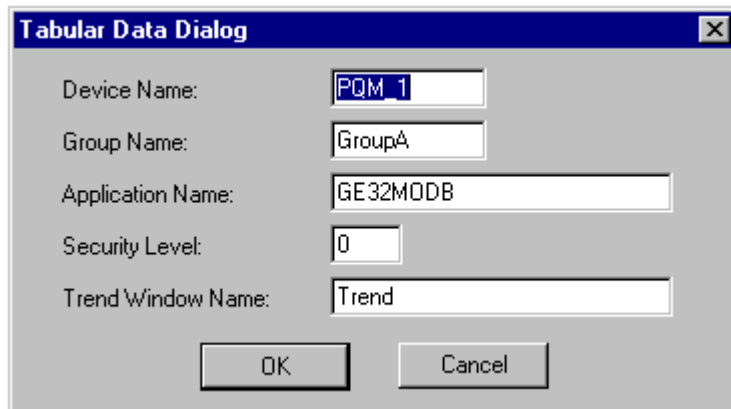
Create the links to the device screens by double-clicking on each small faceplate and entering the name of the device's Large Faceplate screen. For example, double-click on the PQM's Small Faceplate on the panelboard; then, in the resulting dialog box, type the name of the PQM_Face window. Complete these links for the remaining devices.

Next we'll develop the device screens. For the purposes of this chapter, we'll just walk through the two PQM screens. The development of the trip unit screens follows the same procedure.

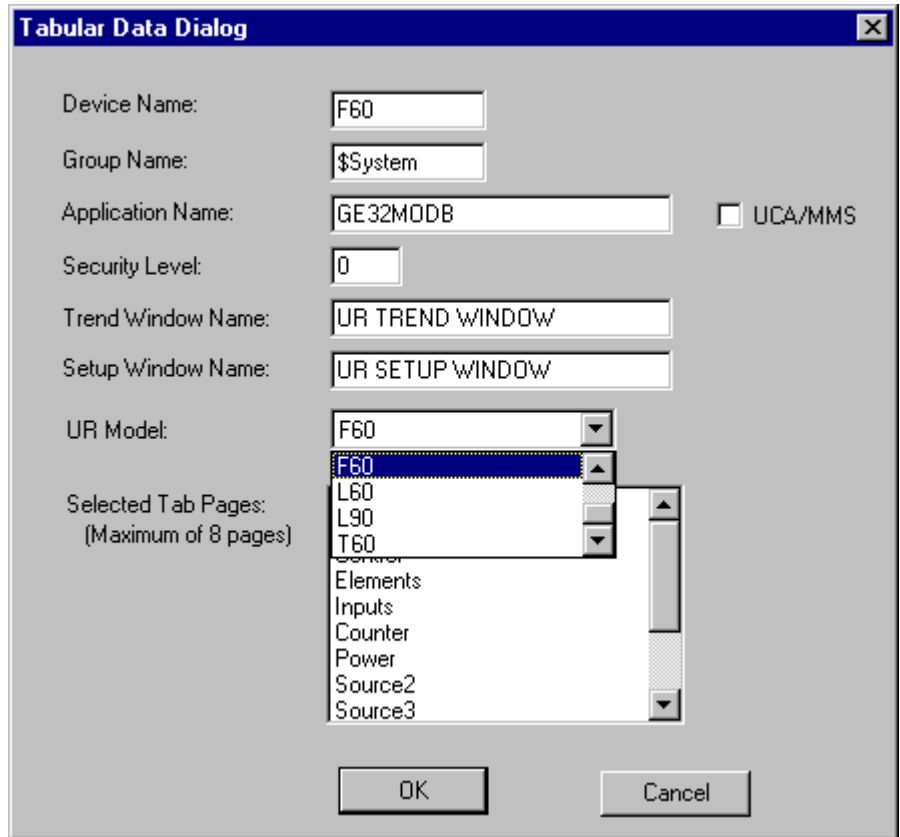
Select the PQM_Face window, then use the Wonderware Button tool found on the Toolbox to create two new buttons, "HOME" and "Go back to Panel." Use the Animation Links command to tie these buttons to the Main Screen and Panelboard windows, respectively. Now use the Wizards tool to place the PQM Large Faceplate wizard on the PQM_Face window. The screen should look similar to the following:



Now we'll develop the PQM Tabular data screen. Select the PQM Tab window and use the Wizards tool to place the PQM Tabular Data wizard on the screen. Double click the wizard and fill in the Device Name and the Trending windows as shown below. Click OK.



Finally, add some navigation buttons to the Tabular screen for returning to the Main Screen (HOME), to the Panelboard (Go to Panel), or to the Large Faceplate screen (Go back to Faceplate). Link each button to the appropriate screen, and you're all set!



Complete the application by developing the Faceplate and Tabular screens for each of the four trip units and that's it — we've just developed a PMCS application using the GE Wonderware Wizards.

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Features of GE Large Faceplate Wizards

About the Large Faceplate Wizards

This chapter contains descriptions of the functions available with each of the GE Large Faceplate wizards. While a majority of the most popular data available at each device have been made available in the Wizards, some functions available with the actual devices are not provided in the Large Faceplate representations, such as the following:

- Test Mode or Simulation Mode on some devices is not fully supported
- Details on status/alarm/trips other than the information displayed by the front LEDs and a brief text message (see Tabular Data Screens for detailed status/alarm/trip information)
- Any flashing status messages which may be produced by a device
- Some actual values are not displayed on the Large Faceplate Wizard, but can be found on Tabular Data Screen Wizards

Users should be aware that not all values displayed by the GE Large Faceplate Wizards are automatically updated. Also, some rapidly changing values, especially those requiring calculation, cannot be displayed as rapidly on the wizard as on the actual device's screen.

For a more detailed description of the functions of a device, see the user's guide for that device.

POWER LEADER EPM



The large faceplate representation of the POWER LEADER EPM provides the following animated functions:

| Click on... | Function |
|---------------------|---|
| Display Window | Clicking on the display area opens the tabular data window specified during wizard configuration and sets the view to the Normal Metering page. |
| GE Logo | Clicking the GE logo opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| SELECT/ENTER Button | Toggles the display between the normal and alternate lists of metering parameters. |
| SCROLL Buttons | Loop through all metered parameters for the current mode, displaying two values at a time. The down arrow scrolls down through the parameter list, with the new value appearing on the lower line of the display. The up arrow scrolls up through the parameter list with the new value appearing on the display's upper line. Depending on whether the EPM has been configured as a Delta or Wye device, certain parameters display either line-to-line or line-to-neutral values. |

Table 1. PLEPM Faceplate animated functions.

The electrical parameters and status information displayed by the EPM are listed below for both the normal and alternate scrolls. Note that the displayed parameters

differ depending on whether the EPM is configured as Wye or Delta. Please note that the Normal Scroll Delta and Alternate Scroll Delta lists contain several parameters marked with an asterisk; these parameters were included in the wizard for programming reasons, but are not valid for Delta configurations and should not be used.

| Normal Scroll, Wye | Normal Scroll, Delta |
|---------------------------|-----------------------------|
| Current, RMS Phase A | Current, Phase A |
| Current, RMS Phase B | Current, Phase B |
| Current, RMS Phase C | Current, Phase C |
| Current, RMS Neutral | Current, RMS Neutral * |
| Voltage, RMS Phase A–N | Voltage, RMS Phase A–N * |
| Voltage, RMS Phase B–N | Voltage, RMS Phase B–N * |
| Voltage, RMS Phase C–N | Voltage, RMS Phase C–N * |
| Voltage, RMS Phase A–B | Voltage, RMS Phase A–B |
| Voltage, RMS Phase B–C | Voltage, RMS Phase B–C |
| Voltage, RMS Phase C–A | Voltage, RMS Phase C–A |
| Watts, Phase A | Watts, Phase A–B |
| Watts, Phase B | Watts, Phase B–C |
| Watts, Phase C | Watts, Total |
| Watts, Total | Watts, Demand |
| Watts, Demand | Watts, Peak Demand |
| Watts, Peak Demand | Vars, Phase A–B |
| Vars, Phase A | Vars, Phase B–C |
| Vars, Phase B | Vars, Total |
| Vars, Phase C | Volt-amperes, Phase A–B |
| Vars, Total | Volt-amperes, Phase B–C |
| Volt-amperes, Phase A | Volt-amperes, Total |
| Volt-amperes, Phase B | Power Factor, Total |
| Volt-amperes, Phase C | Watt-hours, Total |
| Volt-amperes, Total | Varhours, Total Lag (+) |
| Power Factor, Total | Varhours, Total Lead (-) |
| Watt-hours, Total | Volt-ampere-hours, Total |
| Varhours, Total Lag (+) | Frequency, in hertz |
| Varhours, Total Lead (-) | |
| Volt-ampere-hours, Total | |
| Frequency, in hertz | |

| Alternate Scroll, Wye | Alternate Scroll, Delta |
|-----------------------------------|-----------------------------------|
| Current, Phase A Demand | Current, Phase A Demand |
| Current, Phase A Peak Demand | Current, Phase A Peak Demand |
| Current, Phase B Demand | Current, Phase B Demand * |
| Current, Phase B Peak Demand | Current, Phase B Peak Demand * |
| Current, Phase C Demand | Current, Phase C Demand |
| Current, Phase C Peak Demand | Current, Phase C Peak Demand |
| Watts Demand at Peak VA Demand | Watts Demand at Peak VA Demand |
| Vars, Demand Lag (+) | Vars, Demand Lag (+) |
| Vars, Demand Lead (-) | Vars, Demand Lead (-) |
| Vars, Peak Demand Lag (+) | Vars, Peak Demand Lag (+) |
| Vars, Peak Demand Lead (-) | Vars, Peak Demand Lead (-) |
| Volt-amperes, Demand | Volt-amperes, Demand |
| Volt-amperes, Peak Demand | Volt-amperes, Peak Demand |
| Q-hours, Total | Q-hours, Total |
| Power Factor, Phase A | Power Factor, Phase A-B |
| Power Factor, Phase B | Power Factor, Phase B-C |
| Power Factor, Phase C | Power Factor, Average Since Reset |
| Power Factor, Average Since Reset | Power Factor, Demand Average |
| Power Factor, Demand Average | Power Factor at Peak VA Demand |
| Power Factor at Peak VA Demand | Number of Demand Resets |
| Number of Demand Resets | Time Left in Demand Subinterval |
| Time Left in Demand Subinterval | Number of Power Outages |
| Number of Power Outages | Potential Transformer Ratio |
| Potential Transformer Ratio | Current Transformer Ratio |
| Current Transformer Ratio | |

Spectra MicroVersaTrip Trip Unit



The large faceplate representation of the Spectra MicroVersaTrip trip unit provides the following animated functions:

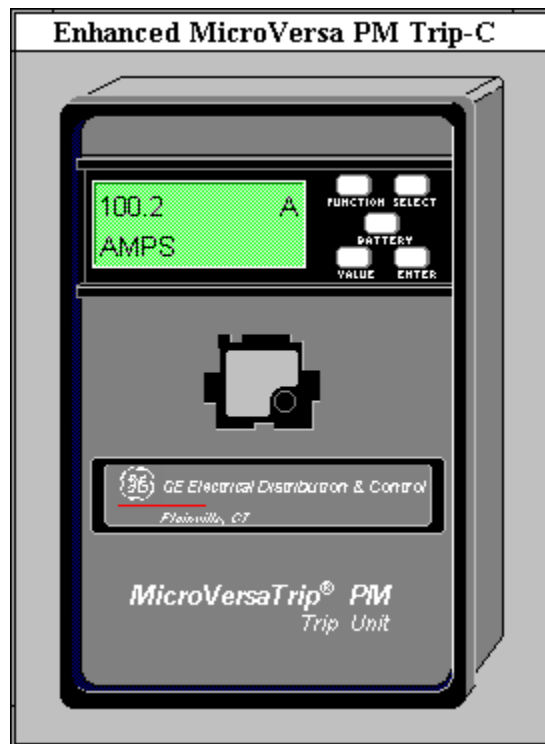
| Click on... | Function |
|-----------------|---|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Normal Monitoring page. |
| FUNCTION Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| ENTER Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| VALUE Button | Changes phases in appropriate modes, depending on whether the device has been configured as Wye or Delta Phase is indicated by letters in the upper right of the display; press VALUE to display a different phase. |
| SELECT Button | Rotates among six different modes, as shown in the lower left of the display, with units in the lower right. |

Table 2. Spectra MVT Faceplate animated functions.

The metering modes available with the SELECT button are as follows:

| Mode | Description |
|-------|---|
| AMPS | Current, with no label in the units area of the display. Phase shifting in both Delta and Wye configurations. |
| VOLTS | Voltage, displayed as line-to-line (V_{L-L}) for Delta and line-to-neutral (V_{L-N}) for Wye. Phase shifting in both configurations. |
| ENGY | Energy, displayed in kWh; no phase shifting. |
| PWR | Real power indicated by non-blinking units symbol (kW). Apparent power indicated by blinking units symbol. Phase shifting in Wye configuration. |
| FREQ | Frequency, displayed in Hz. Phase shifting in both Delta and Wye configurations. |

Enhanced MicroVersaTrip-C Trip Unit



The large faceplate representation of the Enhanced MicroVersaTrip-C trip unit provides the following animated functions:

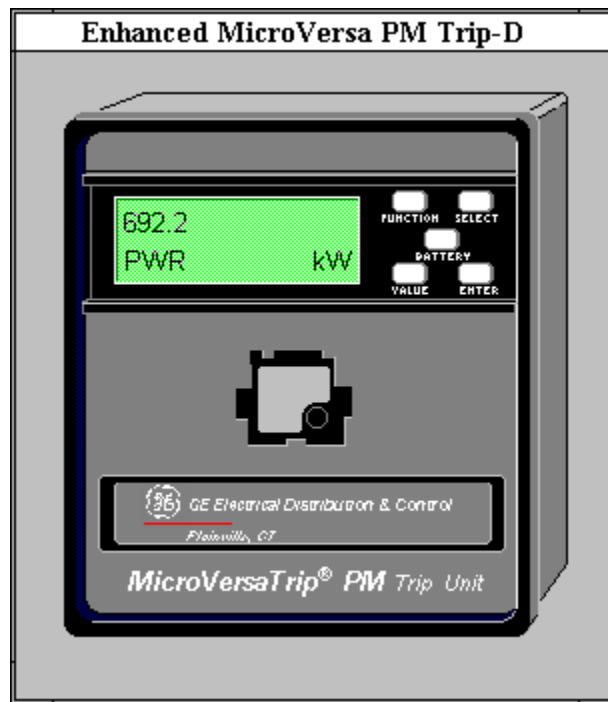
| Click on ... | Function |
|-----------------|--|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| FUNCTION Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| ENTER Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| BATTERY Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| VALUE Button | Changes phases in appropriate modes, depending on whether the device has been configured as Wye or Delta, Phase is indicated by numbers in the upper right of the display; press VALUE to display a different phase. |
| SELECT Button | Rotates among eight different modes, as shown in the lower left of the display, with units in the lower right. |

Table 3. EMVT-C Faceplate animated functions.

The EMVT-C's metering modes available with the SELECT button are as follows:

| Mode | Description |
|-------------|--|
| AMPS | Current, with no label in the units area of the display. Phase shifting in both Delta and Wye configurations. |
| VOLTS | Voltage, displayed as line-to-line (Ph-Ph) for Delta and line-to-neutral (Ph-N) for Wye. Phases shown as 01, 02, or 03 for Wye and 01 02, 01 03, or 02 03 for Delta. |
| kWh | Energy; no phase shifting. |
| kW | Real power; no phase shifting. |
| kVA | Apparent power; no phase shifting. |
| Demand | Power demand, displayed with steady kW symbol. Peak power demand, displayed with blinking kW symbol. No phase shifting. |
| FREQ | Frequency, displayed in Hz. Phase shifting in both Delta and Wye configurations. |

Enhanced MicroVersaTrip-D Trip Unit



The large faceplate representation of the Enhanced MicroVersaTrip-D trip unit provides the following animated functions:

| Feature | Function |
|-----------------|---|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| FUNCTION Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| ENTER Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| BATTERY Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| VALUE Button | Changes phases in appropriate modes, depending on whether the device has been configured as Wye or Delta Phase is indicated by numbers in the upper right of the display; press VALUE to display a different phase. |
| SELECT Button | Rotates among eight different modes, as shown in the lower left of the display, with units in the lower right. |

Table 4. EMVT-D Faceplate animated functions.

The metering modes available with the SELECT button are as follows:

| Mode | Description |
|-------------|--|
| AMPS | Current, with no label in the units area of the display. Phase shifting in both Delta and Wye configurations. |
| VOLTS | Voltage, displayed as line-to-line (Ph-Ph) for Delta and line-to-neutral (Ph-N) for Wye. Phases shown as 01, 02, or 03 for Wye and 01 02, 01 03, or 02 03 for delta. |
| kWh | Energy; no phase shifting. |
| kW | Real power; no phase shifting. |
| kVA | Apparent power; no phase shifting. |
| Demand | Power demand, displayed with steady kW symbol. Peak power demand, displayed with blinking kW symbol. No phase shifting. |
| FREQ | Frequency, displayed in Hz. Phase shifting in both Delta and Wye configurations. |

POWER LEADER Meter



The large faceplate representation of the POWER LEADER Meter provides the following animated functions:

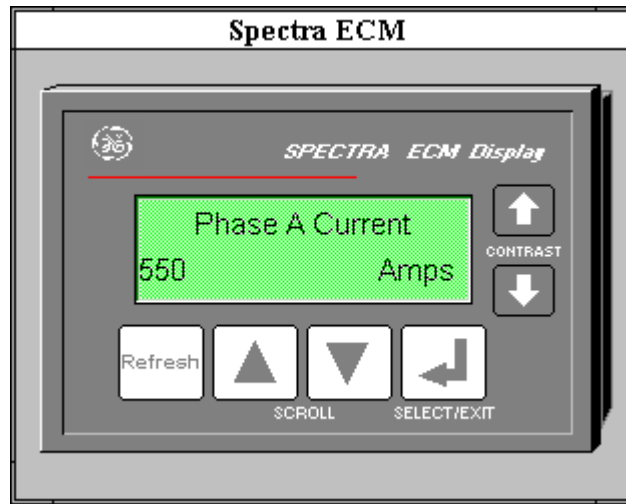
| Feature | Function |
|-----------------------------------|--|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| GE Logo | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| RESET/ENTER Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| PHASE Button | Rotates among phase readings for appropriate modes, indicated by the phase LEDs below the display window. |
| SCROLL UP and SCROLL DOWN Buttons | Loop through display modes either down or up the list of parameters. Fourteen modes available with a Delta-configured device; one additional with Wye. |

Table 5. PL Meter Faceplate animated functions.

The parameters available with the SCROLL buttons are listed below:

| Mode | Description |
|------------------|--|
| RMS Current | Units in Amps; phase shifting among A, B, and C. |
| RMS Voltage L-N | Units in Volts; available only in Wye configuration, with phase shifting among A, B, and C. |
| RMS Voltage L-L | Units in Volts; phase shifting among AB, BC, and CA. |
| Watts | Units in kW; phase shifting among A, B, C, and total. |
| Vars | Units in kVARs; phase shifting among A, B, C, and total. |
| Volt-Amps | Units in kVA; phase shifting among A, B, C, and total. |
| Power Factor | No units; no phase shifting. |
| Watt-Hours | Units in kWh; no phase shifting. |
| VAR-Hours | Units in kVARH; no phase shifting. |
| Current Demand | Units in A; phase shifting among A, B, and C. |
| Peak Current | Units in A; phase shifting among A, B, and C. |
| Watt Demand | Units in kW; no phase shifting. |
| Peak Watt Demand | Units in kW; no phase shifting. |
| Frequency | Units in Hz; no phase shifting. |
| Harm Distortion | Value area of display is blank; degree of harmonic distortion is shown as negligible, mild, moderate, or severe. |

Spectra ECM



The large faceplate representation of the Spectra ECM provides the following animated functions:

| Feature | Function |
|--------------------|---|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| CONTRAST Buttons | Open the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| Refresh Button | Updates the display to the most current readings. |
| SCROLL Buttons | Loop through all selections for each of the valid modes accessed by the SELECT/EXIT button. |
| SELECT/EXIT Button | Displays the top-line message "Press SELECT for". Press one of the SCROLL buttons to rotate among the four modes. Press SELECT/EXIT to display the first value of the current mode and the SCROLL buttons for all other values available in that mode. Press again to redisplay the "Press SELECT for" prompt for mode selection. |

Table 6. Spectra ECM Faceplate animated functions.

The modes and the parameters available in each mode are as follows:

| Mode | Parameters and Units |
|----------------|---|
| STATUS | Motor Status ECM Status Trip Status |
| SETPOINTS | FLA Setting, amps Rating Plug, amps Phase Unbalance, disabled/enabled Ground Fault, disabled/enabled Commnet Address |
| METERING | Phase A Current, amps Phase B Current, amps Phase C Current, amps Average Current, amps Phase Unbalance, percent Ground Current, amps Motor Load, percent |
| LAST TRIP INFO | Last Trip Cause Phase A @ Trip, amps Phase B @ Trip, amps Phase C @ Trip, amps Unbalance @ Trip, percent Ground Current @ Trip, amps |

EPM 3710 Meter



The large faceplate representation of the EPM 3710 provides the following animated functions:

| Feature | Function |
|-----------------|---|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| MIN/MAX Buttons | Open the tabular data window specified during wizard configuration and set the view to the Setup page. |
| PHASE Button | Rotates the left side of the display through eight sets of instantaneous values, as described in the table below. |
| FUNCTION Button | Rotates the right side of the display through 13 accumulated values. |

Table 7. EPM 3710 Faceplate animated functions.

The parameters displayed by the PHASE button are listed in the following table.

| Display Indication | Parameters |
|--------------------|--|
| A | Phase A current and line-to-neutral voltage |
| B | Phase B current and line-to-neutral voltage |
| C | Phase C current and line-to-neutral voltage |
| * | Average current and line-to-neutral voltage |
| A, | Phase A current and A-B line-to-line voltage |
| B, | Phase B current and B-C line-to-line voltage |
| C, | Phase C current and C-A line-to-line voltage |
| *, | Average current line-to-line voltage |

The parameters displayed by the FUNCTION button are listed in the following table. If any of the import or export values are zero, they are not displayed and the next nonzero value is shown. When any of these parameters are displayed, the AMPS portion of the display window is used to allow display of the complete value.

| Display Indication | Parameter |
|---------------------------|---|
| kW | Total real power |
| kVA | Total apparent power |
| kQ | Total reactive power |
| PFLG or PFLD | Power factor; lagging or leading |
| Hz | Frequency |
| kWD | Kilowatt total demand |
| A or kVA | Current average demand or apparent power demand |
| VX | RMS auxiliary voltage |
| I4 | RMS neutral current |
| kWH-F | Import energy |
| kWH-R | Export energy |
| kVARH-F | Import reactive energy |
| kVARH-R | Export reactive energy |

EPM 3720 Meter



The large faceplate representation of the EPM 3720 meter provides the following animated functions:

| Feature | Function |
|-----------------|--|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| GROUP Buttons | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| PHASE Button | Rotates the left side of the display through eight sets of instantaneous values, as described in the table below. May also affect the POWER FUNCTIONS portion of the display, depending on the FUNCTION selection. |
| FUNCTION Button | Rotates the right side of the display through 24 accumulated values, in conjunction with the PHASE button. |

Table 8. EPM 3720 Faceplate animated functions.

The parameters displayed by the PHASE button are listed in the following table.

| Display Indication | Parameters |
|--------------------|--|
| A | Phase A current and line-to-neutral voltage |
| B | Phase B current and line-to-neutral voltage |
| C | Phase C current and line-to-neutral voltage |
| * | Average current and line-to-neutral voltage |
| A, | Phase A current and A-B line-to-line voltage |

| Display Indication | Parameters |
|--------------------|--|
| B, | Phase B current and B-C line-to-line voltage |
| C, | Phase C current and C-A line-to-line voltage |
| *, | Average current line-to-line voltage |

The parameters displayed by the FUNCTION button are listed in the following table. When any of the import, export, or net parameters are displayed, the AMPS portion of the display window is used to allow display of the complete value.

| Display Indication | Parameter |
|--------------------|---|
| kW | Real power for phase A, B, or C as set by PHASE button, or total real power if PHASE is set to * or *,. |
| kVR | Reactive power for phase A, B, or C as set by PHASE button, or total reactive power if PHASE is set to * or *,. |
| kVA | Apparent power for phase A, B, or C as set by PHASE button, or total apparent power if PHASE is set to * or *,. |
| PFLG or PFLD | Power factor, lagging or leading, for phase !A, B, or C as set by PHASE button, or total power factor if PHASE is set to * or *,. |
| I4 | RMS neutral current |
| Hz | Frequency |
| VX | RMS auxiliary voltage |
| kWH IM | Import energy |
| kWH EX | Export energy |
| kVARH IM | Import reactive energy |
| kVARH EX | Export reactive energy |
| kVAH NET | Net reactive energy |

EPM 7700 Meter



The large faceplate representation of the EPM 7700 meter provides the following animated functions:

| Feature | Function |
|--------------------|--|
| LCD display window | Opens the tabular data window specified during wizard configuration and sets the view to the Metering page. |
| ESC | Opens the displays the main menu on the faceplate as shown above. |
| Blank Buttons | Pressing the keys adjacent to the LCD Display window displays the selected screen. For instance, selecting the Total Power button displays the Total Power screen of data. |

Table 9. EPM 7700 Faceplate animated functions.

The parameters displayed by the various data screen buttons are listed in the following table.

| Screen Selected | Description |
|------------------------------|---|
| 1 - Total Power | <ul style="list-style-type: none"> • KW Total • KVAR Total • KVA Total • PF Signed Total |
| 2 - Three-Phase Measurements | <ul style="list-style-type: none"> • Vln a; Vln b: n/a when Voltage Mode is DELTA • Vln c: n/a when Voltage Mode is DELTA or SINGLE • Vln Avg: n/a when Voltage Mode is DELTA • VII ab • VII bc; VII ca; VII avg: n/a when Voltage Mode is SINGLE • Ia, Ib, Ic, Iavg • Ic: n/a when Voltage Mode is SINGLE • V unbal • I unbal • Line Frequency |
| 3 - Per-Phase Power | <ul style="list-style-type: none"> • KW a; KW b: n/a when Voltage Mode is DELTA • KW c: n/a when Voltage Mode is DELTA or SINGLE • KW Total • KVAR a; KVAR b: n/a when Voltage Mode is DELTA • KVAR c: n/a when Voltage Mode is DELTA or SINGLE • KVAR Total • KVA a; KVA b: n/a when Voltage Mode is DELTA • KVA c: n/a when Voltage Mode is DELTA or SINGLE • KVA Total • PF Signed a; PF Signed b: n/a when Voltage Mode is DELTA • PF Signed c: n/a when Voltage Mode is DELTA or SINGLE |
| 4 - Energy | <ul style="list-style-type: none"> • KWh Import; KWh Export; KWh Total; KWh Net • KVARh Import; KVARh Export; KVARh Total; KVARh Net • KVAh Total • KW Total Min; KVAR Total Min; KVA Total Min • KW Total Max; KVAR Total Max; KVA Total Max |
| 5 - Symmetrical Components | <ul style="list-style-type: none"> • I ZeroSeqMag; I PosSeqMag; I NegSeqMag • V ZeroSeqMag; V PosSeqMag; V NegSeqMag • I ZeroSeqPhs; I PosSeqPhs; I NegSeqPhs • V ZeroSeqPhs; V PosSeqPhs; V NegSeqPhs |
| 6 - Digital Inputs | <ul style="list-style-type: none"> • Status Inputs 1 - 8 |

| Screen Selected | Description |
|------------------------|---|
| 7 - Per-Phase Minimums | <ul style="list-style-type: none"> • VIn a Min; VIn b Min: n/a when Voltage Mode is DELTA • VIn c Min: n/a when Voltage Mode is DELTA or SINGLE • VIn Avg Min: n/a when Voltage Mode is DELTA • VII ab Min • VII bc Min; VII ca Min; VII Avg Min: n/a when Voltage Mode is SINGLE • Ia Min; Ib Min • Ic Min: n/a when Voltage Mode is SINGLE • I Avg Min |
| 8 - Per-Phase Maximums | <ul style="list-style-type: none"> • VIn a Max; VIn b Max : n/a when Voltage Mode is DELTA • VIn c Max: n/a when Voltage Mode is DELTA or SINGLE • VIn Avg Max: n/a when Voltage Mode is DELTA • VII ab Max • VII bc Max; VII ca Max; VII Avg Max: n/a when Voltage Mode is SINGLE • Ia Max; Ib Max • Ic Max: n/a when Voltage Mode is SINGLE • I Avg Max |
| 9 - Power & Amp Demand | <ul style="list-style-type: none"> • KW SWD; KVAR SWD; KVA SWD** • KW PD; KVAR PD; KVA PD** • KW Total; KVAR Total; KVA Total |
| 10 - THD and K-Factor | <ul style="list-style-type: none"> • V1 THD; V2 THD; V3 THD: n/a when Source is n/a • I1 THD; I2 THD; I3 THD; I4 THD: n/a when Source is n/a • I1 K Factor; I2 K Factor; I3 K Factor; I4 K Factor: n/a when Source is n/a |

****NOTE:** If the Sliding Demand Reset is initiated, or a SWD setup register is changed, SWD values are “N/A” in the meter until the number of sub-intervals specified in the #sub intervals setup register have expired. The 3D faceplate and Tabular wizard will display 0 for these values during this state.

269 Plus Motor Management Relay



The large faceplate representation of the 269 Plus provides the following animated functions:

| Feature | Function |
|----------------------|---|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to the Monitoring page. |
| SET POINTS Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| RESET Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| CLEAR Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| VALUE Buttons | Open the tabular data window specified during wizard configuration and set the view to the Setup page. |
| HELP Button | Displays a Windows help screen for PMCS. |
| ACTUAL VALUES Button | Brings the meter to an initial setting point and displays ACTUAL VALUES HAS SEVEN PAGES OF DATA. |
| REFRESH Button | Updates the display to the current meter reading. |
| STORE Button | Resets the meter at two special points in the display of values. Press STORE to toggle the response on the bottom line. |
| PAGE Buttons | Rotate among seven pages of parameter data. Press one of the arrow keys to display PAGE #: ACTUAL VALUES on the top line, a description on the bottom, and reset to the first parameter value. The seven pages are listed in the table below. |

| Feature | Function |
|----------------------|--|
| LINE Buttons | Rotate among parameters within a page. Certain configurations or meter values may prevent display of all parameters within a page. The parameters in each page are listed in the table below. |
| Panel Display Lights | Display animation that shows the status of the 269 Plus relay. If a trip or alarm has occurred, auxiliary relay 1 or 2 is active. If the meter fails its self-test, the dark red square to the left of the label appears bright red. |

Table 10. 269+ Faceplate animated functions.

The following table lists the pages that can be accessed with the PAGE buttons, with the parameters available in each page that can be accessed with the LINE buttons.

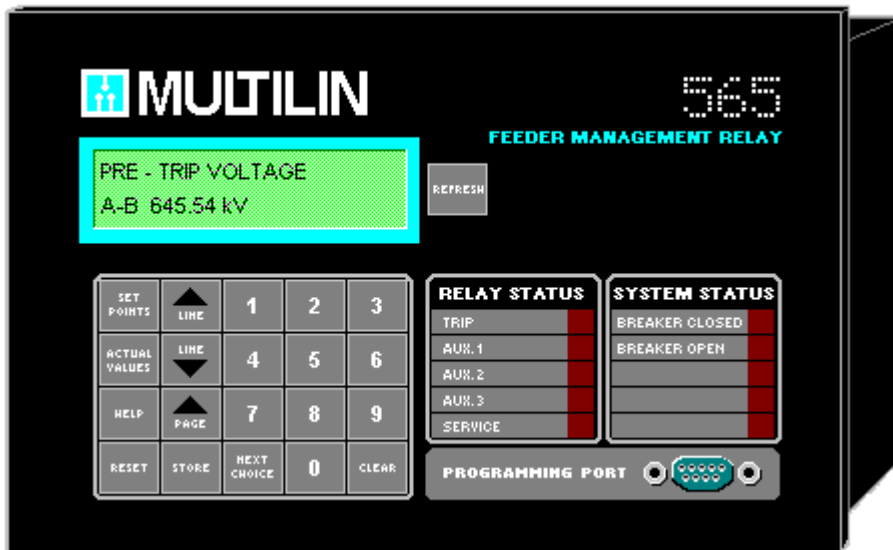
| Page | Value | Text Displayed | Description |
|------|-------|---|---|
| 1 | 1 | PAGE 1: ACTUAL VALUES PHASE CURRENT DATA | Page header |
| | 2 | I1=xxx I2=xxx I3=xxx (AMPS)--- | Phase current in amps; --- or RUN based on motor status |
| | 3 | I(3 Ph avg.)=xxx AMPS Max Stator RTD=xxx C | Average phase current Hottest stator temperature |
| | 4 | UNBALANCE RATIO (In/Ip) U/B=xx PERCENT | |
| | 5 | GROUND FAULT CURRENT G/F=xxx.0 AMPS | Units = *.1 if G/F CT ratio = 2000:1 |
| | 6 | ST/HR TIMERS (MIN) xx xx xx xx xx | Starts per hour |
| | 7 | TIME BETWEEN STARTS TIMER = xxx MIN | |
| | 8 | END OF PAGE ONE ACTUAL VALUES | Page footer |
| 2 | 1 | PAGE 2: ACTUAL VALUES RTD TEMPERATURE DATA | Page header |
| | 2 | HOTTEST STATOR RTD RTD #xx = xxx | |
| | 3-12 | RTD TEMPERATURE RTD # xx = xxx | Displays temperatures of RTDs #1-10 |
| | 13 | MAX STATOR SINCE LAST ACCESS: RTD #x = xxx DEGREES C | |
| | 14-17 | MAXIMUM RTD #x TEMP SINCE LAST ACCESS: xxx DEGREES C | Displays #7-10 max |
| | 18 | CLEAR LAST ACCESS DATA? NO | Press STORE to clear; message changes to YES |
| | 19 | END OF PAGE TWO ACTUAL VALUES | Page footer |

| Page | Value | Text Displayed | Description |
|------|-------|---|---|
| 3 | 1 | PAGE 3: ACTUAL VALUES MOTOR CAPACITY DATA | Page header |
| | 2 | ESTIMATED TIME TO TRIP = xxx SECONDS | |
| | 3 | MOTOR LOAD AS A PERCENT FULL LOAD = xxx PERCENT | |
| | 4 | THERMAL CAPACITY USED = xxx PERCENT | |
| | 5 | END OF PAGE THREE: ACTUAL VALUES | Page footer |
| 4 | 1 | PAGE 4: ACTUAL VALUES STATISTICAL DATA | Page header |
| | 2 | RUNNING HOURS SINCE LAST COMMISSIONING xxx HOURS | |
| | 3 | MEGAWATTHOURS SINCE LAST COMMISSIONING xxx MWHR | Displayed only if MTM unit is installed in 269 |
| | 4 | # OF STARTS SINCE LAST COMMISSIONING xxx | |
| | 5 | # OF TRIPS SINCE LAST COMMISSIONING xxx | |
| | 6 | # O/L TRIPS SINCE LAST COMMISSIONING xxx | Overload trips |
| | 7 | # RAPID TRIPS SINCE LAST COMMISSIONING xxx | |
| | 8 | # U/B TRIPS SINCE LAST COMMISSIONING xxx | Unbalance trips |
| | 9 | # G/F TRIPS SINCE LAST COMMISSIONING xxx | Ground-fault trips |
| | 10 | # RTD TRIPS SINCE LAST COMMISSIONING xxx | |
| | 11 | # S/C TRIPS SINCE LAST COMMISSIONING xxx | Short-circuit trips |
| | 12 | # START TRIPS SINCE LAST COMMISSIONING xxx | |
| | 13 | # U/V TRIPS SINCE LAST COMMISSIONING xxx | Undervoltage trips |
| | 14 | # O/V TRIPS SINCE LAST COMMISSIONING xxx | Overvoltage trips |
| | 15 | # PF TRIPS SINCE LAST COMMISSIONING xxx | Power-failure trips |
| | 16 | VOLTAGE PHASE REVERSALS SINCE COMMISSIONING xxx | |
| | 17 | START NEW COMMISSIONING NO | Press STORE to start; message changes to YES |
| 4 | 18 | END OF PAGE FOUR: ACTUAL VALUES | Page footer |
| | 1 | PAGE 5: ACTUAL VALUES PRE-TRIP DATA | Page header |

| Page | Value | Text Displayed | Description |
|------|-------|---|--|
| 5 | 2 | CAUSE OF LAST TRIP message | Message is a brief explanation of trip cause |
| | 3 | PRE-TRIP AVERAGE MOTOR CURRENT = xxx AMPS | |
| | 4 | PRE-TRIP U/B RATIO (I/I _p) xxx PERCENT | Unbalance |
| | 5 | PRE-TRIP G/F CURRENT G/F=xxx.0 AMPS | Units = *.1 if G/F CT ratio = 2000:1 |
| | 6 | PRE-TRIP MAX STATOR RTD RTD #XX = xxx C | |
| | 7 | PRE-TRIP AVERAGE VOLTAGE VOLTS = xxx | Displayed only if MTM unit is installed in 269 |
| | 8 | PRE-TRIP KWATTS KW = xxx | Displayed only if MTM unit is installed in 269 |
| | 9 | PRE-TRIP KVARs KVAR = xxx | Displayed only if MTM unit is installed in 269 |
| | 10 | PRE-TRIP POWER FACTOR PF = xxx | Displayed only if MTM unit is installed in 269 |
| | 11 | PRE-TRIP FREQUENCY HZ = xxx | Displayed only if MTM unit is installed in 269 |
| | 12 | END OF PAGE FIVE ACTUAL VALUES | Page footer |
| | 6 | 1 | PAGE 6: ACTUAL VALUES LEARNED PARAMETERS | Page header |
| 2 | | LEARNED I _{start} (AVG OF 4 STARTS)=xxx AMPS | |
| 3 | | LEARNED I _{start} (last one) =xxx AMPS | |
| 4 | | LEARNED K FACTOR K = xxx AMPS | |
| 5 | | LEARNED RUNNING COOL TIME-xxx MIN | |
| 6 | | LEARNED STOPPED COOL TIME = xxx MIN | |
| 7 | | LEARNED ACCEL TIME ACCEL TIME = xxx SEC | |
| 8 | | LEARNED Start Capacity Required = xxx PERCENT | |
| 9 | | END OF PAGE SIX ACTUAL VALUES | Page footer |
| 7 | 1 | PAGE 7: ACTUAL VALUES METERING DATA | Page header |
| | 2 | V _{ab} = xxx V _{bc} = xxx V _{ac} = xxx (VOLTS) or MTM METER MODULE NOT INSTALLED | Displayed only if MTM unit is on line |
| | 3 | 3 PHASE KWATTS KW = xxx | Displayed only if MTM unit is on line |

| Page | Value | Text Displayed | Description |
|-------------|--------------|------------------------------------|---------------------------------------|
| 7 | 4 | 3 PHASE KVAR KVAR = xxx | Displayed only if MTM unit is on line |
| | 5 | POWER FACTOR PF = xxx | Displayed only if MTM unit is on line |
| | 6 | FREQUENCY HZ = xx.x | Displayed only if MTM unit is on line |
| | 7 | END OF PAGE SEVEN ACTUAL VALUES | Page footer |

565 Feeder Management Relay



The large faceplate representation of the 565 provides the following animated functions:

| Feature | Function |
|----------------------|---|
| Display Window | Opens the tabular data window specified during wizard configuration and sets the view to Monitoring page. |
| SET POINTS Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| RESET Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| CLEAR Button | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| NEXT CHOICE | Opens the tabular data window specified during wizard configuration and sets the view to the Setup page. |
| 0 to 9 Buttons | Open the tabular data window specified during wizard configuration and set the view to the Setup page. |
| HELP Button | Displays a Windows help screen for PMCS. |
| ACTUAL VALUES Button | Brings the meter to an initial setting point and displays ACTUAL VALUES HAS NINE PAGES OF DATA. |
| REFRESH Button | Updates the display to the current meter reading. |
| STORE Button | Resets the meter at six special points in the display of values. Press STORE to toggle the response on the bottom line. |
| PAGE UP Button | Rotates among nine pages of parameter data. Press the key to display ACTUAL VALUES on the top line, a description on the bottom, and reset to the first parameter value. The nine pages are listed in the table below. |
| LINE Buttons | Rotate among parameters within a page. Certain configurations or meter values may prevent display of all parameters within a page. The parameters in each page are listed in the table below. |
| Panel Display Lights | Display animation that shows the status of the 565 relay. The dark red square to the left of the label appears bright red to indicate an active state. The TRIP bar shows the current trip condition. Auxiliary relays 1, 2, and 3 show user-selected function status. The BREAKER CLOSED and BREAKER OPEN bars show the status of the monitored feeder breaker. The SERVICE bar is not animated. |

Table 11. 565 Faceplate animated functions.

The following table lists the pages that can be accessed with the PAGE UP button, with the parameters available in each page that can be accessed with the LINE buttons.

| Page | Value | Text Displayed | Description |
|------|-------|--|--|
| | 1 | ACTUAL VALUES CURRENT | Page header |
| | 2 | PHASE A CURRENT xxx | Value in amps |
| | 3 | PHASE B CURRENT xxx | Value in amps |
| 1 | 4 | PHASE C CURRENT xxx | Value in amps |
| | 5 | GROUND CURRENT xxx | Value in amps |
| | 6 | PHASES A = xxx B = xxx C = xxx or PHASES A<1% FS B<1% FS C<1% FS | Value in amps Breaker is closed and current <1% of trip level in all phases |
| | 7 | CURRENT END OF PAGE | Page footer |
| | 1 | ACTUAL VALUES ANALOG INPUT | Page header |
| 2 | 2 | <analog input name> xxx <units> or ANALOG INPUT DISABLED | Name entered by user, value given in user-defined units Displayed if disabled |
| | 3 | ANALOG INPUT END OF PAGE | Page footer |
| | 1 | ACTUAL VALUES MAINTENANCE DATA | Page header |
| | 2 | BRKR mm/dd/yy DATE: xx/xx/xx | |
| | 3 | BREAKER TRIPS xxx | Number of trips since last reset |
| | 4 | ACCUMULATED KA PHASE A xxx | |
| 3 | 5 | ACCUMULATED KA PHASE B xxx | |
| | 6 | ACCUMULATED KA PHASE C xxx | |
| | 7 | MAINTENANCE DATA CLEAR NO | Press STORE button to reset trip counter |
| | 8 | DATA CLEARED LAST: xx/xx/xx | Date of last reset |
| | 9 | MAINTENANCE DATA END OF PAGE | Page footer |
| | 1 | ACTUAL VALUES OPERATIONS DATA | Page header |

| Page | Value | Text Displayed | Description |
|------|-------|--------------------------------|---|
| | 2 | TIMED PHASE O/C TRIPS ### | |
| | 3 | INST PHASE O/C TRIPS ### | |
| | 4 | TIMED GROUND O/C TRIPS ### | |
| 4 | 5 | INST GROUND O/C TRIPS ### | |
| | 6 | OVERVOLTAGE TRIPS ### | |
| | 7 | UNDERVOLTAGE TRIPS ### | |
| | 8 | ANALOG INPUT TRIPS ### | |
| | 9 | CLEAR OPERATIONS DATA? NO | Press STORE button to clear trip counters |
| | 10 | DATA CLEARED LAST 0/0/0 | |
| | 11 | OPERATIONS DATA END OF PAGE | Page footer |
| | 1 | ACTUAL VALUES PRE-TRIP DATA | Page header |
| | 2 | ALARM PHASE O/C | |
| | 3 | ALARM: GROUND O/C | |
| | 4 | ALARM: OVERVOLT | |
| | 5 | ALARM: UNDERVOLT | |
| | 6 | ALARM: ANALOG INPUT | |
| | 7 | ALARM: ACCUMULATED KA | |
| | 8 | SWITCH ALARM 1 | |
| | 9 | ALARM: AMPS DEMAND | |
| | 10 | ALARM: KW DEMAND | |
| | 11 | ALARM: KVAR DEMAND | |
| | 12 | ALARM: POWER FACTOR | |
| | 13 | ALARM: FREQUENCY | |
| | 14 | ALARM: TRIP COIL | |
| 5 | 15 | ALARM: MTM COMM | |
| | 16 | CAUSE OF LAST TRIP: | |

| Page | Value | Text Displayed | Description |
|------|-------|--|---|
| 17 | | TIME OVERCURRENT PHASE ABC or TIME OVERCURRENT GROUND or INST OVERCURRENT PHASE ABC or UNDERVOLTAGE FAULT or OVERVOLTAGE FAULT or EXTERNAL TRIP #x or ANALOG INPUT or POWER FACTOR FAULT or FREQUENCY FAULT | Only phases in alarm are displayed x is in range 1-4 |
| 18 | | PHASE A PRE-TRIP CURRENT xxx A | Value in amps |
| 19 | | PHASE B PRE-TRIP CURRENT xxx A | Value in amps |
| 20 | | PHASE C PRE-TRIP CURRENT xxx A | Value in amps |
| 21 | | GROUND PRE-TRIP CURRENT xxx A | Value in amps |
| 22 | | PRE -TRIP VOLTAGE A-B xxx.xx kV or A-N xxx.xx kV | If configured as Delta or If configured as Wye |
| 23 | | PRE -TRIP VOLTAGE B-C xxx.xx kV or B-N xxx.xx kV | If configured as Delta or If configured as Wye |
| 24 | | PRE -TRIP VOLTAGE C-A xxx.xx kV or C-N xxx.xx kV | If configured as Delta or If configured as Wye |
| 25 | | FREQUENCY AT TRIP xxx.xx Hz | |
| 26 | | DATE OF TRIP xx/xx/xx | mm/dd/yy |
| 27 | | TIME OF TRIP xx:xx:xx | hh:mm:ss |
| 28 | | PRE-TRIP DATA END OF PAGE | Page footer |

| Page | Value | Text Displayed | Description |
|------|-------|--|--|
| | 1 | ACTUAL VALUES VOLTAGE | Page header |
| | 2 | VOLTAGE A-B xxx.xx kV | |
| 6 | 3 | VOLTAGE B-C xxx.xx kV | |
| | 4 | VOLTAGE C-A xxx.xx kV | |
| | 5 | FREQUENCY OF FEEDER xxx.xx Hz | |
| | 6 | VOLTAGE END OF PAGE | Page footer |
| | 1 | ACTUAL VALUES EVENT | Page header |
| | 2 | NO OF EVENTS xxx or EVENT RECORDING DISABLED | Displayed only if enabled |
| 7 | 3 | CLEAR EVENTS? NO | Press STORE button to clear event counter |
| | 4 | EVENTS CLEARED LAST: xx/xx/xx | Date of last reset: mm/dd/yy |
| | 5 | EVENT END OF PAGE | Page footer |
| | 1 | ACTUAL VALUES DEMAND DATA | Page header |
| | 2 | PH-A PEAK DEMAND xxx A or AMPS DEMAND DISABLED | Value in amps or Next prompt is CLEAR AMP DEMAND |
| | 3 | PH-B PEAK DEMAND xxx A | Value in amps |
| | 4 | PH-C PEAK DEMAND xxx A | Value in amps |
| | 5 | CLEAR AMP DEMAND DATA? NO | Press STORE button to reset amp data |
| | 6 | DATA CLEARED LAST: xx/xx/xx | Date of last reset: mm/dd/yy |
| 8 | 7 | PEAK KW DEMAND xxx kW or KW DEMAND DISABLED | or Displayed if disabled |
| | 8 | CLEAR KW DEMAND DATA? NO | Press STORE button to reset kilowatt data |
| | 9 | KW DEMAND DATA CL'D: xx/xx/xx | Date of last reset: mm/dd/yy |

| Page | Value | Text Displayed | Description |
|------|-------|------------------------------------|---------------------------------------|
| | 10 | PEAK KVAR DEMAND xxx kVAR | |
| | | or | or |
| | | KVAR DEMAND DISABLED | Displayed if disabled |
| | 11 | CLEAR KVAR DEMAND DATA? NO | Press STORE button to reset kVAR data |
| | 12 | KVAR DEMAND DATA CL'D: xx/xx/xx | Date of last reset: mm/dd/yy |
| | 13 | DEMAND DATA END OF PAGE | Page footer |
| | 1 | METERING DATA DEMAND DATA | Page header |
| | 2 | POWER FACTOR LAGGING: x.xx | If PF < 0 |
| | | or | or |
| | | LEADING: x.xx | If PF > 0 |
| | 3 | FREQUENCY MTM x.xx Hz | |
| 9 | 4 | REAL POWER xxx kW | |
| | 5 | REACTIVE POWER xxx kVAR | |
| | 6 | ENERGY USED xxx MWHRS | |
| | 7 | METERING DATA END OF PAGE | Page footer |

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Features of Tabular Data Screen Wizards

Introduction

This chapter describes the features available with tabular data screens. The set of features basic to all tabular data screens is described first, then any unique features are described for each device.

Features of Tabular Data Screens

The upper left-hand area of every tabular data screen contains a 3-D graphic of the device faceplate. This graphic is simply to verify identification and is not animated.

The middle area on the left-hand side displays common information about the device. It provides a quick indication of how the device is configured and contains no animation.

The buttons on the lower-left of the screen provide features described below. Not all devices support all of these buttons, so on some screens one or more of the buttons may be grayed out.

- The Help button calls up the PMCS help file with regard to the current device.
- The Exit button closes the tabular data screen.
- The Events button starts or jumps to the PMCS Event Logger client program and displays its window in the foreground.
- The Trend button displays the trend window that was specified in the configuration dialog. The button will be disabled if no trend window was specified during configuration of the Wizard.
- The Wave button runs the PMCS Waveform Capture client program for that device. This button is only enabled for devices supporting waveform capture.
- The Setup button displays the trend window that was specified in the configuration dialog. The button will be disabled if no setup window was specified during configuration of the Wizard.

The right side of the screen contains a display of the device data. The tabs at the bottom enable you to select among the various data tables which can be displayed. The number of tabs (screens) varies according to the type and amount of data available from the device. The two main types of data are *metering*, which shows the data being monitored by the device, and *setup*, which is used to configure the device. Other tabs may be available depending on the device's capabilities.

Some devices have push buttons that reset events or clear accumulated data; these will be discussed below in the individual device sections. These functions are represented by 3-D push buttons on the tabular data screens. When a button is pressed, a dialog box appears that either asks for confirmation of the action or states that the operator has an insufficient access level to perform the operation. If security is enabled in your InTouch application, the current operator must have an Access level greater than or equal to the Access level configured for each tabular wizard in order to issue device commands. See the Wonderware InTouch documentation for more information on how to use security features within InTouch.

Power Leader EPM

PLEPM Normal Metering Values (Delta)

| | <u>A-B</u> | <u>C-B</u> | <u>Total</u> | <u>Three Phase Values</u> | |
|-------|------------|------------|--------------|---------------------------|------|
| kW: | 1.42 | 1.46 | 4.32 | kWh Total: | 2.00 |
| kVar: | 1.40 | 1.45 | 4.31 | kVarh Lag Total: | 2.00 |
| kVA: | 2.00 | 2.06 | 6.10 | kVarh Lead Total: | 2.00 |
| PF: | 0.71 | 0.71 | 2.12 | kVAh Total: | 2.00 |
| | | | | kQh Total: | 7.47 |

Device Name: EPM
 Group Name: GROUP 1
 Primary Voltage: 0.00
 Primary Current: 0
 Commnet Address: 0
 Modbus Address: 0
 Serial Number: 0
 Meter Rev.: 0.00
 Comm Card Rev.: 0.00

Current A: 44.55
 Current B: 44.91
 Current C: 45.36
 Current Demand A: 44.55 Peak: 0.00
 Current Demand C: 45.36 Peak: 0.00
 Frequency: 60.00
 Voltage A-B: 77.72
 Voltage B-C: 78.74
 Voltage C-A: 78.59

Event Logger | Trend Wave | Help Exit

Normal Metering | Alternate Metering | Setup

The Power Leader EPM Tabular Data Screen wizard provides the following command buttons:

| Tab | Button | Function |
|-------|------------------|--|
| Setup | Meter Initialize | Performs a complete meter reset |
| | Clear Errors | Clears the event log in the meter |
| | Demand Reset | Clears the watt demand register in the meter |
| | Energy Reset | Clears the accumulated energy registers in the meter |

Table 12. PLEPM Tabular data screen commands.

Another feature to bear in mind when working with the PLEPM tabular wizard is:

- The Normal Metering screen displays one of two tables depending on whether the meter is configured as Delta or Wye.

Spectra MicroVersaTrip

Spectra MicroVersa Trip Monitoring Screen

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>Total</u> |
|-----------------|----------|----------|------------|--------------|
| Amps: | 45.10 | 44.83 | 45.41 | |
| Volts L-N: | 45.08 | 44.93 | 45.23 | |
| kW: | 1.45 | 1.44 | 1.46 | 4.34 |
| kVAR: | 1.43 | 1.41 | 1.45 | 4.29 |
| kVA: | 2.03 | 2.01 | 2.05 | 6.10 |
| kWh: | 2 | | Volts A-B: | 78.07 |
| kW demand: | 2 | | Volts B-C: | 77.82 |
| Peak kW demand: | 2 | | Volts A-C: | 78.35 |
| PF: | 0.71 | | | |
| Frequency: | 60.3 | | | |
| Breaker Status: | Open | | | |

Device Name: MVT
 Group Name: \$System
 Connection: Delta
 Frame Size: G Frame
 Current Sensor: 0
 Rating Plug: 0
 PT Rating: 0
 Commnet Address: 0
 Modbus Address: 0
 Software Rev: 0.00
 Product Rev: 0.00

Event Trend Help
 Logger Wave Exit

Normal Monitoring Setup Screen

The Spectra MicroVersaTrip Tabular Data Screen wizard provides the following command buttons on the Setup screen:

| Tab | Button | Function |
|-------|--------------|--|
| Setup | Download | Downloads the energy demand interval to the DDE Server |
| | Refresh | Loads the energy demand interval from the DDE Server into the screen display |
| | Clear Demand | Clears the accumulated energy |

Table 13. Spectra MVT Tabular data screen commands.

Another feature to bear in mind when working with the Spectra MicroVersaTrip tabular wizard is:

- The data entry field for the energy demand interval can be set to values of 5 to 60 minutes in increments of 5 minutes.

Enhanced MicroVersaTrip-C Trip Unit

Enhanced MicroVersa Trip-C Monitoring Screen

| | A | B | C | N |
|-----------------|----------|--------------------------|----------|--------------|
| Amps: | 44.82 | 44.57 | 44.91 | 45.07 |
| Volts L-N: | 45.26 | 45.08 | 45.15 | Total |
| kW: | 1.43 | 1.42 | 1.43 | 4.28 |
| kVAR: | 1.44 | 1.42 | 1.44 | 4.30 |
| kVA: | 2.03 | 2.01 | 2.03 | 6.07 |
| kW demand: | 903.00 | Volts A-B: | 78.40 | |
| Peak kW demand: | 903.00 | Volts B-C: | 78.08 | |
| kWh: | 903.00 | Volts C-A: | 78.20 | |
| PF: | 2.11 | Trip Operations Counter: | Disabled | |
| Frequency: | 59.9 | Sw. Inst./Short Time: | Disabled | |
| Breaker Status: | Open | Current Unbalance Relay: | Disabled | |
| Wires: | 3 wire | Gnd Fault ZSI Selected: | Disabled | |
| | | Short Time ZSI Selected: | Disabled | |

Device Name: EMVTC
 Group Name: \$System
 Connection: Delta
 Frame Size: 0
 Rating Plug: 0
 PT Rating: 0
 Commnet Address: 0
 Modbus Address: 0
 Software Rev: 0.00
 Product Rev: Unknown

Event Logger | Trend Wave | Help Exit

Normal Monitoring | Setup Screen

The Enhanced MicroVersaTrip-C Tabular Data Screen provides six push buttons on the Setup screen:

| Tab | Button | Function |
|-------|--------------|--|
| Setup | Energy | Clears the accumulated energy registers in the trip unit |
| | Demand | Clears the peak demand register in the trip unit |
| | Inst. Trip | Resets the instantaneous trip counter in the trip unit |
| | Short Trip | Resets the short-time trip counter in the trip unit |
| | Long Trip | Resets the long-time trip counter in the trip unit |
| | Ground Fault | Resets the ground fault trip counter in the trip unit |

Table 14. EMVT-C Tabular data screen commands.

Enhanced MicroVersaTrip-D Trip Unit

Enhanced MicroVersa Trip-D Monitoring Screen

| | A | B | C | N |
|-----------------|----------|-----------------------------------|----------|--------------|
| Amps: | 90.41 | 90.45 | 90.15 | 89.51 |
| Volts L-N: | 90.16 | 90.46 | 89.51 | Total |
| kW: | 0.06 | 0.06 | 0.03 | 0.03 |
| kVAR: | 8.15 | 8.18 | 8.07 | 24.40 |
| kVA: | 8.15 | 8.18 | 8.07 | 24.40 |
| kW demand: | 1293.00 | Volts A-B: | | 156.17 |
| Peak kW demand: | 1293.00 | Volts B-C: | | 156.69 |
| kWh: | 1293.00 | Volts A-C: | | 155.03 |
| PF: | 1.00 | | | |
| Frequency: | 59.7 | | | |
| Breaker Status: | Open | Trip Operations Counter: Disabled | | |
| Wires: | 3 wire | Sw. Inst/Short Time: Disabled | | |
| | | Current Unbalance Relay: Disabled | | |
| | | Gnd Fault ZS1 Selected: Disabled | | |
| | | Short Time ZS1 Selected: Disabled | | |

Device Name: EMVTD
 Group Name: \$System
 Connection: Delta
 Frame Size: 0
 Rating Plug: 0
 PT Rating: 0
 Commnet Address: 0
 Modbus Address: 0
 Software Rev: 0.00
 Product Rev: Unknown

Event Logger | Trend | Help | Exit

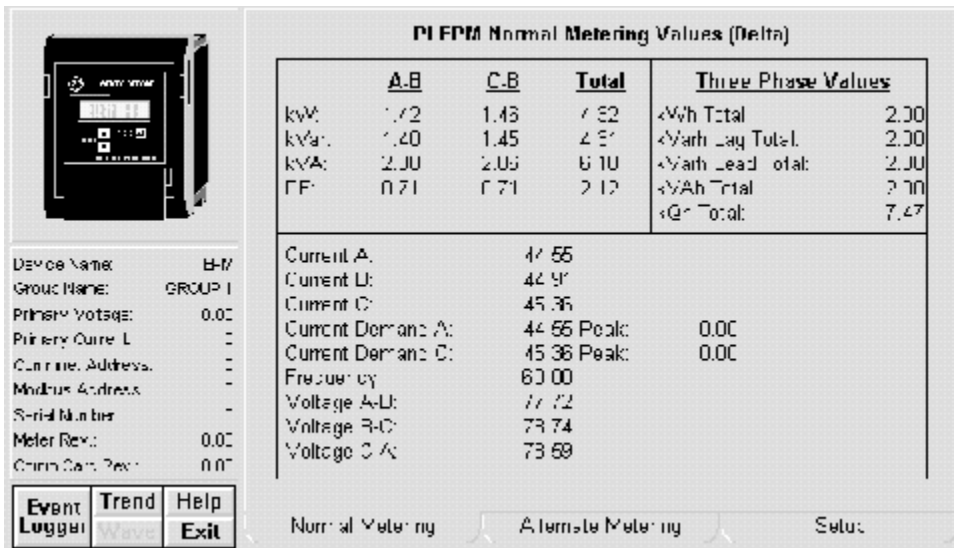
Normal Monitoring | Setup Screen

The Enhanced MicroVersaTrip-D Tabular Data Screen provides six push buttons on the Setup tab:

| Tab | Button | Function |
|-------|--------------|--|
| Setup | Energy | Clears the accumulated energy registers in the trip unit |
| | Demand | Clears the peak demand register in the trip unit |
| | Inst. Trip | Resets the instantaneous trip counter in the trip unit |
| | Short Trip | Resets the short-time trip counter in the trip unit |
| | Long Trip | Resets the long-time trip counter in the trip unit |
| | Ground Fault | Resets the ground fault trip counter in the trip unit |

Table 15. EMVT-D Tabular data screen commands.

POWER LEADER Meter



PI FPM Normal Metering Values (Delta)

| | <u>A-B</u> | <u>C-B</u> | <u>Total</u> | <u>Three Phase Values</u> |
|-------|------------|------------|--------------|---------------------------|
| kW: | 1.72 | 1.45 | 4.62 | kWh Total: 2.00 |
| kVar: | 1.20 | 1.45 | 2.91 | kVarh Lag Total: 2.00 |
| kVA: | 2.00 | 2.00 | 6.10 | kVarh Lead Total: 2.00 |
| PF: | 0.71 | 0.71 | 0.12 | kVAh Total: 2.00 |
| | | | | kWh Total: 7.47 |

Device Name: BM
 Group Name: GROUP 1
 Primary Voltage: 0.00
 Primary Current: -
 Current Address: -
 Modbus Address: -
 Serial Number: -
 Meter Rev: 0.00
 Comm. Data Rev: 0.00

Event Logger | Trend Wave | Help Exit

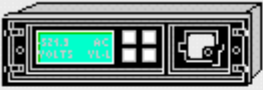
Normal Metering | Alternate Metering | Setup

The POWER LEADER Meter Tabular Data Screen wizard provides three push buttons on the Command screen:

| Tab | Button | Function |
|---------|------------------------|--|
| Command | Energy /VARH Clear | Clears the accumulated energy registers in the meter |
| | Peak Current Clear | Clears the peak current register in the meter |
| | Peak Watt Demand Clear | Clears the peak demand in the meter |

Table 16. PL Meter Tabular data screen commands.

Spectra ECM



Spectra MicroVersa Trip Monitoring Screen

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>Total</u> |
|-----------------|----------|------------|----------|--------------|
| Amps: | 45.10 | 44.83 | 45.41 | |
| Volts L-N: | 45.08 | 44.93 | 45.23 | |
| kW: | 1.45 | 1.44 | 1.46 | 4.34 |
| kVAR: | 1.43 | 1.41 | 1.45 | 4.29 |
| kVA: | 2.03 | 2.01 | 2.05 | 6.10 |
| kWh: | 2 | Volts A-B: | | 78.07 |
| kW demand: | 2 | Volts B-C: | | 77.82 |
| Peak kW demand: | 2 | Volts A-C: | | 78.35 |
| PF: | 0.71 | | | |
| Frequency: | 60.3 | | | |
| Breaker Status: | Open | | | |

| | |
|-----------------|----------|
| Device Name: | MVT |
| Group Name: | \$System |
| Connection: | Delta |
| Frame Size: | G Frame |
| Current Sensor: | 0 |
| Rating Plug: | 0 |
| PT Rating: | 0 |
| Commet Address: | 0 |
| Modbus Address: | 0 |
| Software Rev: | 0.00 |
| Product Rev: | 0.00 |

| | | |
|-----------------|---------------|--------------|
| Event Logger | Trend Wave | Help Exit |
|-----------------|---------------|--------------|

Normal Monitoring Setup Screen

The Spectra ECM Tabular Data Screen wizard performs the following actions with push buttons on the Command screen:

| Tab | Button | Function |
|---------|------------------------|--|
| Command | Contactor 1 Start | Closes contactor 1 |
| | Contactor 2 Fast Start | Initiates a fast start of contactor 2 |
| | Contactor 2 Rev Start | Reverse closes contactor 2 |
| | Stop 1 & 2 | Opens contactors 1 and 2 |
| | ECM Reset | Completely resets the ECM |
| | Initialize Temperature | Resets the temperature memory in the ECM |
| | Trip ECM Contactor | Trips the ECM contactors |

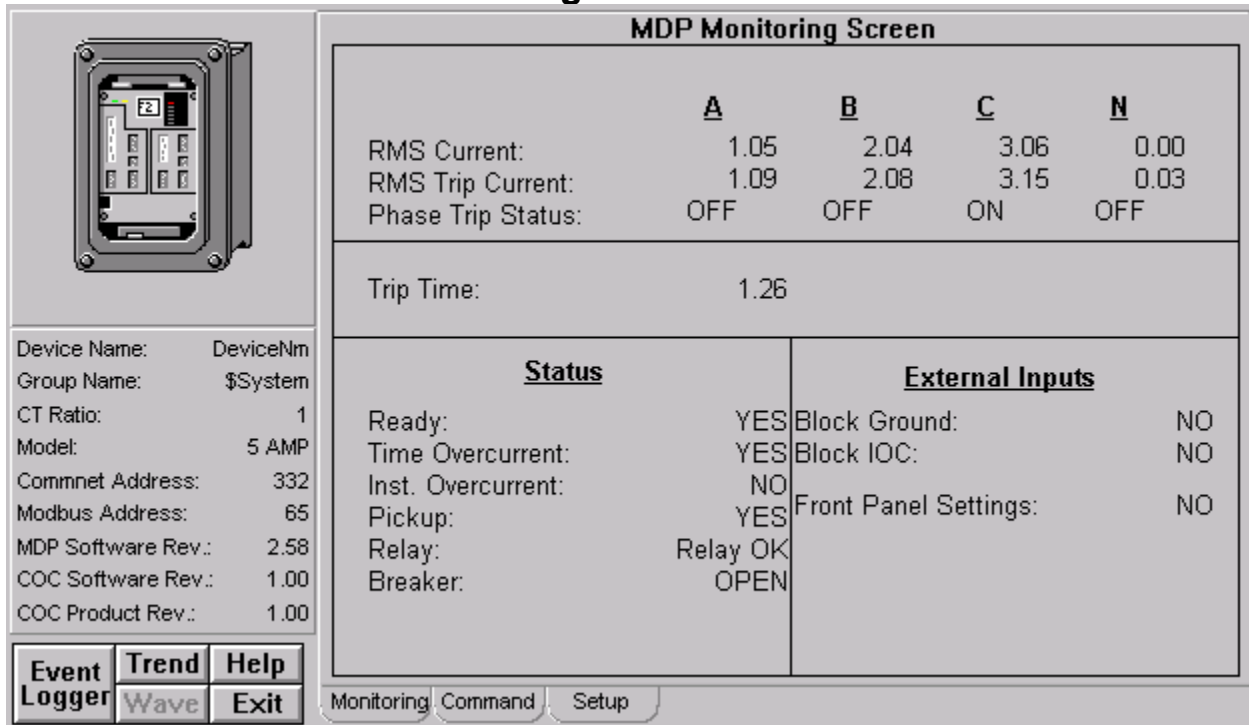
Table 17. Spectra ECM Tabular data screen commands.

MDP Digital Overcurrent Relay

The feature to bear in mind when working with the MDP tabular wizard is:

- On the Setup screen, you must enter a value into the CT Ratio box. This value is multiplied by the values in the amp registers to convert the latter into user units. If you do not enter a value for the CT Ratio, the message “CT Ratio has not been entered” appears on the bottom of the Tabular Data Screen and on the Large Faceplate wizard.

Monitoring Tab



The screenshot displays the MDP Monitoring Screen interface. On the left, there is a small image of the device faceplate. Below it, a table lists device parameters:

| | |
|--------------------|----------|
| Device Name: | DeviceNm |
| Group Name: | \$System |
| CT Ratio: | 1 |
| Model: | 5 AMP |
| Commnet Address: | 332 |
| Modbus Address: | 65 |
| MDP Software Rev.: | 2.58 |
| COC Software Rev.: | 1.00 |
| COC Product Rev.: | 1.00 |

The main area of the screen is titled "MDP Monitoring Screen" and contains the following data:

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>N</u> |
|--------------------|----------|----------|----------|----------|
| RMS Current: | 1.05 | 2.04 | 3.06 | 0.00 |
| RMS Trip Current: | 1.09 | 2.08 | 3.15 | 0.03 |
| Phase Trip Status: | OFF | OFF | ON | OFF |

Below this table, the Trip Time is shown as 1.26.

The screen is divided into two columns: **Status** and **External Inputs**.

| <u>Status</u> | | <u>External Inputs</u> | |
|--------------------|----------|------------------------|----|
| Ready: | YES | Block Ground: | NO |
| Time Overcurrent: | YES | Block IOC: | NO |
| Inst. Overcurrent: | NO | Front Panel Settings: | NO |
| Pickup: | YES | | |
| Relay: | Relay OK | | |
| Breaker: | OPEN | | |

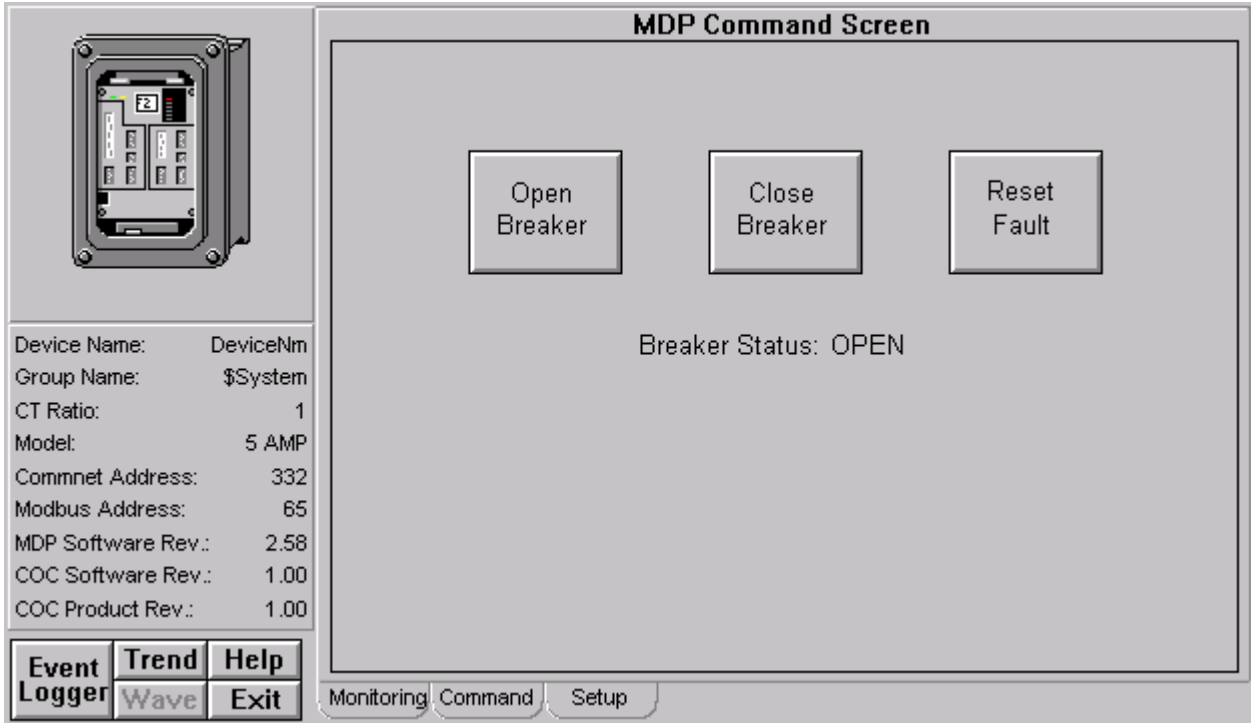
At the bottom left, there are buttons for "Event Logger", "Trend Wave", and "Help Exit". At the bottom center, there are buttons for "Monitoring", "Command", and "Setup".

The MDP Monitoring Screen shows the following:

- Metering values of RMS Current, RMS Trip Current and Phase Trip Status
- Trip Time
- Status
- External Inputs

The message “CT Ratios has not been entered!” will appear when no CT Ratio entered on the Setup tab. Click on Setup Screen Tab to enter the CT Ratio.

Command Tab



The MDP Tabular Data Screen wizard has three command buttons:

| Tab | Button | Function |
|---------|---------------|-----------------------------------|
| Command | Open Breaker | Opens the breaker. |
| | Close Breaker | Closes the breaker. |
| | Reset Fault | Clears the event table in the MDP |

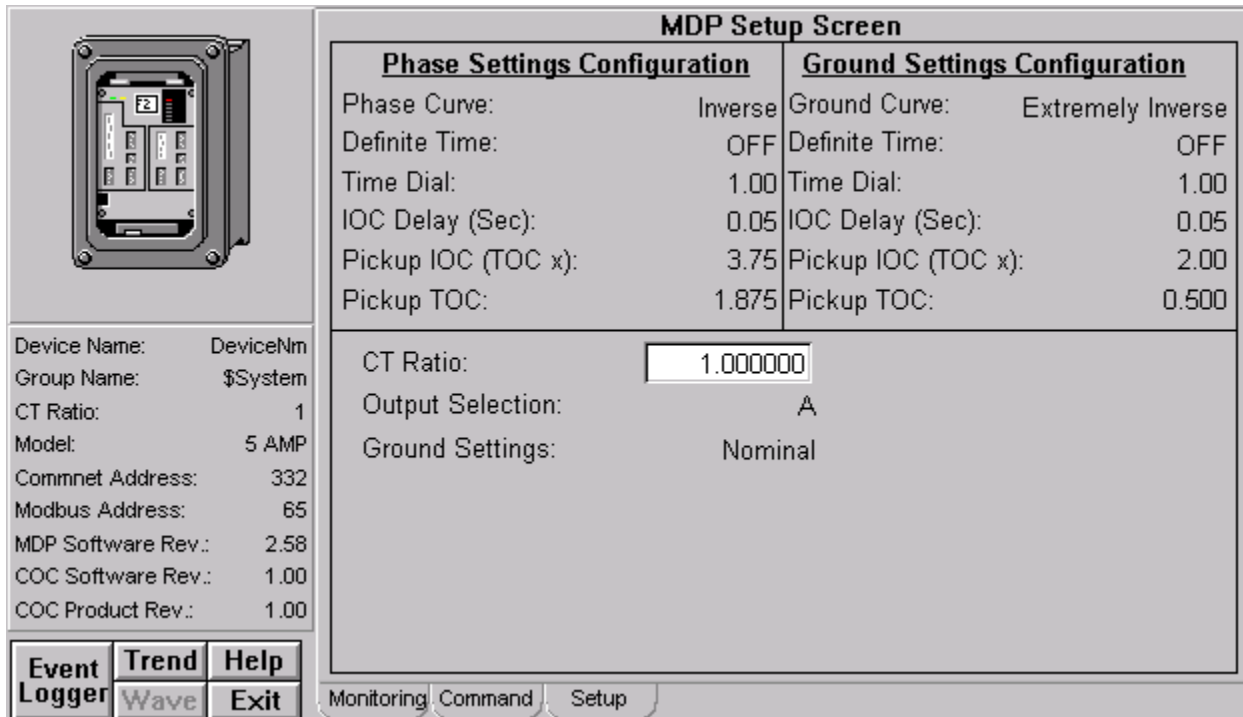
Table 18. MDP Tabular data screen commands.

The MDP Command Screen shows 3 buttons:

- **Open Breaker:** Opens the Breaker
- **Close Breaker:** Closes the Breaker
- **Reset Fault:** Clears the Event Table in the MDP

The screen also shows the Breaker Status, for example OPEN.

Setup Tab



The MDP Setup Screen displays the following information:

| Phase Settings Configuration | | Ground Settings Configuration | |
|------------------------------|---------|-------------------------------|-------------------|
| Phase Curve: | Inverse | Ground Curve: | Extremely Inverse |
| Definite Time: | OFF | Definite Time: | OFF |
| Time Dial: | 1.00 | Time Dial: | 1.00 |
| IOC Delay (Sec): | 0.05 | IOC Delay (Sec): | 0.05 |
| Pickup IOC (TOC x): | 3.75 | Pickup IOC (TOC x): | 2.00 |
| Pickup TOC: | 1.875 | Pickup TOC: | 0.500 |

Device Name: DeviceNm
Group Name: \$System
CT Ratio: 1
Model: 5 AMP
Commnet Address: 332
Modbus Address: 65
MDP Software Rev.: 2.58
COC Software Rev.: 1.00
COC Product Rev.: 1.00

CT Ratio:
Output Selection: A
Ground Settings: Nominal

Event Logger | Trend Wave | Help Exit | Monitoring | Command | Setup

The MDP Setup Screen shows:

- Phase Settings Configuration
- Ground Settings Configuration

You must enter CT Ratio in the relevant field.

PQM (Power Quality Meter)

All six function buttons under the Info box are enabled for the PQM.


The PQM Tabular Data Screen wizard has nine command buttons, described below.

| Tab | Button | Function |
|------------|-------------------------|---|
| Metering | Clear Energy | Clears the PQM's energy counters |
| | Reset Device | Issues a RESET command to the PQM |
| Demand | Clear Max Demand Values | Clears the PQM's Max Demand values from memory |
| | Clear Frequency Values | Clears the PQM's Max Frequency values from memory |
| I, V Range | Clear Current Min/Max | Clears the PQM's Current Min/Max values from memory |
| | Clear Voltage Min/Max | Clears the PQM's Voltage Min/Max values from memory |
| P Range | Clear Power Min/Max | Clears the PQM's Power Min/Max values from memory |
| Analysis | Clear Max THD Values | Clears the PQM's Max THD values from memory |
| I/O | Reset Pulse Counter | Resets the PQM's pulse counter |

Table 19. PQM Tabular data screen commands.

See the PQM Instruction Manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Metering Tab



Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

Multilin PQM Metering

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>3 Phase</u> |
|---|------------|----------------------------|---|--------------------------------|
| Amps: | 1 | 1 | 1 | 1 (Average) |
| PF: | 1.00 Lag | 1.00 Lag | 0.99 Lag | 1.00 Lag |
| kW: | 0.00 | 0.74 | 0.74 | 1.48 |
| kvar: | 0.00 | -0.02 | 0.02 | 0.00 |
| kVA: | 0.00 | 0.74 | 0.75 | 1.48 |
| V (Phase): | 0 | 751 | 752 | 501 (Average) |
| | <u>A-B</u> | <u>B-C</u> | <u>C-A</u> | |
| V (Line): | 750 | 1301 | 751 | 934 (Average) |
| Neutral Current (A): | 0 | | Voltage Unbalance (%): | 100.0 |
| Current Unbalance (%): | 0.0 | | Frequency (Hz): | 0.00 |
| Energy | | | kVAh: | 2148 |
| Positive kWh: | 2122 | kWh last 24 hrs: | | 31 |
| Negative kWh: | 22 | Real Energy Cost (\$): | | 212.20 |
| Positive kvarh: | 12 | Real Energy Cost/day (\$): | | 6.06 |
| Negative kvarh: | 17 | Output Relays | | |
| Last Energy Reset: 19:05:51 11/07/2001 | | | <input checked="" type="checkbox"/> Alarm | <input type="checkbox"/> Aux 2 |
| <input type="button" value="Clear Energy"/> <input type="button" value="Reset Device"/> | | | <input type="checkbox"/> Aux 1 | <input type="checkbox"/> Aux 3 |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |


| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin PQM Metering tab shows:

- **Metering values:** For A, B, C and 3 Phase
- **Energy:** In various values
- **Output Relays:** Alarm, Aux 1, Aux 2 and Aux 3

The **Clear Energy** button, when clicked, will clear all energy values. The **Reset Device** button, when clicked, will reset the Device.

Status Tab



Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02

Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Multilin PQM Alarm, Aux1, Aux2, Aux3 Relay Status

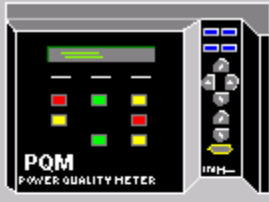
| | | |
|---|--|--|
| <input type="checkbox"/> Phase Undercurrent | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Underfrequency | <input type="checkbox"/> Clock Not Set |
| <input type="checkbox"/> Phase Overcurrent | <input type="checkbox"/> Overfrequency | <input type="checkbox"/> Param. Not Set |
| <input type="checkbox"/> Neutral Overcurrent | <input type="checkbox"/> Apparent Power Dmnd | <input type="checkbox"/> Pulse Input 1 |
| <input type="checkbox"/> Undervoltage | <input type="checkbox"/> Phase A Current Dmnd | <input type="checkbox"/> Current THD |
| <input type="checkbox"/> Overvoltage | <input type="checkbox"/> Phase B Current Dmnd | <input type="checkbox"/> Voltage THD |
| <input type="checkbox"/> Current Unbalance | <input type="checkbox"/> Phase C Current Dmnd | <input type="checkbox"/> Main Analog I/P |
| <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Voltage Unbalance | <input type="checkbox"/> Neutral Current Dmnd | <input type="checkbox"/> Alt Analog I/P |
| <input type="checkbox"/> Phase Reversal | <input type="checkbox"/> Switch Input A | <input type="checkbox"/> Data Log 1 |
| <input type="checkbox"/> Power Factor Lead 1 | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Switch Input B | <input type="checkbox"/> Data Log 2 |
| <input type="checkbox"/> Power Factor Lead 2 | <input type="checkbox"/> Switch Input C | <input type="checkbox"/> COM1 Failure |
| <input type="checkbox"/> Power Factor Lag 1 | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Switch Input D | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> COM2 Failure |
| <input type="checkbox"/> Power Factor Lag 2 | <input type="checkbox"/> Internal Fault | <input type="checkbox"/> Pulse Input 2 |
| <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Positive Real Power | <input type="checkbox"/> Pos. Real Power Dmnd | <input type="checkbox"/> Pulse Input 3 |
| <input type="checkbox"/> Negative Real Power | <input type="checkbox"/> Neg. Real Power Dmnd | <input type="checkbox"/> Pulse Input 4 |
| <input type="checkbox"/> Pos. Reactive Power | <input type="checkbox"/> Pos. Reactive Pwr Dmnd | <input type="checkbox"/> Total Pulse Inp. |
| <input type="checkbox"/> Neg. Reactive Power | <input type="checkbox"/> Neg. Reactive Pwr Dmnd | <input type="checkbox"/> Time Alarm |

Legend: ■ = Pickup ■ = Active

Metering
Status
Demand
IVRange
PRange
Analysis
IO
Setpoints

The Multilin Status tab shows the status of Alarms, Aux1, Aux2, Aux3 Relays.

Demand Tab



Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

| Multilin PQM Demand | | | | | |
|--|------------------|------------|-------------------------------|------------|--------------------------|
| Multilin PQM Metering Frequency & Demand Range | | | | | |
| | <u>Frequency</u> | <u>Min</u> | | <u>Max</u> | |
| Hz | 60.00 | 0.00 | 00:00:00 | 00/00/00 | 655.35 00:00:00 00/00/00 |
| <u>Demand Current & Power</u> | | | <u>Peak Demand</u> | | |
| Phase A Current Demand (Amps): | 0 | 0 | 13:39:46 | 09/14/2000 | |
| Phase B Current Demand (Amps): | 0 | 0 | 13:39:46 | 09/14/2000 | |
| Phase C Current Demand (Amps): | 0 | 0 | 13:39:46 | 09/14/2000 | |
| Neutral Current Demand (Amps): | 0 | 0 | 13:39:46 | 09/14/2000 | |
| Real Power Demand (kW): | 0.61 | 0.61 | 09:26:59 | 12/13/2001 | |
| Reactive Power Demand (kvar): | 0.01 | 0.01 | 11:53:12 | 12/13/2001 | |
| Apparent Power Demand (kVA): | 0.61 | 0.61 | 09:26:59 | 12/13/2001 | |
| Clear Max Demand Values | | | Clear Frequency Values | | |


| | | | | | | | | | |
|---------------|--------------|-------------|--|--|--|--|--|--|--|
| Events | Trend | Help | | | | | | | |
| Setup | Wave | Exit | | | | | | | |

The Multilin PQM Demand screen shows :

- Demand Current & Power
- Peak Demand
- Minimum and Maximum Frequency and their Time Stamps.

The Clear Max Demand Values button, when clicked, will clear all the maximum demand values. The Clear Frequency Values button, when clicked, will clear all the frequency values.

IV Range Tab



Multilin PQM Current, Voltage Min/Max Detected Values

| <u>Current</u> | <u>Min</u> | <u>Max</u> |
|------------------|-------------------------------|---------------------------------|
| Amps A: | 0 13:39:44 09/14/2000 | 3 19:45:20 12/10/2001 |
| Amps B: | 0 13:39:45 09/14/2000 | 2 19:45:32 12/10/2001 |
| Amps C: | 0 13:39:45 09/14/2000 | 3 19:52:03 12/10/2001 |
| Amps N: | 0 13:39:45 09/14/2000 | 0 13:39:45 09/14/2000 |
| Amps Unbal. (%): | 0.0 13:39:45 09/14/2000 | 100.0 19:45:05 12/07/2001 |

| <u>Voltage</u> | <u>Min</u> | <u>Max</u> |
|-------------------|-------------------------------|-------------------------------|
| Volts AB: | 0 Invalid Time | 384 15:02:53 11/23/2001 |
| Volts BC: | 0 Invalid Time | 384 15:02:55 11/23/2001 |
| Volts CA: | 0 Invalid Time | 432 10:34:09 11/26/2001 |
| Volts An: | 0 13:39:45 09/14/2000 | 300 10:41:07 11/26/2001 |
| Volts Bn: | 0 13:39:45 09/14/2000 | 222 15:02:53 11/23/2001 |
| Volts Cn: | 0 13:39:45 09/14/2000 | 301 10:41:07 11/26/2001 |
| Volts Unbal. (%): | 0.0 13:39:45 09/14/2000 | 100.0 Invalid Time |

Clear Current Min/Max

Clear Voltage Min/Max

Metering
Status
Demand
IVRange
PRange
Analysis
IO
Setpoints

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |


Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

The Multilin PQM IV Range tab shows the Minimum and Maximum Current, Voltage Values.

The **Clear Current Min/Max** button, when clicked, will clear all the minimum and maximum values of the current.

The **Clear Voltage Min/Max** button, when clicked, will clear all the minimum and maximum values of voltage.

P Range Tab



Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

| Multilin PQM Power | | | | | | |
|--------------------|----------|--------------|------------|----------|----------|------------|
| | Min | | | Max | | |
| 3 Ph. kW: | 0.00 | 13:39:45 | 09/14/2000 | 0.70 | 09:25:18 | 12/13/2001 |
| Ph. A kW: | 0.00 | 13:39:45 | 09/14/2000 | 0.45 | 19:45:59 | 12/10/2001 |
| Ph. B kW: | 0.00 | 13:39:46 | 09/14/2000 | 0.20 | 08:56:09 | 12/13/2001 |
| Ph. C kW: | 0.00 | 13:39:46 | 09/14/2000 | 0.45 | 20:26:20 | 12/10/2001 |
| 3 Ph. kvar: | 0.00 | 13:39:45 | 09/14/2000 | 0.39 | 11:52:36 | 12/13/2001 |
| Ph. A kvar: | 0.00 | 13:39:45 | 09/14/2000 | 0.00 | 13:39:46 | 09/14/2000 |
| Ph. B kvar: | 0.00 | 13:39:46 | 09/14/2000 | -0.19 | 11:52:24 | 12/13/2001 |
| Ph. C kvar: | 0.00 | 13:39:46 | 09/14/2000 | 0.39 | 11:52:13 | 12/13/2001 |
| 3 Ph. kVA: | 0.00 | 13:39:45 | 09/14/2000 | 0.70 | 09:25:18 | 12/13/2001 |
| Ph. A kVA: | 0.00 | 13:39:46 | 09/14/2000 | 0.45 | 19:45:58 | 12/10/2001 |
| Ph. B kVA: | 0.00 | 13:39:46 | 09/14/2000 | 0.20 | 08:56:06 | 12/13/2001 |
| Ph. C kVA: | 0.00 | 13:39:46 | 09/14/2000 | 0.45 | 20:26:20 | 12/10/2001 |
| 3 Ph. PF: | 0.00 Lag | 23:19:36 | 12/07/2001 | 1.00 Lag | 13:39:45 | 09/14/2000 |
| Ph. A PF: | 0.00 Lag | Invalid Time | | 1.00 Lag | 13:39:46 | 09/14/2000 |
| Ph. B PF: | 0.00 Lag | Invalid Time | | 1.00 Lag | 13:39:46 | 09/14/2000 |
| Ph. C PF: | 0.00 Lag | Invalid Time | | 1.00 Lag | 13:39:46 | 09/14/2000 |

Clear Power Min/Max


| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin PQM Power Range screen shows the Power minimum and maximum values.

The **Clear Power Min/Max** button, when clicked, will clear all the minimum and maximum values of the power.

Analysis Tab



Multilin PQM Power Analysis

| <u>Power Quality Values</u> | | | |
|-----------------------------|-------|--|-------|
| Ia Crest Factor: | 1.416 | Ia Transformer Harmonic Derating Factor: | 0.997 |
| Ib Crest Factor: | 1.413 | Ib Transformer Harmonic Derating Factor: | 1.000 |
| Ic Crest Factor: | 1.415 | Ic Transformer Harmonic Derating Factor: | 0.998 |

| <u>Total Harmonic Distortion</u> | | <u>THD Max</u> | |
|----------------------------------|-----|----------------|---------------------|
| Phase A Current THD (%): | 1.0 | 6503.5 | Invalid Time |
| Phase B Current THD (%): | 0.7 | 6506.2 | Invalid Time |
| Phase C Current THD (%): | 0.7 | 6501.5 | Invalid Time |
| Neutral Current THD (%): | 0.0 | 0.0 | 13:39:46 09/14/2000 |
| Voltage An THD (%): | 0.7 | 170.3 | 15:25:30 11/22/2001 |
| Voltage Bn THD (%): | 0.6 | 112.3 | 13:27:25 12/04/2001 |
| Voltage Cn THD (%): | 0.6 | 86.4 | Invalid Time |
| Voltage AB THD (%): | 0.0 | 0.0 | 13:39:46 09/14/2000 |
| Voltage BC THD (%): | 0.0 | 0.0 | 13:39:46 09/14/2000 |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Metering
Status
Demand
IVRange
PRange
Analysis
IO
Setpoints

Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

The Multilin PQM Power Analysis screen shows:

- Power Quality Values
- Total Harmonic Distortion
- THD Max

The **Clear Max THD Values** button, when clicked, will clear all maximum THD values.

IO Tab

Multilin PQM Inputs and Outputs

Digital Input Switches

| | |
|---------------|------------|
| SWTCH INPUT A | Not Active |
| SWTCH INPUT B | Active |
| SWTCH INPUT C | Not Active |
| SWTCH INPUT D | Active |

Output Relays

| | |
|--------------|--------------|
| Alarm: | De-Energized |
| Auxiliary 1: | Energized |
| Auxiliary 2: | Energized |
| Auxiliary 3: | Energized |

Analog Input

| | |
|------------------------|---|
| Main/Alt Analog Input: | 0 |
|------------------------|---|

Switch Input Pulse Counters

| | | | | |
|------------------------|---|------|----------------------|-----|
| Pulse Count 1: | 0 | nits | Pulse Input 1 Value: | 1 |
| Pulse Count 2: | 0 | | Pulse Input 2 Value: | 2 |
| Pulse Count 3: | 0 | | Pulse Input 3 Value: | 3 |
| Pulse Count 4: | 0 | | Pulse Input 4 Value: | 4 |
| Totalized Pulse Input: | 0 | | Pulse Input Total: | 1+2 |

Reset Pulse Counter

Device Name: MLPQM
Group Name: \$System
Device Type: PQM
Hardware Rev.: C
Main Program Rev.: 3.41
Boot Program Rev.: 1.10
Supervisor Rev.: 1.02
Mod File Numbers:
1 2 3 4 5
000 000 000 000 000

Events Trend Help
Setup Wave Exit

Metering Status Demand IVRange PRange Analysis IO Setpoints

The Multilin PQM Inputs and Outputs screen shows:

- Digital Input Switches
- Output Relays
- Analog Input
- Switch Input Pulse Counters

The **Reset Pulse Counter** button, when clicked, will reset all the pulse counter values.

Setpoints Tab

Multilin PQM System Setpoints

| | | | |
|-----------------------------------|---------------------|--------------------------|--------------------|
| Current Demand Type: | Block Interval | Analog Input Select: | Aux. 1 Relay |
| Current Demand Time Interval (m): | 15 | Analog Input Main Relay: | Alarm Relay |
| Power Demand Type: | Thermal Exponential | Analog Input Alt. Relay: | Alarm Relay |
| Power Demand Time Interval (m): | 15 | Analog Out 1 Main: | Avg. Phase Current |
| Energy Cost Per kWh (cents): | 10.00 | Analog Out 1 Alt.: | Phase A Current |
| Phase CT Primary (A): | 5 | Analog Out 2 Main: | 3 Phase kW |
| Neutral Current Sensing: | Separate CT | Analog Out 2 Alt.: | Phase A Current |
| Neutral CT Primary (A): | 10 | Analog Out 3 Main: | 3 Phase kvar |
| CT Wiring: | Phase A only | Analog Out 3 Alt.: | Phase A Current |
| Voltage Transformer Ratio: | 10.0 : 1 | Analog Out 4 Main: | 3 Phase PF |
| VT Wiring: | 4 Wire Wye/3 VTs | Analog Out 4 Alt.: | Phase A Current |
| VT Nominal Secondary Voltage (V): | 60 | Switch A Function: | Alarm Relay |
| Nominal Direct Input Voltage (V): | 40 | Switch B Function: | Alarm Relay |
| Nominal System Frequency (Hz): | 60 | Switch C Function: | Alarm Relay |
| Modbus Address: | 1 | Switch D Function: | Alarm Relay |

Device Name: MLPQM
 Group Name: \$System
 Device Type: PQM
 Hardware Rev.: C
 Main Program Rev.: 3.41
 Boot Program Rev.: 1.10
 Supervisor Rev.: 1.02

Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

Events Trend Help
 Setup Wave Exit

Metering Status Demand IVRange PRange Analysis IO Setpoints

The Multilin PQM System Setpoints screen shows:

- Current Demand Type
- Current Demand Time Interval (m)
- Power Demand Type
- Power Demand Time Interval (m)
- Energy Cost Per kWh (cents)
- Neutral Current Sensing
- Analog Input Main Relay
- Analog Input Alt Relay
- Switch A Function
- Switch B Function
- Switch C Function
- Switch D Function

Power Quality Meter PQMII (EPM 8000)

All six function buttons under the Info box are enabled for the PQMII.


The PQMII Tabular Data Screen wizard has nine command buttons, described below.

| Tab | Button | Function |
|------------|-------------------------|---|
| Metering | Clear Energy | Clears the PQMII's energy counters |
| | Reset Device | Issues a RESET command to the PQMII |
| Demand | Clear Max Demand Values | Clears the PQMII's Max Demand values from memory |
| | Clear Frequency Values | Clears the PQMII's Max Frequency values from memory |
| I, V Range | Clear Current Min/Max | Clears the PQMII's Current Min/Max values from memory |
| | Clear Voltage Min/Max | Clears the PQMII's Voltage Min/Max values from memory |
| P Range | Clear Power Min/Max | Clears the PQMII's Power Min/Max values from memory |
| Analysis | Clear Max THD Values | Clears the PQMII's Max THD values from memory |
| I/O | Reset Pulse Counter | Resets the PQMII's pulse counter |

Table 20. PQMII Tabular data screen commands.

See the PQMII Instruction Manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Metering Tab



EPM8000

EPM8000 Metering

| | A | B | C | 3 Phase |
|------------------------|----------|----------|------------------------|-------------|
| Amps: | 0 | 0 | 0 | 0 (Average) |
| PF: | 1.00 Lag | 1.00 Lag | 1.00 Lag | 1.00 Lag |
| kW: | 0.00 | 0.00 | 0.00 | 0.00 |
| kvar: | 0.00 | 0.00 | 0.00 | 0.00 |
| kVA: | 0.00 | 0.00 | 0.00 | 0.00 |
| V (Phase): | 0 | 0 | 0 | 0 (Average) |
| | A-B | B-C | C-A | |
| V (Line): | 0 | 0 | 0 | 0 (Average) |
| Neutral Current (A): | 0 | | Voltage Unbalance (%): | 0.0 |
| Current Unbalance (%): | 0.0 | | Frequency (Hz): | 0.00 |

Energy

Positive kWh: 0

Negative kWh: 0

Positive kvarh: 0

Negative kvarh: 0

Last Energy Reset: 11:33:17 12/23/2003

kVAh: 0

kWh last 24 hrs: 0

Real Energy Cost (\$): 0.00

Real Energy Cost/day (\$): 0.00

Output Relays

Alarm Aux 2

Aux 1 Aux 3

Clear Energy

Reset Device

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |


| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin PQMII Metering tab shows:

- **Metering values:** For A, B, C and 3 Phase
- **Energy:** In various values
- **Output Relays:** Alarm, Aux 1, Aux 2 and Aux 3

The **Clear Energy** button, when clicked, will clear all energy values. The **Reset Device** button, when clicked, will reset the Device.

Status Tab



EPM8000

EPM8000 Alarm, Aux1, Aux2, Aux3 Relay Status

| | | |
|---|--|--|
| <input type="checkbox"/> <input type="checkbox"/> Phase Undercurrent | <input type="checkbox"/> <input type="checkbox"/> Underfrequency | <input type="checkbox"/> <input type="checkbox"/> Clock Not Set |
| <input type="checkbox"/> <input type="checkbox"/> Phase Overcurrent | <input type="checkbox"/> <input type="checkbox"/> Overfrequency | <input type="checkbox"/> <input type="checkbox"/> Param. Not Set |
| <input type="checkbox"/> <input type="checkbox"/> Neutral Overcurrent | <input type="checkbox"/> <input type="checkbox"/> Apparent Power Dmnd | <input type="checkbox"/> <input type="checkbox"/> Pulse Input 1 |
| <input type="checkbox"/> <input type="checkbox"/> Undervoltage | <input type="checkbox"/> <input type="checkbox"/> Phase A Current Dmnd | <input type="checkbox"/> <input type="checkbox"/> Current THD |
| <input type="checkbox"/> <input type="checkbox"/> Overvoltage | <input type="checkbox"/> <input type="checkbox"/> Phase B Current Dmnd | <input type="checkbox"/> <input type="checkbox"/> Voltage THD |
| <input type="checkbox"/> <input type="checkbox"/> Current Unbalance | <input type="checkbox"/> <input type="checkbox"/> Phase C Current Dmnd | <input type="checkbox"/> <input type="checkbox"/> Main Analog I/P |
| <input type="checkbox"/> <input type="checkbox"/> Voltage Unbalance | <input type="checkbox"/> <input type="checkbox"/> Neutral Current Dmnd | <input type="checkbox"/> <input type="checkbox"/> Alt Analog I/P |
| <input type="checkbox"/> <input type="checkbox"/> Phase Reversal | <input type="checkbox"/> <input type="checkbox"/> Switch Input A | <input type="checkbox"/> <input type="checkbox"/> Data Log 1 |
| <input type="checkbox"/> <input type="checkbox"/> Power Factor Lead 1 | <input type="checkbox"/> <input type="checkbox"/> Switch Input B | <input type="checkbox"/> <input type="checkbox"/> Data Log 2 |
| <input type="checkbox"/> <input type="checkbox"/> Power Factor Lead 2 | <input type="checkbox"/> <input type="checkbox"/> Switch Input C | <input type="checkbox"/> <input type="checkbox"/> COM1 Failure |
| <input type="checkbox"/> <input type="checkbox"/> Power Factor Lag 1 | <input type="checkbox"/> <input type="checkbox"/> Switch Input D | <input type="checkbox"/> <input type="checkbox"/> COM2 Failure |
| <input type="checkbox"/> <input type="checkbox"/> Power Factor Lag2 | <input type="checkbox"/> <input type="checkbox"/> Internal Fault | <input type="checkbox"/> <input type="checkbox"/> Pulse Input 2 |
| <input type="checkbox"/> <input type="checkbox"/> Positive Real Power | <input type="checkbox"/> <input type="checkbox"/> Pos. Real Power Dmnd | <input type="checkbox"/> <input type="checkbox"/> Pulse Input 3 |
| <input type="checkbox"/> <input type="checkbox"/> Negative Real Power | <input type="checkbox"/> <input type="checkbox"/> Neg. Real Power Dmnd | <input type="checkbox"/> <input type="checkbox"/> Pulse Input 4 |
| <input type="checkbox"/> <input type="checkbox"/> Pos. Reactive Power | <input type="checkbox"/> <input type="checkbox"/> Pos. Reactive Pwr Dmnd | <input type="checkbox"/> <input type="checkbox"/> Total Pulse Inp. |
| <input type="checkbox"/> <input type="checkbox"/> Neg. Reactive Power | <input type="checkbox"/> <input type="checkbox"/> Neg. Reactive Pwr Dmnd | <input type="checkbox"/> <input type="checkbox"/> Time Alarm |


Legend: ■ = Pickup ■ = Active

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin Status tab shows the status of Alarms, Aux1, Aux2, Aux3 Relays.

Demand Tab



EPM8000

EPM8000 Demand

EPM8000 Metering Frequency & Demand Range

| <u>Frequency</u> | <u>Min</u> | <u>Max</u> |
|------------------|---------------------|---------------------|
| Hz | 0.00 | 0.00 |
| | 12:08:44 12/23/2003 | 12:08:44 12/23/2003 |

| <u>Demand Current & Power</u> | <u>Peak Demand</u> |
|-----------------------------------|-------------------------------|
| Phase A Current Demand (Amps): | 0 12:08:57 12/23/2003 |
| Phase B Current Demand (Amps): | 0 12:08:57 12/23/2003 |
| Phase C Current Demand (Amps): | 0 12:08:57 12/23/2003 |
| Neutral Current Demand (Amps): | 0 12:08:57 12/23/2003 |
| Real Power Demand (kW): | 0.00 0.00 12:08:57 12/23/2003 |
| Reactive Power Demand (kvar): | 0.00 0.00 12:08:57 12/23/2003 |
| Apparent Power Demand (kVA): | 0.00 0.00 12:08:57 12/23/2003 |

Clear Max Demand Values

Clear Frequency Values

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |


| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin PQMII Demand screen shows :

- Demand Current & Power
- Peak Demand
- Minimum and Maximum Frequency and their Time Stamps.

The Clear Max Demand Values button, when clicked, will clear all the maximum demand values. The Clear Frequency Values button, when clicked, will clear all the frequency values.

IV Range Tab



EPM8000

EPM8000 Current, Voltage Min/Max Detected Values

| <u>Current</u> | <u>Min</u> | <u>Max</u> |
|------------------|------------|---------------------|
| Amps A: | 0 | 11:29:59 12/23/2003 |
| Amps B: | 0 | 11:29:59 12/23/2003 |
| Amps C: | 0 | 11:29:59 12/23/2003 |
| Amps N: | 0 | 11:29:59 12/23/2003 |
| Amps Unbal. (%): | 0.0 | 11:29:59 12/23/2003 |

| <u>Voltage</u> | <u>Min</u> | <u>Max</u> |
|-------------------|------------|---------------------|
| Volts AB: | 0 | 11:28:46 12/23/2003 |
| Volts BC: | 0 | 11:28:46 12/23/2003 |
| Volts CA: | 0 | 11:28:46 12/23/2003 |
| Volts An: | 0 | 11:28:46 12/23/2003 |
| Volts Bn: | 0 | 11:28:46 12/23/2003 |
| Volts Cn: | 0 | 11:28:46 12/23/2003 |
| Volts Unbal. (%): | 0.0 | 11:28:46 12/23/2003 |

Clear Current Min/Max

Clear Voltage Min/Max

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |


| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin PQMII IV Range tab shows the Minimum and Maximum Current, Voltage Values.

The **Clear Current Min/Max** button, when clicked, will clear all the minimum and maximum values of the current.

The **Clear Voltage Min/Max** button, when clicked, will clear all the minimum and maximum values of voltage.

P Range Tab



EPM8000

EPM8000 Power

| | Min | | | Max | | |
|-------------|----------|----------|------------|----------|----------|------------|
| 3 Ph. kW: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. A kW: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. B kW: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. C kW: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| 3 Ph. kvar: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. A kvar: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. B kvar: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. C kvar: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| 3 Ph. kVA: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. A kVA: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. B kVA: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| Ph. C kVA: | 0.00 | 11:29:00 | 12/23/2003 | 0.00 | 11:29:00 | 12/23/2003 |
| 3 Ph. PF: | 1.00 Lag | 11:29:00 | 12/23/2003 | 1.00 Lag | 11:29:00 | 12/23/2003 |
| Ph. A PF: | 0.00 Lag | 11:29:00 | 12/23/2003 | 1.00 Lag | 20:00:51 | 12/29/2003 |
| Ph. B PF: | 0.00 Lag | 11:29:00 | 12/23/2003 | 1.00 Lag | 20:00:51 | 12/29/2003 |
| Ph. C PF: | 0.00 Lag | 11:29:00 | 12/23/2003 | 1.00 Lag | 20:00:51 | 12/29/2003 |

| | | | |
|--------|-------|------|----------------------------|
| Events | Trend | Help | Clear Power Min/Max |
| Setup | Wave | Exit | |


| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

Device Name: EPM8000
 Group Name: \$System
 Device Type: Unknown
 Hardware Rev.: D
 Main Program Rev.: 2.00
 Boot Program Rev.: 3.00
 Supervisor Rev.: 0.00
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

The Multilin PQMII Power Range screen shows the Power minimum and maximum values.

The **Clear Power Min/Max** button, when clicked, will clear all the minimum and maximum values of the power.

Analysis Tab



EPM8000

EPM8000 Power Analysis

| <u>Power Quality Values</u> | | | |
|-----------------------------|-------|--|-------|
| Ia Crest Factor: | 0.000 | Ia Transformer Harmonic Derating Factor: | 0.000 |
| Ib Crest Factor: | 0.000 | Ib Transformer Harmonic Derating Factor: | 0.000 |
| Ic Crest Factor: | 0.000 | Ic Transformer Harmonic Derating Factor: | 0.000 |

| <u>Total Harmonic Distortion</u> | | <u>THD Max</u> | |
|----------------------------------|-----|----------------|---------------------|
| Phase A Current THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Phase B Current THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Phase C Current THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Neutral Current THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Voltage An THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Voltage Bn THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Voltage Cn THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Voltage AB THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |
| Voltage BC THD (%): | 0.0 | 0.0 | 11:29:24 12/23/2003 |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Metering
Status
Demand
IVRange
PRange
Analysis
IO
Setpoints

The Multilin PQMII Power Analysis screen shows:

- Power Quality Values
- Total Harmonic Distortion
- THD Max

The **Clear Max THD Values** button, when clicked, will clear all maximum THD values.

IO Tab

EPM8000

Device Name: EPM8000
 Group Name: \$System
 Device Type: Unknown
 Hardware Rev.: D
 Main Program Rev.: 2.00
 Boot Program Rev.: 3.00
 Supervisor Rev.: 0.00
 Mod File Numbers:
 1 2 3 4 5
 000 000 000 000 000

EPM8000 Inputs and Outputs

| Digital Input Switches | | Output Relays | |
|------------------------|--|---------------|--------------|
| Active | | Alarm: | Energized |
| Active | | Auxiliary 1: | De-Energized |
| Active | | Auxiliary 2: | De-Energized |
| Active | | Auxiliary 3: | De-Energized |

Analog Input

Main/Alt Analog Input: 0

Switch Input Pulse Counters

| | | | |
|------------------------|---|----------------------|-----|
| Pulse Count 1: | 0 | Pulse Input 1 Value: | 0 |
| Pulse Count 2: | 0 | Pulse Input 2 Value: | 0 |
| Pulse Count 3: | 0 | Pulse Input 3 Value: | 0 |
| Pulse Count 4: | 0 | Pulse Input 4 Value: | 0 |
| Totalized Pulse Input: | 0 | Pulse Input Total: | 1+2 |

Reset Pulse Counter

Events Trend Help
 Setup Wave Exit


Metering Status Demand IVRange PRRange Analysis IO Setpoints

The Multilin PQMII Inputs and Outputs screen shows:

- Digital Input Switches
- Output Relays
- Analog Input
- Switch Input Pulse Counters

The **Reset Pulse Counter** button, when clicked, will reset all the pulse counter values.

Setpoints Tab



EPM8000

EPM8000 System Setpoints

| | |
|--|------------------------------|
| Current Demand Type: Thermal Exponential | Analog Input Select: Off |
| Current Demand Time Interval (m): 30 | Analog Input Main Relay: Off |
| Power Demand Type: Thermal Exponential | Analog Input Alt. Relay: Off |
| Power Demand Time Interval (m): 30 | Analog Out 1 Main: Not Used |
| Energy Cost Per kWh (cents): 10.00 | Analog Out 1 Alt.: Not Used |
| Phase CT Primary (A): 200 | Analog Out 2 Main: Not Used |
| Neutral Current Sensing: Off | Analog Out 2 Alt.: Not Used |
| Neutral CT Primary (A): 100 | Analog Out 3 Main: Not Used |
| CT Wiring: Phase A, B, and C | Analog Out 3 Alt.: Not Used |
| Voltage Transformer Ratio: 1.0 : 1 | Analog Out 4 Main: Not Used |
| VT Wiring: 4 Wire Wye/3 VTs | Analog Out 4 Alt.: Not Used |
| VT Nominal Secondary Voltage (V): 100 | Switch A Function: Not Used |
| Nominal Direct Input Voltage (V): 600 | Switch B Function: Not Used |
| Nominal System Frequency (Hz): 60 | Switch C Function: Not Used |
| Modbus Address: 2 | Switch D Function: Not Used |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | | | | | |
|----------|--------|--------|---------|--------|----------|----|-----------|
| Metering | Status | Demand | IVRange | PRange | Analysis | IO | Setpoints |
|----------|--------|--------|---------|--------|----------|----|-----------|

The Multilin PQMII System Setpoints screen shows:

- Current Demand Type
- Current Demand Time Interval (m)
- Power Demand Type
- Power Demand Time Interval (m)
- Energy Cost Per kWh (cents)
- Neutral Current Sensing
- Analog Input Main Relay
- Analog Input Alt Relay
- Switch A Function
- Switch B Function
- Switch C Function
- Switch D Function

Motor Manager II (MMII)

Five of the six function buttons under the Info box are enabled for the MMII; the Wave button is not supported for the MMII.

The MMII Tabular Data Screen wizard has four command buttons, described below.

| Tab | Button | Function |
|-------------|---------------------------|---|
| Metering | Clear Energy | Clears the MMII's energy counters |
| Maintenance | Clear Start/Trip Counters | Clears the MMII's Start and Trip count values from memory |
| | Clear Timers | Clears the MMII's Timer values from memory |
| | Clear Interlock Counter | Clears the MMII's Interlock Counter values from memory |

Table 21. MMII Tabular data screen commands.

See the MMII's Instruction Manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

EPM 3710 Meter


| | <u>A</u> | <u>B</u> | <u>C</u> | <u>Three Phase Values</u> | |
|------------------|----------|--------------|---------------|---------------------------|-----|
| Volts L-N: | 78 | 78 | 78 | Average Volts L-N: | 78 |
| Current: | 78 | 77 | 78 | Average Volts L-L: | 135 |
| kW: | 0 | 0 | 0 | Average Amps: | 78 |
| kVA: | 24 | 0 | 0 | Total kW: | 0 |
| kVAR: | 8 | 8 | 8 | Total kVA: | 0 |
| | | | | Total kVAR: | 24 |
| PF: | + 0.08 | | | Volts AB: | 136 |
| Frequency: | 601.1 | | | Volts BC: | 135 |
| Neutral Current: | 90 | | | Volts CA: | 136 |
| V AUX: | 0 | | | | |
| kW Demand: | + 0 | | | | |
| ??? Demand: | + 0 | | | | |
| | | <u>Total</u> | <u>Import</u> | <u>Export</u> | |
| kWH: | + 875 | 0 | 0 | | |
| kVARH: | + 875 | 0 | 0 | | |

The EPM 3710 Tabular Data Screen wizard provides the following special features:

- The Normal Metering Values screen has a label that displays either kVA Demand or Amps Demand, depending on how the meter is configured.
- The Setpoints screen has two scroll buttons that determine which setpoint is displayed.
- The Setup tab contains a field "Iout Key" corresponding to the Iout Key display on the actual device. On the actual device, this field displays text messages such as "Voltage A" or "Current C". In the Tabular Data Screen wizard, these messages are presented as a numeric code and must be referenced against the following table.

| Code | Meaning | Code | Meaning | Code | Meaning |
|------|-----------|------|-------------|------|------------|
| 0 | Voltage A | 9 | KVA A | 18 | KVA Total |
| 1 | Voltage B | 10 | KVA B | 19 | KVAR Total |
| 2 | Voltage C | 11 | KVA C | 20 | PF |
| 3 | Current A | 12 | KVAR A | 21 | KW Demand |
| 4 | Current B | 13 | KVAR B | 22 | Amp Demand |
| 5 | Current C | 14 | KVAR C | 23 | Frequency |
| 6 | KVA | 15 | VOLTAGE AVG | 24 | Vaux |
| 7 | KWB | 16 | CURRENT AVG | 25 | Current I4 |
| 8 | KWC | 17 | KW Total | | |

EPM 3720 Meter



Device Name: EPM3720
 Group Name: \$System
 Voltage Scale: 0
 Current Scale: 0
 Modbus Address: 0
 Meter Rev.: 0.0.0.0

EPM 3720 Normal Metering Values

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>Three Phase Values</u> | | |
|------------------------|----------|--------------|---------------|---------------------------|------------|----|
| Voltage L-N: | 45 | 45 | 45 | Avg. Voltage L-N: | 45 | |
| Current: | 45 | 45 | 45 | Avg. Voltage L-L: | 78 | |
| kW: | 1 | 1 | 1 | Avg. Current: | 45 | |
| kVA: | 6 | 0 | 0 | Total kW: | 4 | |
| kVAR: | 1 | 1 | 1 | Total kVA: | 0 | |
| PF (%): | + 0 | + 0 | + 0 | Total kVAR: | 4 | |
| | | | | Total PF (%): | + 0 | |
| V AUX: | | | | 0 | | |
| Neutral Current: | | | | 45 | Volts AB: | 78 |
| Frequency: | | | | 60.28 | Volts BC: | 77 |
| Voltage Unbalance (%): | | | | 0 | Volts CA: | 78 |
| Current Unbalance (%): | | | | 0 | | |
| | | <u>Total</u> | <u>Import</u> | <u>Export</u> | <u>Net</u> | |
| kWh: | 860 | 860 | 0 | 0 | | |
| kVAh: | 860 | 860 | 0 | 0 | | |
| kVAh: | 0 | 0 | 0 | 0 | | |

Metering
Thermal Dmnd
Sliding Dmnd
Setup 1
Setup 2
Setpoints

The EPM 3720 Tabular Data Screen wizard has several special features. You can use the Setup 1, Setup 2, and Setpoints screens to change the meter configuration. Values displayed in white boxes are changeable. Some are changed by clicking on the displayed value, while others provide scroll buttons, and some have both.

- The Download and Refresh buttons on the Setup 1 and Setup 2 screens upload and download the values for all of the setup parameters.
- The Download and Refresh buttons on the Setpoints screen upload and download all of the setpoints from the device.
- The Reset Energy Integrators and Reset All Min/Max buttons on the Setup 1 screen provide the named functions.
- The Sliding Demand tab supports downloading of up to 10 sliding demand measurements to the device. See Appendix B for information on setting the sliding demand keys.

To change setpoints at the device, first press the Refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired, then press the Download button to send all setpoints to unit.

When you first open the EPM 3720 Tabular Data Screen, you may see values of zero in all fields. The EPM 3720 Tabular Data Screen requires some user interaction (such as pressing a key) to update its values.

EPM 7300 Meter

The EPM 7300 Tabular Data Screen wizard has several special features. You can use the Setup screen to change the meter configuration. Values displayed in white boxes are changeable. Some are changed by clicking on the displayed value, while others are changed by clicking on the associated scroll button. The Download and Refresh buttons on the setup screen upload and download all of the setpoints from the device.


To change setpoints at the device, first press the refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired, then press the download button to send all setpoints to the unit.

The EPM 7300 Tabular Data Screen's command buttons are described below:

| Tab | Button | Function |
|----------------|----------------------|---|
| Metering | Reset Energy | Resets all Energy Integrators in the meter. |
| MIN/MAX Demand | Digital Input Labels | The user can enter descriptive text (up to 20 characters) for each digital input. These labels are retentive. |
| | Force ON | For each digital output, this button will force the output to the ON state. |
| | Force OFF | For each digital output, this button will force the output to the OFF state. |
| | Reset Sliding Demand | Resets all Sliding Demand Values in the device. |
| | Reset Min/Max | Resets all Min/Max values in the device. |

Table 22. EPM 7300 Tabular data screen commands.

Metering Tab



Device Name: E7300
Group Name: \$System
Device Type: EPM 7300
Modbus Address: 18

7300 ION Normal Metering Values

| | A | B | C | <u>Three Phase Values</u> | |
|------------------------|-------|--|---------------|---------------------------|------------|
| Voltage L-N: | 156 | 190 | 150 | Avg. Voltage L-N: | 165 |
| Current (A): | 12 | 180 | 359 | Avg. Voltage L-L: | 49 |
| kW: | 1 | 26 | -54 | Avg. Current (A): | 184 |
| kVA: | 2 | 34 | 54 | Total kW: | -27 |
| kVAR: | -2 | 22 | 0 | Total kVA: | 34 |
| PF (%): | 54.63 | -75.60 | -100.00 | Total kVAR: | 20 |
| Voltage THD (%): | 0.00 | 4.71 | 4.71 | Total PF (%): | 79.73 |
| Current THD (%): | 8.27 | 0.79 | 0.97 | | |
| K Factor: | 1.43 | 1.01 | 1.01 | | |
| Voltage Unbalance (%): | | 14.92 | | Volts AB: | 72 |
| Current Unbalance (%): | | 95.47 | | Volts BC: | 67 |
| Frequency (Hz): | | 60.00 | | Volts CA: | 9 |
| Phase Reversal: | | ON | | | |
| | | <u>Import</u> | <u>Export</u> | <u>Total</u> | <u>Net</u> |
| kWh | | 216 | 419 | 635 | -203 |
| kVARh | | 118 | 3 | 121 | 115 |
| kVAh | | | | 698 | |

The 7300 ION Normal Metering Values screen shows the metering values:

- A, B and C
- Three Phase Values
- Voltage Imbalance
- Current Imbalance
- Frequency (Hz)
- Phase Reversal
- Energy

The **Reset Energy** button will reset the energy.

Min/Max Tab

7300 ION MIN/MAX/Demand Values

| | Min | Max |
|-------------------|------------|------------|
| Avg. Voltage L-N: | 0 | 176 |
| Avg. Current (A): | 0 | 239 |
| Frequency (Hz): | 60 | 60 |
| kW Total | | 80 |
| kVAR Total | | 28 |
| kVA Total | | 122 |

Digital Outputs

| | | Force ON | Force OFF | Status |
|------|----------------|-----------------|------------------|---------------|
| D01: | DIGITAL INPUT1 | Force ON | Force OFF | OFF |
| D02: | DIGITAL INPUT2 | Force ON | Force OFF | OFF |
| D03: | DIGITAL INPUT3 | Force ON | Force OFF | OFF |

| | Sliding Window Demand | Predicted Demand |
|------|------------------------------|-------------------------|
| kW | -27 | -27 |
| kVA | 34 | 34 |
| kVAR | 20 | 20 |

Buttons: **Reset Sliding Demand** **Reset Min/Max**

Navigation: Metering | MinMax | Setup

Utility: Event Logger | Trend | Help | Wave | Exit


The 7300 ION Min/Max/Demand Values screen shows:

- Minimum and maximum metering values
- Digital Outputs
 1. By clicking on the Text box provided, a popup box will be appeared where text can be entered.
 2. By clicking on Force ON and Force OFF the status can be seen as ON or OFF respectively.
- Sliding Window Demand and Predicted Windows Demand

The Reset Sliding Demand button, when clicked, will reset all Sliding Demand values in the device.

The Reset Min/Max button, when clicked, will reset all Min/Max values in the device.

Setup Tab



7300 ION Setup

| | | | | | |
|--------------|--------|---|----------------------|---------------|---|
| Volts Mode: | 4-w Y | ↓ | PT Secondary: | 120 | |
| Va Polarity: | Normal | ↓ | CT Secondary: | 5 | |
| Vb Polarity: | Normal | ↓ | Dig. Out 1 Polarity: | Inverting | ↓ |
| Vc Polarity: | Normal | ↓ | Dig. Out 2 Polarity: | Inverting | ↓ |
| Phase Order: | ABC | ↓ | Dig. Out 3 Polarity: | Inverting | ↓ |
| Ia Polarity: | Normal | ↓ | KYZ Polarity: | Non-Inverting | ↓ |
| Ib Polarity: | Normal | ↓ | Com 1 Baud Rate: | 19,200 | ↓ |
| Ic Polarity: | Normal | ↓ | Com 1 Unit ID: | 18 | ↓ |

| | SD Sub Interval | SD #Sub Intervals | SD Predicted Response |
|----------------------|-----------------|-------------------|-----------------------|
| kW Sliding Demand: | 900 sec. | 1 | 70 |
| kVAR Sliding Demand: | 900 sec. | 1 | 70 |
| kVA Sliding Demand: | 900 sec. | 1 | 70 |

Download
Refresh

Event
Logger
Trend
Wave
Help
Exit

Metering
MinMax
Setup

The 7300 ION Setup screen shows various setup values of the device such as Volts Mode, Phase Order, PT Secondary and CT Secondary.

The **Download** button, when clicked, will download all relevant values in the device.

The **Refresh** button, when clicked, will refresh all the values coming from the device.

EPM 7330 Meter

The EPM 7330 Tabular Data Screen wizard has several special features. You can use the Setup screen to change the meter configuration. Values displayed in white boxes are changeable. Some are changed by clicking on the displayed value, while others are changed by clicking on the associated scroll button. The Download and Refresh buttons on the setup screen upload and download all of the setpoints from the device.


To change setpoints at the device, first press the refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired, then press the download button to send all setpoints to the unit.

The EPM 7330 Tabular Data Screen's command buttons are described below:

| Tab | Button | Function |
|----------------|----------------------|---|
| Metering | Reset Energy | Resets all Energy Integrators in the meter. |
| MIN/MAX Demand | Digital Input Labels | The user can enter descriptive text (up to 20 characters) for each digital input. These labels are retentive. |
| | Force ON | For each digital output, this button will force the output to the ON state. |
| | Force OFF | For each digital output, this button will force the output to the OFF state. |
| | Reset Sliding Demand | Resets all Sliding Demand Values in the device. |
| | Reset Min/Max | Resets all Min/Max values in the device. |

Table 23. EPM 7330 Tabular data screen commands

Metering Tab



Device Name: E7330
 Group Name: \$System
 Device Type: EPM 7330
 Modbus Address: 18

7330 ION Normal Metering Values

| | A | B | C | <u>Three Phase Values</u> | |
|--|--------|---------------|---------------|---------------------------|------------|
| Voltage L-N: | 130 | 103 | 75 | Avg. Voltage L-N: | 103 |
| Current (A): | 0 | 119 | 120 | Avg. Voltage L-L: | 178 |
| kW: | 0 | -12 | -9 | Avg. Current (A): | 80 |
| kVA: | 0 | 12 | 9 | Total kW: | -21 |
| kVAR: | 0 | 0 | 0 | Total kVA: | 21 |
| PF (%): | 100.00 | 100.00 | 99.99 | Total kVAR: | 0 |
| Voltage THD (%): | 0.00 | 0.00 | 0.00 | Total PF (%): | 99.99 |
| Current THD (%): | 265.75 | 0.00 | 0.00 | | |
| K Factor: | -14.46 | 1.00 | 1.00 | | |
| Voltage Unbalance (%): 26.81 | | | | Volts AB: | 226 |
| Current Unbalance (%): 100.00 | | | | Volts BC: | 178 |
| Frequency (Hz): 60.00 | | | | Volts CA: | 130 |
| Phase Reversal: ON | | | | | |
| | | <u>Import</u> | <u>Export</u> | <u>Total</u> | <u>Net</u> |
| kWh | 1431 | 3234 | 4665 | -1803 | |
| kVARh | 109 | 1150 | 1259 | -1041 | |
| kVAh | | | 5037 | | |

The 7330 ION Normal Metering Values screen shows the metering values:

- A, B and C
- Three Phase Values
- Voltage Imbalance
- Current Imbalance
- Frequency (Hz)
- Phase Reversal
- Energy

The **Reset Energy** button will reset the energy.

Min/Max

7330 ION MIN/MAX/Demand Values

Device Name: E7330
Group Name: \$System
Device Type: EPM 7330
Modbus Address: 18

| | <u>Min</u> | <u>Max</u> |
|-------------------|------------|------------|
| Avg. Voltage L-N: | 0 | 217 |
| Avg. Current (A): | 0 | 562 |
| Frequency (Hz): | 44 | 60 |
| kW Total | | 95 |
| kVAR Total | | 41 |
| kVA Total | | 100 |

Digital Outputs

| | | <u>Force ON</u> | <u>Force OFF</u> | <u>Status</u> |
|------|---|---|--|--|
| D01: | <input type="text" value="DIGITAL INPUT1"/> | <input type="button" value="Force ON"/> | <input type="button" value="Force OFF"/> | <input type="button" value="OFF"/> |
| D02: | <input type="text" value="DIGITAL INPUT2"/> | <input type="button" value="Force ON"/> | <input type="button" value="Force OFF"/> | <input checked="" type="button" value="ON"/> |
| D03: | <input type="text" value="DIGITAL INPUT3"/> | <input type="button" value="Force ON"/> | <input type="button" value="Force OFF"/> | <input type="button" value="OFF"/> |

Sliding Window Demand **Predicted Demand**

| | | |
|------|-----|-----|
| kW | -21 | -21 |
| kVA | 21 | 21 |
| kVAR | 0 | 0 |

Event Logger Trend Help
Wave Exit

Metering MinMax Setup


The 7330 ION Min/Max/Demand Values screen shows:

- Minimum and maximum metering values
- Digital Outputs
 1. By clicking on the Text box provided, a popup box will be appeared where text can be entered.
 2. By clicking on Force ON and Force OFF the status can be seen as ON or OFF respectively.
- Sliding Window Demand and Predicted Windows Demand

The Reset Sliding Demand button, when clicked, will reset all Sliding Demand values in the device.

The Reset Min/Max button, when clicked, will reset all Min/Max values in the device.

Setup Tab



7330

7330 ION Setup

Device Name: E7330
 Group Name: \$System
 Device Type: EPM 7330
 Modbus Address: 18

| | | | | |
|--------------|--------|---|----------------------|---------------|
| Volts Mode: | 3-w Y | ↓ | PT Secondary: | 120 |
| Va Polarity: | Normal | ↓ | CT Secondary: | 5 |
| Vb Polarity: | Normal | ↓ | Dig. Out 1 Polarity: | Inverting |
| Vc Polarity: | Normal | ↓ | Dig. Out 2 Polarity: | Inverting |
| Phase Order: | ABC | ↓ | Dig. Out 3 Polarity: | Inverting |
| Ia Polarity: | Normal | ↓ | KYZ Polarity: | Non-Inverting |
| Ib Polarity: | Normal | ↓ | Com 1 Baud Rate: | 19,200 |
| Ic Polarity: | Normal | ↓ | Com 1 Unit ID: | 18 |

| | SD Sub Interval | SD #Sub Intervals | SD Predicted Response |
|----------------------|-----------------|-------------------|-----------------------|
| kW Sliding Demand: | 900 sec. | 1 | 70 |
| kVAR Sliding Demand: | 900 sec. | 1 | 70 |
| kVA Sliding Demand: | 900 sec. | 1 | 70 |

Download

Refresh

Event
Logger

Trend
Wave

Help
Exit

Metering

MinMax

Setup

The 7330 ION Setup screen shows various setup values of the device such as Volts Mode, Phase Order, PT Secondary and CT Secondary.

The **Download** button, when clicked, will download all relevant values in the device.

The **Refresh** button, when clicked, will refresh all the values coming from the device.

EPM 7500/7600 Meter


The EPM 7500/7600 Tabular Data Screen wizard has several special features. You can use the Setup screen to change the meter configuration. Values displayed in white boxes are changeable. Some are changed by clicking on the displayed value, while others are changed by clicking on the associated scroll button. The Download and Refresh buttons on the setup screen upload and download all of the setpoints from the device.

To change setpoints at the device, first press the refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired, then press the download button to send all setpoints to the unit.

In the following pages, each of the 7500/7600 Meter's Tabular Data Screen Wizards' tabs will be displayed and detailed.

Metering Tab

7500 Test
7500 Metering



Device Name: DeviceNm
Group Name: \$System
Device Type: 7500
Serial ID: PK-9909A072-00
Firmware Rev: 7500V205
Voltage Mode: 4W-WYE

| | Phase A | Phase B | Phase C | Neutral | Average |
|------------------|---------|---------|---------|---------|---------|
| V L-N (Volts): | 119.91 | 120.23 | 119.99 | ..... | 120.05 |
| Current (Amps): | 503.66 | 502.55 | 505.05 | 0.00 | 503.75 |
| Total | | | | | |
| kW: | -52.26 | -52.26 | -52.33 | ..... | -156.85 |
| kVA: | 60.40 | 60.42 | 60.60 | ..... | 181.38 |
| kVAR: | 30.28 | 30.31 | 30.51 | ..... | 91.09 |
| PF Lead (%): | 86.53 | 86.50 | 86.35 | ..... | 86.47 |
| PF Lag (%): | N/A | N/A | N/A | ..... | N/A |
| PF (%): | 86.53 | 86.50 | 86.35 | ..... | 86.47 |
| Voltage THD (%): | 0.00 | 0.00 | 0.00 | ..... | ..... |
| Current THD (%): | 0.00 | 0.32 | 1.05 | 0.00 | ..... |
| K Factor: | 1.00 | 1.04 | 1.34 | 0.00 | ..... |

| Three Phase Values | | | |
|------------------------|--------|------------------------|-------|
| Vab (Volts): | 207.99 | Frequency (Hz): | 60.00 |
| Vbc (Volts): | 207.89 | Phase Reversal: | ON |
| Vca (Volts): | 207.89 | Voltage Unbalance (%): | 0.15 |
| V L-L Average (Volts): | 207.92 | Current Unbalance (%): | 0.26 |

Event
Logger

Trend
Wave

Help
Exit

Metering

MIN/MAX

Quality

Demand

Inputs

Setup 1

Setup 2

EPM 7500/7600 Meter - Metering Data Screen

The Metering tab displays the following metered values from the EPM 7500/7600.

- VIn A, B: n/a when Voltage Mode is DELTA
- VIn C: n/a when Voltage Mode is DELTA or SINGLE
- VIn Avg: n/a when Voltage Mode is DELTA
- VII AB
- VII BC, CA, and Avg: n/a when Voltage Mode is SINGLE
- I A, B, Neutral, and Avg

- I C: n/a when Voltage Mode is SINGLE
- KW A, B: n/a when Voltage Mode is DELTA
- KW C: n/a when Voltage Mode is DELTA or SINGLE
- KW Total
- KVA A, B: n/a when Voltage Mode is DELTA
- KVA C: n/a when Voltage Mode is DELTA or SINGLE
- KVA Total
- KVAR A, B: n/a when Voltage Mode is DELTA
- KVAR C: n/a when Voltage Mode is DELTA or SINGLE
- KVAR Total
- Power Factor Lead A, B: n/a when Voltage Mode is DELTA or PF is Lagging
- Power Factor Lead C: n/a when Voltage Mode is DELTA or SINGLE or PF is Lagging
- Power Factor Lead Total: n/a when PF is Lagging
- Power Factor Lag A, B: n/a when Voltage Mode is DELTA or PF is Leading
- Power Factor Lag C: n/a when Voltage Mode is DELTA or SINGLE or PF is Leading
- Power Factor Lag Total: n/a when PF is Leading
- Power Factor Total A, B: n/a when Voltage Mode is DELTA
- Power Factor Total C: n/a when Voltage Mode is DELTA or SINGLE
- Power Factor Total
- Total Harmonic Distortion – Voltage A, B, and C: n/a when Source is n/a.
- Total Harmonic Distortion – Current A, B, C, and Neutral: n/a when Source is n/a.
- K Factor A, B, C, and Neutral: n/a when Source is n/a.

Three-Phase Values

- Vab, Vbc, Vca
- Voltage Unbalance
- Current Unbalance
- Frequency
- Phase Reversal (On, Off) : n/a when Voltage Mode is SINGLE

Min/Max Tab

7500 Test

7500 Maximum Values

| | Phase A | Phase B | Phase C | Neutral | Average |
|-----------------|---------|---------|---------|---------|---------|
| V L-N (Volts): | 120.38 | 120.32 | 120.18 | ..... | 120.14 |
| Current (Amps): | 1511.03 | 1509.52 | 1514.87 | 193.83 | 1511.73 |
| V THD (%): | 26.95 | 19.94 | 14.43 | ..... | ..... |
| I THD (%): | 0.00 | 91.05 | 181.38 | 1514.87 | ..... |
| K Factor: | 208.08 | 100.00 | 1511.03 | 1509.52 | ..... |

Three Phase Values

| | | | |
|------------------------|--------|--------------------|--------|
| Vab (Volts): | 208.91 | Total PF Lead (%): | 100.00 |
| Vbc (Volts): | 208.96 | Total PF Lag (%): | 0.00 |
| Vca (Volts): | 208.10 | | |
| V L-L Average (Volts): | 208.08 | | |
| Voltage Unbalance (%): | 100.00 | Frequency (Hz): | 62.34 |

Buttons: Show Maximum, Show Minimum, Reset MIN/MAX

Navigation: Event Logger, Trend, Help, Wave, Exit, Metering, MIN/MAX, Quality, Demand, Inputs, Setup 1, Setup 2

EPM 7500/7600 Meter - Min/Max Tab

The Minimum/Maximum Values tab displays a variety of minimum and maximum values recorded by the EPM 7500/7600. Select Show Minimum or Show Maximum buttons to display either the minimum or maximum values for the displayed parameters. To reset all min/max values, select the Reset Min/Max button.

Min/Max values may be displayed for the following parameters:

Phase A, B, C, Neutral and Average Values

- Vln A, B: n/a when Voltage Mode is DELTA
- Vln C: n/a when Voltage Mode is DELTA or SINGLE
- Vln Avg: n/a when Voltage Mode is DELTA
- VII AB
- VII BC, CA, and Avg: n/a when Voltage Mode is SINGLE
- I A, B, Neutral, and Avg
- I C: n/a when Voltage Mode is SINGLE
- Total Harmonic Distortion – Voltage A, B, and C: n/a when Source is n/a.
- Total Harmonic Distortion – Current A, B, C, and Neutral: n/a when Source is n/a.
- K Factor A, B, C, and Neutral: n/a when Source is n/a.

Three-Phase Values

- Vab, Vbc, Vca
- Power Factor Lead Total: n/a when PF is Lagging
- Power Factor Lag Total: n/a when PF is Leading
- Voltage Unbalance

- Frequency

Power Quality Tab

7500 Test

7500 Power Quality

Symmetric Components

| | | | | | |
|-----------------------|--------|------------------------|-----------------------|-------|------------------------|
| Current Zero Seq: | 6.6 | $\angle 161.05^\circ$ | Voltage Zero Seq: | 0.5 | $\angle -62.47^\circ$ |
| Current Positive Seq: | 1.8 | $\angle 83.92^\circ$ | Voltage Positive Seq: | 1.0 | $\angle -116.72^\circ$ |
| Current Negative Seq: | 1009.7 | $\angle -111.88^\circ$ | Voltage Negative Seq: | 240.2 | $\angle 0.31^\circ$ |

Disturbance Counts

Sag Swell Counter: 7

Relative Setpoints

| | | | | |
|--------------|-------------------------------------|-------|--|---|
| Over KW SWD: | <input checked="" type="checkbox"/> | UNDER | <input type="button" value="Enable Over KW SWD"/> | <input type="button" value="Disable Over KW SWD"/> |
| Over Ia: | <input checked="" type="checkbox"/> | OVER | | |
| Over Ib: | <input checked="" type="checkbox"/> | OVER | <input type="button" value="Enable Over Current"/> | <input type="button" value="Disable Over Current"/> |
| Over Ic: | <input checked="" type="checkbox"/> | OVER | | |
| Over Vunbal: | <input checked="" type="checkbox"/> | OVER | <input type="button" value="Enable Over Vunbal"/> | <input type="button" value="Disable Over Vunbal"/> |

Legend: Enabled: Disabled:

Event Logger | Trend Wave | Help Exit

Metering | MIN/MAX | Quality | Demand | Inputs | Setup 1 | Setup 2

EPM 7500/7600 Meter - Power Quality Tab

The Power Quality tab displays the following power quality values from the EPM 7500/7600.

Symmetric Components

- Zero Sequence Phase and Magnitude for Current and Voltage
- Positive Sequence Phase and Magnitude for Current and Voltage
- Negative Sequence Phase and Magnitude for Current and Voltage

Disturbance Counts

- Sag / Swell Counter

Relative Setpoints

- Over KW Sliding Window Demand Status
- Over Current Phase A Status
- Over Current Phase B Status
- Over Current Phase C Status
- Over Voltage Unbalance Status

*Note: no color code is used for the Relative Setpoint Status.

The Power Quality tab also provides push buttons for performing the following commands:

Reset Sag Swell Disturbance Counter – Resets Sag Swell Counter.

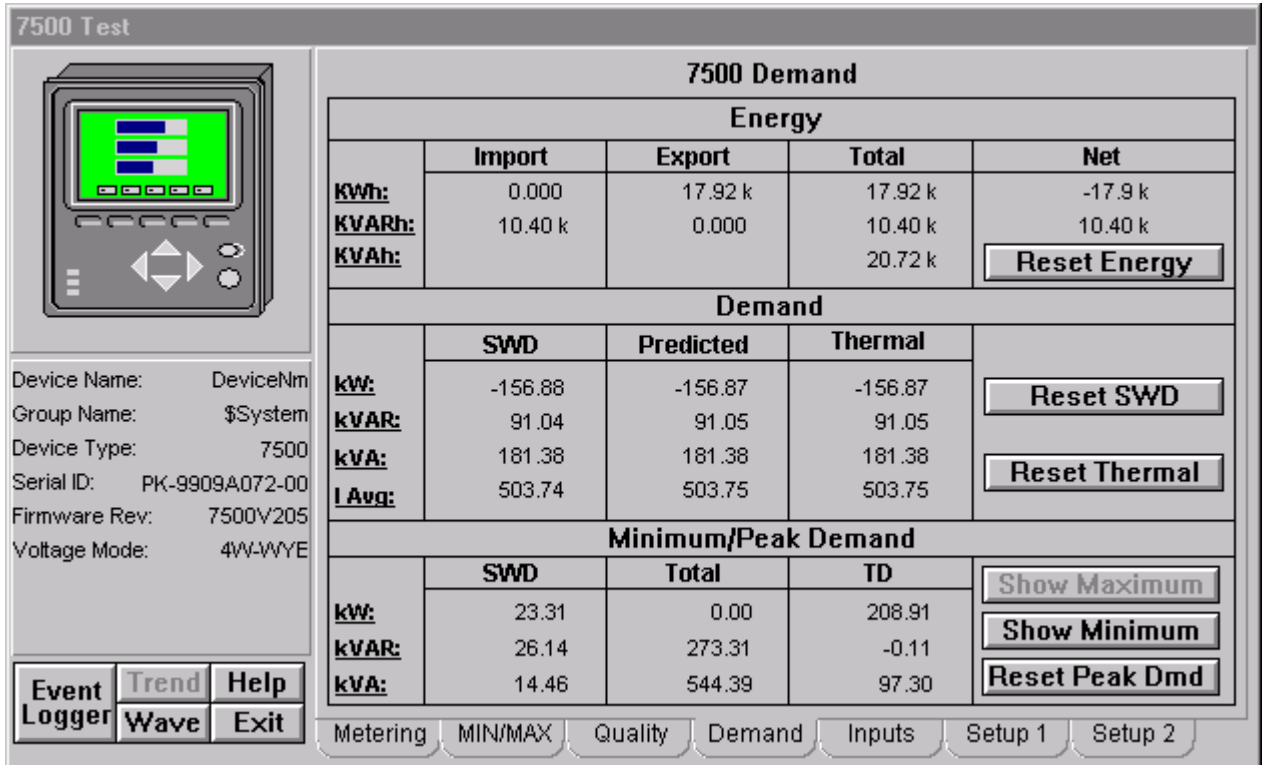
Enable/Disable Sag Swell – Enables or Disables Sag Swell Tracking.

Enable/Disable Over KW SWD – Enables or Disables Over Real Power Sliding Window Demand for Relative Setpoint Tracking.

Enable/Disable Over Current – Enables or Disables Over Current for Phases A, B, and C for Relative Setpoint Tracking.

Enable/Disable Over Vunb – Enables or Disables Over Voltage Unbalance for Relative Setpoint Tracking.

Demand Tab



EPM 7500/7600 Meter - Demand Tab

The Demand tab displays the following demand values from the EPM 7500/7600.

Energy

- Real Energy Import, Export, Total, and Net
- Reactive Energy Import, Export, Total, and Net
- Apparent Energy Total

Demand

- Real Power Sliding Window Demand, Predicted Demand, and Thermal Demand
- Reactive Power Sliding Window Demand, Predicted Demand, and Thermal Demand
- Apparent Power Sliding Window Demand, Predicted Demand, and Thermal Demand

- Average RMS Current Sliding Window Demand, Predicted Demand, and Thermal Demand

Minimum/Peak Demand

- Minimum or Peak Real Power Sliding Window Demand, Total Demand, and Thermal Demand
- Minimum or Peak Reactive Power Sliding Window Demand, Total Demand, and Thermal Demand
- Minimum or Peak Apparent Power Sliding Window Demand, Total Demand, and Thermal Demand

The Demand tab also provides push buttons for performing the following commands:

Reset Energy – Resets Energy Demand values identified above.

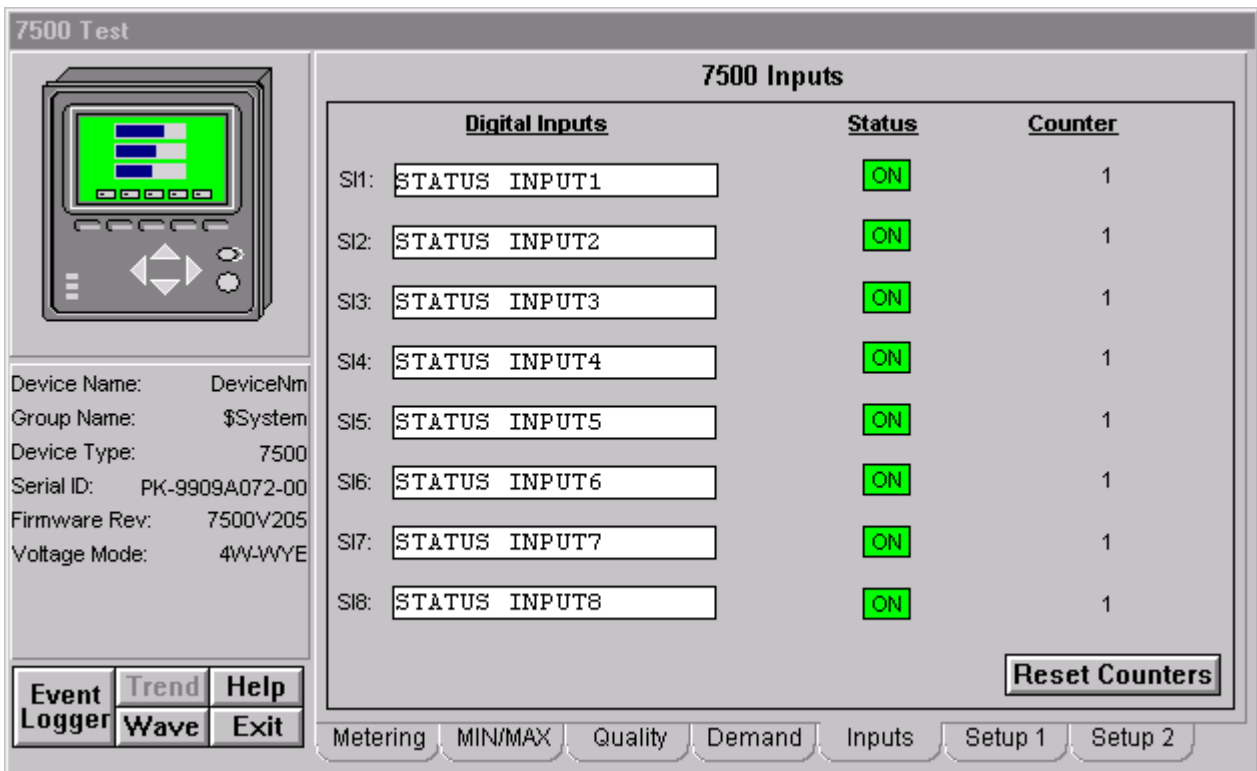
Reset SWD– Resets Sliding Window Demand values identified above.

Reset Thermal – Resets Thermal Demand values identified above.

Reset Peak – Resets Peak Demand values identified above.

The Minimum/Peak panel's Show Maximum and Show Minimum buttons can be used to toggle the display between minimums and peaks.

Inputs Tab



EPM 7500/7600 Meter - Inputs Tab

The Inputs tab displays the following values from the EPM 7500/7600.

Digital Inputs

- Status (On, Off) for Status Inputs (SI) 1-8. (Color Code: Green – ON, Grey – OFF).
- Counters for SI1-8.

The Inputs tab also provides push buttons for performing the following commands:

Reset Counters – Resets Digital Input Status Counters for SI1-8.

The Inputs tab also provides retentive memory inputs for the following:

Digital Input Names for SI1-8.

Setup 1 Tab

7500 Setup 1

| Power | | | | Transformer Ratios | |
|--------------|--------|--------------|--------|--------------------|------|
| Volts Mode: | 4W-WYE | Phase Order: | ABC | PT Primary: | 120 |
| Va Polarity: | Normal | Ia Polarity: | Normal | CT Primary: | 5000 |
| Vb Polarity: | Normal | Ib Polarity: | Normal | PT Secondary: | 120 |
| Vc Polarity: | Normal | Ic Polarity: | Normal | CT Secondary: | 5 |
| | | I4 Polarity: | Normal | I4 CT Primary: | 5 |
| | | | | I4 CT Secondary: | 5 |

Download **Refresh**

| Communications | | | | | |
|------------------|-----------|---------|----------|---------------------------------|--|
| Comm Mode: RS232 | | | | Ethernet IP Address: 3.46.9.247 | |
| Port | Baud Rate | Unit ID | Protocol | Subnet Mask: 255.255.240.0 | |
| Com 1: | 9600 | 9072 | ION | Default Gateway: 3.46.0.1 | |
| Com 2: | 9600 | 101 | ION | | |
| Com 3: | 9600 | 102 | ION | | |

Event Logger Trend Help
Wave Exit

Metering MIN/MAX Quality Demand Inputs Setup 1 Setup 2

EPM 7500/7600 Meter - Setup 1 Tab

The Setup 1 tab displays the following demand values from the EPM 7500/7600.

Power Settings

- Volts Mode
- Phase Order
- Voltage Polarity for A, B, and C
- Current Polarity for A, B, C, and Neutral

Transformer Ratio Settings

- PT and CT Primary

- PT and CT Secondary
- Neutral CT Primary and Secondary

Communications

- Baud Rate for Comm 1, 2, and 3.
- Unit ID for Comm 1, 2, and 3.
- Protocol for Comm 1, 2, and 3.
- Mode for Comm 1.
- IP Address, Subnet Mask, and Default Gateway.

The Setup 1 tab also provides push buttons for performing the following commands:

Download – Executes a script to check for values that have changed and downloads those values to the device via the GE 7700 Gateway.

Refresh – Executes a script to upload all of the meter values for the settings on the screen.

Note: Be sure to click the Refresh button prior to changing or downloading any settings to the EPM7500 or EPM7600, as the latest settings may not be displayed.

Setup 2 Tab

7500 Test
7500 Setup 2

| | SD Sub Interval | SD #Sub Intervals | SD Predicted Response |
|----------------------|-----------------|-------------------|-----------------------|
| kW Sliding Demand: | 900 sec. | 1 | 70 |
| kVAR Sliding Demand: | 900 sec. | 1 | 70 |
| kVA Sliding Demand: | 900 sec. | 1 | 70 |
| Iavg Sliding Demand: | 900 sec. | 1 | 70 |

| Waveform Recorder | | Sag / Swell | |
|-------------------|--------|----------------------|--------|
| Depth: | 128x14 | Nominal (V): | 120.00 |
| | | Sag Limit (%): | 88.00 |
| | | Swell Limit (%): | 106.00 |
| | | Change Criteria (%): | 10.00 |

| | Setpoints | | DropOut | | Pickup | | Time Limits | |
|--------------|-----------|---------|---------|---------|--------|--------|-------------|--|
| | Nominal | Under | Over | Under | Over | On (s) | Off (s) | |
| Over kW SWD: | 0.00 | 200.00% | 0.00% | 200.00% | 0.00% | 30 | 30 | |
| Over Ia: | 0.00 | 200.00% | 0.00% | 200.00% | 0.00% | 30 | 30 | |
| Over Ib: | 0.00 | 200.00% | 0.00% | 200.00% | 0.00% | 30 | 30 | |
| Over Ic: | 0.00 | 200.00% | 0.00% | 200.00% | 0.00% | 30 | 30 | |
| Over Vunbal: | 0.00 | 200.00% | 0.00% | 200.00% | 0.00% | 30 | 30 | |

Download
Refresh

Event
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Metering
MIN/MAX
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Inputs
Setup 1
Setup 2

EPM 7500/7600 Meter - Setup 2 Tab

The Setup 2 tab displays the following demand values from the EPM 7500/7600.

Sliding Window Demand Settings

- Sliding Demand Sub Interval Settings for KW, KVAR, KVA, and Iavg.
- Sliding Demand Number of Sub Intervals for KW, KVAR, KVA, and Iavg.
- Sliding Demand Predicted Response for KW, KVAR, KVA, and Iavg.

Waveform Recorder Settings

- Depth of Waveform Recorder

Sag / Swell / Transient Settings

- Sag / Swell Nominal
- Sag Limit
- Swell Limit
- Change Criteria

Relative Setpoint Settings

- Nominal value for Over KW, Over Current, and Over Vunbal.
- Under Dropout for Over KW, Over Current, and Over Vunbal.
- Over Dropout for Over KW, Over Current, and Over Vunbal.

- Under Pickup for Over KW, Over Current, and Over Vunbal.
- Over Pickup for Over KW, Over Current, and Over Vunbal.
- Time On for Over KW, Over Current, and Over Vunbal.
- Time Off for Over KW, Over Current, and Over Vunbal.

The Setup 2 tab also provides push buttons for performing the following commands:

Download– Executes a script to check for values that have changed and downloads those values to the device via the GE 7700 Gateway.

Refresh– .Executes a script to upload all of the meter values for the settings on the screen.

Note: Be sure to click the Refresh button prior to changing or downloading any settings to the EPM7500 or EPM7600, as the latest settings may not be displayed.

EPM 7700 Meter

The EPM 7700 Tabular Data Screen wizard has several special features. You can use the Setup screen to change the meter configuration. Values displayed in white boxes are changeable. Some are changed by clicking on the displayed value, while others are changed by clicking on the associated scroll button. The Download and Refresh buttons on the setup screen upload and download all of the setpoints from the device.

To change setpoints at the device, first press the refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired, then press the download button to send all setpoints to the unit.

In the following pages, each of the 7700 ION Meter's Tabular Data Screen Wizards' tabs will be displayed and detailed.

Metering Tab

| | A | B | C | N | Three Phase Values | |
|------------------------|--------|-----------|--------|------|--------------------|--------|
| Voltage L-N: | 120.06 | 120.08 | 119.97 | | Avg. Voltage L-N: | 120.03 |
| Current (A): | 1.11 | 1.11 | 1.11 | 0.00 | Avg. Current (A): | 1.11 |
| kW: | 0.12 | 0.12 | 0.12 | | Total kW: | 0.34 |
| kVA: | 0.13 | 0.13 | 0.13 | | Total kVA: | 0.40 |
| kVAR: | -0.07 | -0.07 | -0.07 | | Total kVAR: | -0.20 |
| PF Lead (%): | 86.48 | 86.48 | 86.45 | | Total PF Lead (%): | 86.48 |
| PF Lag (%): | n/a | n/a | n/a | | Total PF Lag (%): | n/a |
| PF (%): | 86.48 | 86.48 | 86.45 | | Total PF (%): | 86.48 |
| V THD (%): | 0.00 | 0.00 | 0.00 | | | |
| I THD (%): | 0.00 | 0.00 | 0.00 | 0.00 | | |
| K Factor: | 1.00 | 1.00 | 1.00 | 0.00 | | |
| Voltage Unbalance (%): | | 0.06 | | | Volts AB: | 207.97 |
| Current Unbalance (%): | | 0.26 | | | Volts BC: | 207.88 |
| Frequency (Hz): | | 59.00 | | | Volts CA: | 207.86 |
| Phase Reversal: | | ON | | | Avg. Voltage L-L: | 207.91 |

EPM 7700 ION Meter - Metering Data Screen

The Metering tab displays the following metered values from the EPM 7700.

- VIn A, B: n/a when Voltage Mode is DELTA
- VIn C: n/a when Voltage Mode is DELTA or SINGLE
- VIn Avg: n/a when Voltage Mode is DELTA
- I A, B, Neutral, and Avg
- I C: n/a when Voltage Mode is SINGLE
- VII AB

- VII BC, CA, and Avg: n/a when Voltage Mode is SINGLE
- KW A, B: n/a when Voltage Mode is DELTA
- KW C: n/a when Voltage Mode is DELTA or SINGLE
- KW Total
- KVAR A, B: n/a when Voltage Mode is DELTA
- KVAR C: n/a when Voltage Mode is DELTA or SINGLE
- KVAR Total
- KVA A, B: n/a when Voltage Mode is DELTA
- KVA C: n/a when Voltage Mode is DELTA or SINGLE
- KVA Total
- Power Factor Lead A, B: n/a when Voltage Mode is DELTA or PF is Lagging
- Power Factor Lead C: n/a when Voltage Mode is DELTA or SINGLE or PF is Lagging
- Power Factor Lead Total: n/a when PF is Lagging
- Power Factor Lag A, B: n/a when Voltage Mode is DELTA or PF is Leading
- Power Factor Lag C: n/a when Voltage Mode is DELTA or SINGLE or PF is Leading
- Power Factor Lag Total: n/a when PF is Leading
- Power Factor Total A, B: n/a when Voltage Mode is DELTA
- Power Factor Total C: n/a when Voltage Mode is DELTA or SINGLE
- Power Factor Total
- Total Harmonic Distortion – Voltage A, B, and C: n/a when Source is n/a.
- Total Harmonic Distortion – Current A, B, C, and Neutral: n/a when Source is n/a.
- K Factor A, B, C, and Neutral: n/a when Source is n/a.
- Voltage Unbalance
- Current Unbalance
- Frequency
- Phase Reversal (On, Off) : n/a when Voltage Mode is SINGLE

Min/Max Tab

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>N</u> | <u>Three Phase Values</u> |
|------------------------|-----------|------------|-------------|----------|---------------------------|
| Voltage L-N: | 120.14 | 120.11 | 120.04 | | Avg. Voltage L-N: 120.07 |
| Current (A): | 1.11 | 1.11 | 1.11 | 0.40 | Avg. Current (A): 1.11 |
| V THD (%): | 11.83 | 2.93 | 12.05 | | Total PF Lead (%): 100.00 |
| I THD (%): | 0.34 | 0.09 | 0.40 | 1.11 | Total PF Lag (%): 0.00 |
| K Factor: | 207.97 | 200.00 | 1.11 | 1.11 | |
| | <u>KW</u> | <u>KVA</u> | <u>KVAR</u> | | Volts AB: 208.88 |
| Total: | 0.35 | 0.40 | 0.10 | | Volts BC: 208.77 |
| SWD: | 0.51 | 18.55 | 6.13 | | Volts CA: 207.94 |
| TD: | 208.88 | 0.09 | 0.34 | | Avg. Voltage L-L: 207.97 |
| Voltage Unbalance (%): | 200.00 | | | | |
| Frequency (Hz): | 60.05 | | | | |

Event Logger | Trend Wave | Help Exit

Metering | **MIN/MAX** | Quality | Demand | Inputs | Setup 1 | Setup 2

EPM 7700 ION Meter - Min/Max Tab

The Minimum/Maximum Values tab displays a variety of minimum and maximum values recorded by the EPM 7700. Select Show Minimum or Show Maximum buttons to display either the minimum or maximum values for the displayed parameters. To reset all min/max values, select the Reset Min/Max button.

Min/Max values may be displayed for the following parameters:

- VIn A, B: n/a when Voltage Mode is DELTA
- VIn C: n/a when Voltage Mode is DELTA or SINGLE
- VIn Avg: n/a when Voltage Mode is DELTA
- I A, B, Neutral, and Avg
- I C: n/a when Voltage Mode is SINGLE
- VII AB
- VII BC, CA, and Avg: n/a when Voltage Mode is SINGLE
- KW Total
- KVAR Total
- KVA Total
- Power Factor Lead Total: n/a when PF is Lagging
- Power Factor Lag Total: n/a when PF is Leading
- Power Factor Total Total
- Total Harmonic Distortion – Voltage A, B, and C: n/a when Source is n/a.
- Total Harmonic Distortion – Current A, B, C, and Neutral: n/a when Source is n/a.
- K Factor A, B, C, and Neutral: n/a when Source is n/a.
- Voltage Unbalance
- Frequency

Power Quality Tab

Gateway Comm Failed

Device Name: DeviceNm
 Group Name: \$System
 Device Type: 7500
 Serial ID: PK-9909A072-00
 Firmware Rev: B0325_7500
 Voltage Mode: 4W-WYE

7700 ION Power Quality

Disturbance Counts

Sag Swell Counter: (enabled) 0
 Transient Counter: (enabled) 0

Relative Setpoints **Status**

Over KW SWD: (enabled)
 Over Ia: (disabled)
 Over Ib: (disabled)
 Over Ic: (disabled)
 Over Vunbal: (disabled)

Symmetric Components

Current Zero Seq: 0.0 / -48.22° Voltage Zero Seq: 0.9 / -57.85°
 Current Positive Seq: 0.0 / 275.51° Voltage Positive Seq: 1.1 / 244.19°
 Current Negative Seq: 2.2 / 30.55° Voltage Negative Seq: 240.2 / 0.41°

Metering MIN/MAX **Quality** Demand Inputs Setup 1 Setup 2

Event Trend Help
 Logger Wave Exit

EPM 7700 ION Meter - Power Quality Tab

The Power Quality tab displays the following power quality values from the EPM 7700.

Disturbance Monitoring

- Sag / Swell Counter
- Transient Counter
- Over KW Sliding Window Demand Status
- Over Current Phase A Status
- Over Current Phase B Status
- Over Current Phase C Status
- Over Voltage Unbalance Status

*Note: no color code is used for the Relative Setpoint Status.

Symmetric Components

- Zero Sequence Magnitude for Current and Voltage
- Zero Sequence Phase for Current and Voltage
- Positive Sequence Magnitude for Current and Voltage
- Positive Sequence Phase for Current and Voltage
- Negative Sequence Magnitude for Current and Voltage
- Negative Sequence Phase for Current and Voltage

The Power Quality tab also provides push buttons for performing the following commands:

Reset Disturbance Counters – Resets Sag Swell and Transient Counters.

Enable/Disable Sag Swell – Enables or Disables Sag Swell Tracking.

Enable/Disable Transient – Enables or Disables Transient Tracking.

Enable/Disable Over KW – Enables or Disables Over Real Power Sliding Window Demand for Relative Setpoint Tracking.

Enable/Disable Over Amps – Enables or Disables Over Current for Phases A, B, and C for Relative Setpoint Tracking.

Enable/Disable Over Vunb – Enables or Disables Over Voltage Unbalance for Relative Setpoint Tracking.

Demand Tab

7700 ION Demand

| | <u>Import</u> | <u>Export</u> | <u>Total</u> | <u>Net</u> |
|---------------|---------------|---------------|--------------|------------|
| KWh: | 34.88 | 25.28 | 60.17 | 9.597 |
| KVARh: | 14.67 | 20.25 | 34.93 | -5.57 |
| KVAh: | | | 69.57 | |

Reset Energy

| | <u>Sliding Window Demand</u> | <u>Predicted Demand</u> | <u>Thermal Demand</u> |
|---------------|------------------------------|-------------------------|-----------------------|
| kW: | 0.34 | 0.34 | 0.34 |
| kVAR: | -0.20 | -0.20 | -0.20 |
| kVA: | 0.40 | 0.40 | 0.40 |
| I Avg: | 1.11 | 1.11 | 1.11 |

Reset SWD **Reset Thermal**

Event Logger Trend Wave Help Exit Metering MIN/MAX Quality Demand Inputs Setup 1 Setup 2

EPM 7700 ION Meter - Demand Tab

The Demand tab displays the following demand values from the EPM 7700.

Energy

- Real Energy Import, Export, Total, and Net
- Reactive Energy Import, Export, Total, and Net
- Apparent Energy Total

Sliding Window Demand (SWD)

- Real Power Sliding Window Demand and Predicted Demand
- Reactive Power Sliding Window Demand and Predicted Demand
- Apparent Power Sliding Window Demand and Predicted Demand

- Average RMS Current Sliding Window Demand and Predicted Demand

Thermal Demand

- Real Power Thermal Demand
- Reactive Power Thermal Demand
- Apparent Power Thermal Demand
- Average RMS Current Thermal Demand

The Demand tab also provides push buttons for performing the following commands:

Reset Energy – Resets Energy Demand values identified above.

Reset SWD– Resets Sliding Window Demand values identified above.

Thermal Demand – Resets Thermal Demand values identified above.

Inputs Tab

7700 ION Inputs

| Digital Inputs | | Status | Counter |
|----------------|---------------|--------|---------|
| SI1: | STATUS INPUT1 | ON | 0 |
| SI2: | STATUS INPUT2 | ON | 0 |
| SI3: | STATUS INPUT3 | OFF | 0 |
| SI4: | STATUS INPUT4 | OFF | 0 |
| SI5: | STATUS INPUT5 | OFF | 0 |
| SI6: | STATUS INPUT6 | OFF | 0 |
| SI7: | STATUS INPUT7 | OFF | 0 |
| SI8: | STATUS INPUT8 | OFF | 0 |

Reset Counters

| Analog Inputs | | Zero Scale | Full Scale | Scaled Value |
|---------------|---------------|------------|------------|--------------|
| A1: | ANALOG INPUT1 | n/a | n/a | n/a |
| A2: | ANALOG INPUT2 | n/a | n/a | n/a |
| A3: | ANALOG INPUT3 | n/a | n/a | n/a |
| A4: | ANALOG INPUT4 | n/a | n/a | n/a |

EPM 7700 ION Meter - Inputs Tab

The Inputs tab displays the following values from the EPM 7700.

Digital Inputs

- Status (On, Off) for Status Inputs (SI) 1-8. (Color Code: Green – ON, Grey – OFF).
- Counters for SI1-8.

Analog Inputs

- Zero Scale Setting for AI1-4. : n/a when doesn't exist on the meter
- Full Scale Setting for AI1-4. : n/a when doesn't exist on the meter
- Scaled Value for AI1-4. : n/a when doesn't exist on the meter

The Inputs tab also provides push buttons for performing the following commands:

Reset Counters – Resets Digital Input Status Counters for SI1-8.

The Inputs tab also provides retentive memory inputs for the following:

Digital Input Names for SI1-8.

Analog Input Names for AI1-4. : n/a when doesn't exist on the meter

Setup 1 Tab

7700 ION Setup 1

Power

| | | |
|--------------|--------|---|
| Volts Mode: | 4W-WYE | ↓ |
| Va Polarity: | Normal | ↓ |
| Vb Polarity: | Normal | ↓ |
| Vc Polarity: | Normal | ↓ |
| Phase Order: | ABC | ↓ |
| Ia Polarity: | Normal | ↓ |
| Ib Polarity: | Normal | ↓ |
| Ic Polarity: | Normal | ↓ |
| I4 Polarity: | Normal | ↓ |

Transformer Ratios

| | |
|------------------|-----|
| PT Primary: | 347 |
| CT Primary: | 5 |
| PT Secondary: | 347 |
| CT Secondary: | 5 |
| I4 CT Primary: | 5 |
| I4 CT Secondary: | 5 |

Communications

| | | | |
|------------------|-------|----------------------|---------------|
| Com 1 Baud Rate: | 9600 | Com 3 Baud Rate: | 9600 |
| Com 1 Unit ID: | 9072 | Com 3 Unit ID: | 102 |
| Comm Protocol: | ION | Comm Protocol: | ION |
| Comm Mode: | RS232 | Ethernet Protocol: | n/a |
| Com 2 Baud Rate: | 9600 | Ethernet IP Address: | 3.46.9.247 |
| Com 2 Unit ID: | 101 | Subnet Mask: | 255.255.240.0 |
| Comm Protocol: | ION | Default Gateway: | 3.46.0.1 |

Event Logger | Trend Wave | Help Exit

Metering | MIN/MAX | Quality | Demand | Inputs | Setup 1 | Setup 2

EPM 7700 ION Meter - Setup 1 Tab

The Setup 1 tab displays the following demand values from the EPM 7700.

Power Settings

- Volts Mode
- Phase Order
- Voltage Polarity for A, B, and C
- Current Polarity for A, B, C, and Neutral

Transformer Ratio Settings

- PT and CT Primary

- PT and CT Secondary
- Neutral CT Primary and Secondary

Communications

- Baud Rate for Comm 1, 2, and 3.
- Unit ID for Comm 1, 2, and 3.
- Protocol for Comm 1, 2, and 3.
- Mode for Comm 1.
- Ethernet Protocol, IP Address, Subnet Mask, and Default Gateway.


The Setup 1 tab also provides push buttons for performing the following commands:

Download – Executes a script to check for values that have changed and downloads those values to the device via the GE 7700 Gateway.

Refresh – Executes a script to upload all of the meter values for the settings on the screen.

Note: Be sure to click the Refresh button prior to changing or downloading any settings to the EPM7700, as the latest settings may not be displayed.

Setup 2 Tab



Gateway Comm Failed

7700 ION Set Up 2

| | SD Sub Interval | SD #Sub Intervals | SD Predicted Response |
|----------------------|---------------------------------------|--------------------------------|---------------------------------|
| kW Sliding Demand: | <input type="text" value="900"/> sec. | <input type="text" value="1"/> | <input type="text" value="70"/> |
| kVAR Sliding Demand: | <input type="text" value="900"/> sec. | <input type="text" value="1"/> | <input type="text" value="70"/> |
| kVA Sliding Demand: | <input type="text" value="900"/> sec. | <input type="text" value="1"/> | <input type="text" value="70"/> |
| Iavg Sliding Demand: | <input type="text" value="900"/> sec. | <input type="text" value="1"/> | <input type="text" value="70"/> |

Waveform Recorder

Depth: ▾

Sag / Swell / Transient

Nominal (V):

Sag Limit (%):

Swell Limit (%):

Change Criteria (%):

Transient Threshold (%):

| | DropOut | | | Pickup | | Time Limits | |
|--------------|-----------------------------------|--------------------------------------|------------------------------------|--------------------------------------|------------------------------------|---------------------------------|---------------------------------|
| | Nominal | Under | Over | Under | Over | On (s) | Off (s) |
| Over kW SWD: | <input type="text" value="0.00"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="30"/> | <input type="text" value="30"/> |
| Over Ia: | <input type="text" value="0.00"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="30"/> | <input type="text" value="30"/> |
| Over Ib: | <input type="text" value="0.00"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="30"/> | <input type="text" value="30"/> |
| Over Ic: | <input type="text" value="0.00"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="30"/> | <input type="text" value="30"/> |
| Over Vunbal: | <input type="text" value="0.00"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="200.00%"/> | <input type="text" value="0.00%"/> | <input type="text" value="30"/> | <input type="text" value="30"/> |

Download

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Setup 2

EPM 7700 ION Meter - Setup 2 Tab

The Setup 2 tab displays the following demand values from the EPM 7700.

Sliding Window Demand Settings

- Sliding Demand Sub Interval Settings for KW, KVAR, KVA, and Iavg.
- Sliding Demand Number of Sub Intervals for KW, KVAR, KVA, and Iavg.
- Sliding Demand Predicted Response for KW, KVAR, KVA, and Iavg.

Waveform Recorder Settings

- Depth of Waveform Recorder

Sag / Swell / Transient Settings

- Sag / Swell Nominal
- Sag Limit
- Swell Limit
- Change Criteria
- Transient Threshold

Relative Setpoint Settings

- Nominal value for Over KW, Over Current, and Over Vunbal.
- Under Dropout for Over KW, Over Current, and Over Vunbal.
- Over Dropout for Over KW, Over Current, and Over Vunbal.
- Under Pickup for Over KW, Over Current, and Over Vunbal.

- Over Pickup for Over KW, Over Current, and Over Vunbal.
- Time On for Over KW, Over Current, and Over Vunbal.
- Time Off for Over KW, Over Current, and Over Vunbal.

The Setup 2 tab also provides push buttons for performing the following commands:

Download– Executes a script to check for values that have changed and downloads those values to the device via the GE 7700 Gateway.

Refresh– .Executes a script to upload all of the meter values for the settings on the screen.

Note: Be sure to click the Refresh button prior to changing or downloading any settings to the EPM7700, as the latest settings may not be displayed.

Universal Relay

The Universal Relay devices are a highly-flexible family of power management devices based on the concept of a backplane and CPU supporting a wide variety of plug-in modules. These modules provide metering, monitoring, protection and control functions, and other abilities.

A UR tabular wizard can display between one and eight screens of data – the number of screens is determined by the user during wizard configuration. There are a total of Twenty Three screens available, depending on the type of UR device connected. For example, the C30 device does not support any metering functions, so the metering an source tabs are not available for this device.


The UR wizard supports connection to the PMCS Modbus and Ethernet servers and third party MMS servers. A UCA/MMS check box is provided on the wizard configuration dialog to correctly set up the Intouch tag names for use with MMS.

Special Note: UCA/MMS support for PMCS 6.14 is removed. **Do not** check this checkbox.

Note: If WindowViewer is running when the wizard configuration dialog is called up, a message appears warning that any changes made to the UR wizard configuration will not take effect until WindowViewer is shut down and restarted. For example, if a user elects to change the number of tabs configured for a device, the changes will not be reflected in the runtime environment until WindowViewer is restarted.

In the following pages, each of the Tabular Data Screen Wizards' tabs will be displayed and described.

Metering Tab



Device Name: D60
 Group Name: \$System
 Order Code: D60-D00-HCH-F8B-H6B-M6D-P6K-W6H
 Product Version: 0
 Serial #: MABC99000003
 Mfr Date: 06/14/1999
 Mod #: 0
 Modbus Addr: 3
 IP Addr: 3.46.9.233
 Prog. State: Not Programmed
 Relay: Relay-1

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| Metering Tab | | | | | | | |
|---------------------|------------|------------------|-------------|-----------|----------|----------------|-------------|
| Phase | Current | | | Phase | Voltage | | |
| | RMS (Amps) | Magnitude (Amps) | Angle (Deg) | | RMS (kV) | Magnitude (kV) | Angle (Deg) |
| A | 0.40 | 0.40 | ∠-118.60 | AG | 0.00 | 0.12 | ∠151.20 |
| B | 0.00 | 0.40 | ∠-357.00 | BG | 0.12 | 0.12 | ∠-27.50 |
| C | 0.00 | 0.40 | ∠-236.90 | CG | 0.12 | 0.12 | ∠270.40 |
| Ground | 0.00 | 0.00 | ∠ 0.00 | AB | 0.00 | 0.21 | ∠177.50 |
| Neutral | 0.00 | 0.00 | ∠ 0.00 | BC | 0.00 | 0.21 | ∠-60.30 |
| | | | | CA | 0.21 | 0.21 | ∠301.30 |
| | | | | Auxiliary | 0.00 | 0.00 | ∠ 0.00 |
| Power | | | | | | | |
| Phase | Real | | Reactive | | Apparent | | p.f. |
| A | 0.00 kW | | -0.02 kVAR | | 0.05 kVA | | -0.86 |
| B | 0.04 kW | | -0.02 kVAR | | 0.05 kVA | | -0.86 |
| C | 0.04 kW | | -0.02 kVAR | | 0.05 kVA | | -0.86 |
| 3-Phase | 0.12 kW | | -0.07 kVAR | | 0.15 kVA | | 0.00 |
| Frequency(Hz) : N/A | | | | | | | |

Metering
Quality
Control
Elements
Inputs
Counter
Power
Source2

Universal Relay - Metering Data Screen

The Metering tab displays the following metered values from the B30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 devices: Actual Values for Voltage, Current, Power, Power Factor, and Frequency. These values are detailed below.

Current

RMS Current for each phase, ground, and neutral

Phasor magnitude and angle for each phase, ground and neutral

Voltage

RMS voltage for each phase-to-phase, phase-to-neutral, and auxiliary voltage value.

Phasor magnitude and angle for phase-to-phase, phase-to-neutral and auxiliary voltage value.

Phase-to-neutral voltages are displayed as "N/A" if derived from a source wired in a delta configuration.

Power

Shows Real (Watts), Reactive (VAR), and Apparent (VA) power values per phase and 3-phase.

By default, all power values are displayed in terms of kW, kVAR, and kVA. These values will scale as appropriate to MW, MVAR, and MVA.

Power values derived from a source wired in a delta configuration are displayed as "N/A".

Power Factor

Shows the signed power factor value in percent.

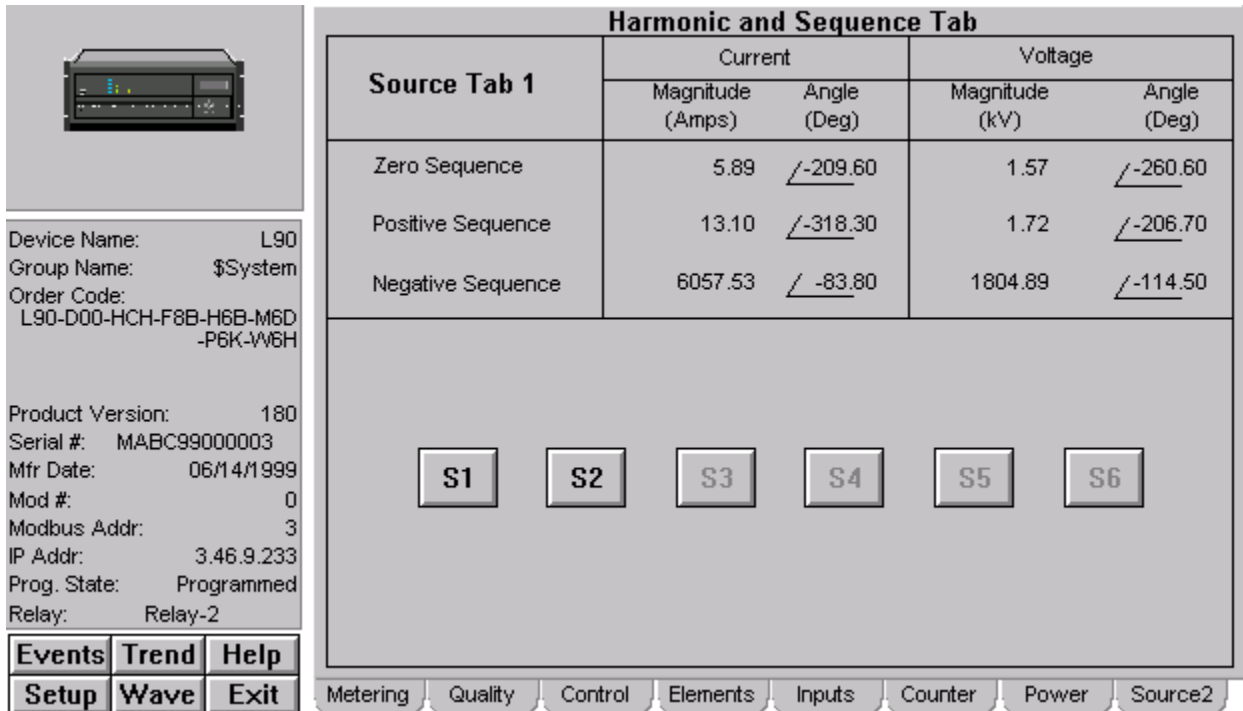
Power Factor values derived from a source wired in a delta configuration are displayed as "N/A".

Frequency

Frequency is shown in units of hertz.

Frequency is only displayed if the Frequency Tracking Reference setpoint is set to a non-zero value.

Power Quality Tab



| Source Tab 1 | Current | | Voltage | |
|-------------------|------------------|------------------|----------------|------------------|
| | Magnitude (Amps) | Angle (Deg) | Magnitude (kV) | Angle (Deg) |
| Zero Sequence | 5.89 | $\angle -209.60$ | 1.57 | $\angle -260.60$ |
| Positive Sequence | 13.10 | $\angle -318.30$ | 1.72 | $\angle -206.70$ |
| Negative Sequence | 6057.53 | $\angle -83.80$ | 1804.89 | $\angle -114.50$ |

Device Name: L90
 Group Name: \$System
 Order Code: L90-D00-HCH-F8B-H6B-M6D-P6K-W6H
 Product Version: 180
 Serial #: MABC99000003
 Mfr Date: 06/14/1999
 Mod #: 0
 Modbus Addr: 3
 IP Addr: 3.46.9.233
 Prog. State: Programmed
 Relay: Relay-2

Events Trend Help
 Setup Wave Exit

Metering Quality Control Elements Inputs Counter Power Source2

Universal Relay - Quality Tab

The Quality tab provides six buttons labeled S1 – S6. These buttons enable you to select the source (1 – 6) for display. The text in the upper left corner of the tab indicates which source is currently displayed. Buttons are disabled for sources that have not been configured or enabled in the attached device. The Voltage parameters displayed are dependent on CT/VT configuration of the device hardware.

For the selected source, the Quality tab displays actual values for Zero Sequence, Positive Sequence, and Negative Sequence currents and voltages. The following devices are supported: B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60. The displayed values are described below.

Current

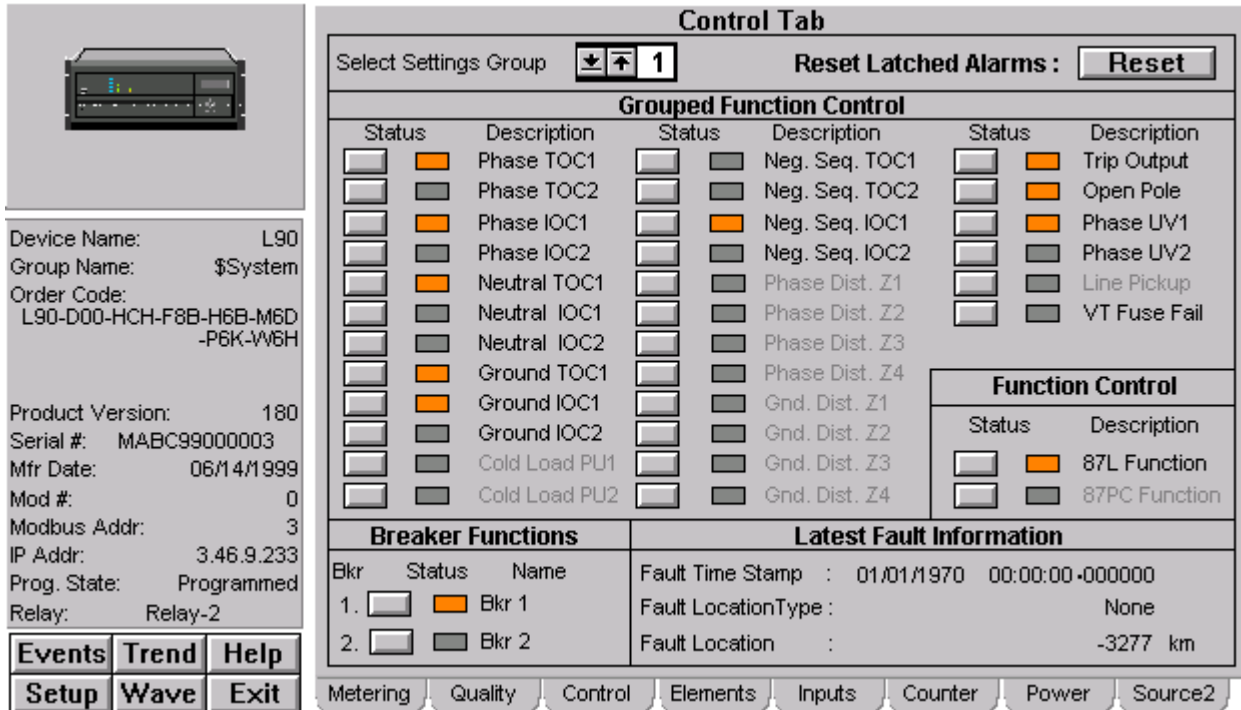
Phasor magnitude and angle for negative, positive and zero sequence currents.

Voltage

Phasor magnitude and angle for negative, positive and zero sequence voltages.

Voltage values derived from a source wired in a delta configuration will appear as "N/A".

Protection Control Tab



Control Tab

Select Settings Group: **1** Reset Latched Alarms:

| Grouped Function Control | | | | | |
|--------------------------|---------------|--------------------------|----------------|---|--------------|
| Status | Description | Status | Description | Status | Description |
| <input type="checkbox"/> | Phase TOC1 | <input type="checkbox"/> | Neg. Seq. TOC1 | <input type="checkbox"/> | Trip Output |
| <input type="checkbox"/> | Phase TOC2 | <input type="checkbox"/> | Neg. Seq. TOC2 | <input type="checkbox"/> | Open Pole |
| <input type="checkbox"/> | Phase IOC1 | <input type="checkbox"/> | Neg. Seq. IOC1 | <input type="checkbox"/> | Phase UV1 |
| <input type="checkbox"/> | Phase IOC2 | <input type="checkbox"/> | Neg. Seq. IOC2 | <input type="checkbox"/> | Phase UV2 |
| <input type="checkbox"/> | Neutral TOC1 | <input type="checkbox"/> | Phase Dist. Z1 | <input type="checkbox"/> | Line Pickup |
| <input type="checkbox"/> | Neutral IOC1 | <input type="checkbox"/> | Phase Dist. Z2 | <input type="checkbox"/> | VT Fuse Fail |
| <input type="checkbox"/> | Neutral IOC2 | <input type="checkbox"/> | Phase Dist. Z3 | Function Control Status Description <input type="checkbox"/> <input type="checkbox"/> 87L Function <input type="checkbox"/> <input type="checkbox"/> 87PC Function | |
| <input type="checkbox"/> | Ground TOC1 | <input type="checkbox"/> | Phase Dist. Z4 | | |
| <input type="checkbox"/> | Ground IOC1 | <input type="checkbox"/> | Gnd. Dist. Z1 | | |
| <input type="checkbox"/> | Ground IOC2 | <input type="checkbox"/> | Gnd. Dist. Z2 | | |
| <input type="checkbox"/> | Cold Load PU1 | <input type="checkbox"/> | Gnd. Dist. Z3 | | |
| <input type="checkbox"/> | Cold Load PU2 | <input type="checkbox"/> | Gnd. Dist. Z4 | | |

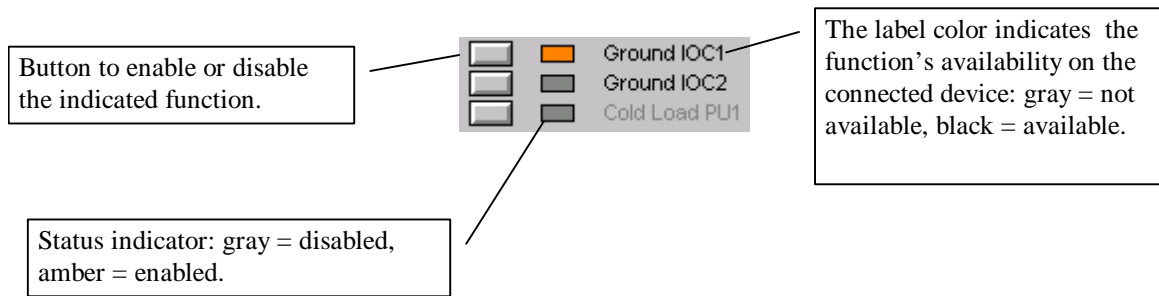
| Breaker Functions | | | Latest Fault Information | |
|-------------------|--------------------------|-------|----------------------------|--|
| Bkr | Status | Name | Fault Time Stamp | |
| 1. | <input type="checkbox"/> | Bkr 1 | 01/01/1970 00:00:00-000000 | |
| 2. | <input type="checkbox"/> | Bkr 2 | Fault LocationType: None | |
| | | | Fault Location: -3277 km | |

Universal Relay - Protection Control Tab

The Protection Control tab is supported for the following devices: B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60. The Protection Control tab provides the features described below.

Grouped Protection Settings

There are eight identical groups of protection settings in the UR - this tab provides an enable/disable status indication of selected protection elements, as well as a pushbutton to change the enable/disable status of those elements in each group. Function availability is determined by the Order Code read from the device – those functions that are not available in the connected device will be grayed out and disabled, as shown below:



To use this tab, the user selects one of the eight settings groups for editing using the control labeled "Select Settings Group". The status of the settings in the selected group will then be displayed, and the user can enable/disable functions without affecting settings in the other seven groups. Note that the displayed group may not be the active group currently in use by the relay's protection algorithms. The pushbuttons are subject to user level security in Intouch.

Phase TOC and IOC Settings

The Phase, Neutral, and Ground buttons in this section may be used to select the display of the TOC and IOC values.

Power System Configuration Tab

| Power System Configuration | | | | | | | | | |
|----------------------------|----------------|------|----------------|------|---|-----------------|-------------------|------------|-------|
| Current Transformer | | | | | Voltage Transformer | | | | |
| No. | Phase | | Ground | | No. | Phase | | | |
| | Primary (Amps) | Sec. | Primary (Amps) | Sec. | | Connection Type | Secondary (Volts) | Ratio (:1) | |
| 1 | 1.00 | 1A | 1.00 | 1A | 1 | Wye | 66.40 | 1.00 | |
| 2 | N/A | N/A | N/A | N/A | 2 | N/A | N/A | N/A | |
| 3 | N/A | N/A | N/A | N/A | 3 | N/A | N/A | N/A | |
| | | | | | Auxiliary | | | | |
| 4 | N/A | N/A | N/A | N/A | 1 | Delta | 66.40 | 1.00 | |
| 5 | N/A | N/A | N/A | N/A | 2 | N/A | N/A | N/A | |
| 6 | N/A | N/A | N/A | N/A | 3 | N/A | N/A | N/A | |
| | | | | | Voltage | | Frequency | | Phase |
| Synchrocheck 1 Delta | | | | | 0 | | 0 | | 0 |
| Synchrocheck 2 Delta | | | | | 0 | | 0 | | 0 |
| IRIG-B Signal Type | | | | | None | | | | |
| Normal Freq.(Hz) | | | | | 60 | | | | |
| Phase Rotation | | | | | ABC | | | | |
| Freq. Tracking Ref. | | | | | 0 | | | | |
| | | | | | <input type="button" value="Disable"/> <input checked="" type="checkbox"/> Hi-Z Function | | | | |
| | | | | | Legend : <input type="checkbox"/> Disabled <input checked="" type="checkbox"/> Enabled | | | | |

Universal Relay - Power System Configuration Tab

The Power System Configuration tab supports the B30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows the source CT and VT configuration of the entire relay. The supported UR devices can be configured with one to three DSP cards containing voltage and/or current transformers for measurement purposes.

Current Transformers (CT)

Primary: indicates the current rating of the CT primary.

Secondary: indicates the output current of the CT secondary, either 1A or 5A.

Displays "N/A" if the Order Code indicates no CT is installed in the affected location.

Voltage Transformers (VT)

Secondary: indicates the output voltage of the VT.

Ratio: the turns ratio of the VT.

Displays "N/A" if the Order Code indicates no VT is installed in the affected location.

Synchrocheck 1/2 Delta

The Delta values for Synchrocheck 1 and 2, voltage frequency, and phase.

IRIG-B Signal Type

Displays the IRIG-B signal type in use, if applicable.

Normal Frequency

The system nominal frequency in hertz.

Phase Rotation

The system phase rotation, ABC or ACB.


Frequency Tracking Reference

A numerical setpoint value associated with a specific source. The indicated source is used by the relay for developing frequency metering information. A value of zero indicates that the relay is not intended to meter frequency.

Hi-Z Function

Enable or Disable the device's High Impedance (Hi-Z) function, if equipped.

Transformer Tab



Device Name: UR_51
 Group Name: \$System
 Order Code: T60-D00-HCH-F8A-H6E-M5F-P5E-W6H
 Product Version: 240
 Serial #: MBHC99000002
 Mfr Date: 06/16/1999
 Mod #: 0
 Modbus Addr: 51
 IP Addr: 3.46.9.234
 Prog. State: Programmed
 Relay: Relay-1

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| Transformer Tab | | | | |
|--------------------------------------|--------------|--------------|---|--------|
| | | lad | lbd | lcd |
| Differential Phasor Magnitude(pu) | | 0.00 | 0.00 | 0.00 |
| Differential Phasor Angle(Degs) | | / 0.00 | / 0.00 | / 0.00 |
| Differential 2nd Harm Magnitude(%fo) | | 0.00 | 0.00 | 0.00 |
| Differential 2nd Harm Angle(Degs) | | / 0.00 | / 0.00 | / 0.00 |
| Differential 5th Harm Magnitude(%fo) | | 0.00 | 0.00 | 0.00 |
| Differential 5th Harm Angle(Degs) | | / 0.00 | / 0.00 | / 0.00 |
| | | lar | lbr | lcr |
| Restraint Phasor Magnitude(pu) | | 0.10 | 0.10 | 0.10 |
| Restraint Phasor Angle(Degs) | | / 0.00 | / 0.00 | / 0.00 |
| T/F Wdg. | Tap Position | Ph. Position | Transformer Ref. Winding(1-6) 3 | |
| 1 | N/A | N/A | <input type="checkbox"/> % Differential Function <input checked="" type="checkbox"/> 5th Harm. Overex. Inhibit Func. <input type="checkbox"/> 2nd Harm. Inrush Inhibit Func. Legend : <input type="checkbox"/> Disabled <input checked="" type="checkbox"/> Enabled | |
| 2 | N/A | N/A | | |
| 3 | N/A | N/A | | |
| 4 | N/A | N/A | | |
| 5 | N/A | N/A | | |
| 6 | N/A | N/A | | |

Universal Relay - Transformer Tab

The T60 device alone supports a Transformer Tab on its wizard. This tab is unique to the T60 device type. The following values are shown:

Differential Current

- Phasor magnitude and angle.
- Differential 2nd Harmonic
- Phasor magnitude and angle
- Differential 5th Harmonic
- Phasor magnitude and angle


Restraint Current

Phasor Magnitude and angle

Transformer Winding Reference

Indicates which of the six possible transformer windings will serve as the reference winding.

Elements Tab



Digital Element

| Module | Digital Element Function | Status | Digital Element Name |
|--------|--------------------------|--------|----------------------|
| 1 | Disable | ■ | Dig Element 1 |
| 2 | Enable | ■ | Dig Element 2 |
| 3 | Disable | ■ | Dig Element 3 |
| 4 | Enable | ■ | Dig Element 4 |
| 5 | Enable | ■ | Dig Element 5 |
| 6 | Enable | ■ | Dig Element 6 |
| 7 | Disable | ■ | Dig Element 7 |
| 8 | Enable | ■ | Dig Element 8 |
| 9 | Enable | ■ | Dig Element 9 |
| 10 | Enable | ■ | Dig Element 10 |
| 11 | Enable | ■ | Dig Element 11 |
| 12 | Disable | ■ | Dig Element 12 |
| 13 | Enable | ■ | Dig Element 13 |
| 14 | Enable | ■ | Dig Element 14 |
| 15 | Disable | ■ | Dig Element 15 |
| 16 | Enable | ■ | Dig Element 16 |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | | | | |
|----------|---------|---------|----------|---------|---------|----|
| Metering | Quality | Control | Elements | VInputs | VOutput | ➤➤ |
|----------|---------|---------|----------|---------|---------|----|


Device Name: UR
 Group Name: \$System
 Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H
 Product Version: 240
 Serial #: MURC99000253
 Mfr Date: 06/10/1999
 Mod #: 0
 Modbus Addr: 45
 IP Addr: 3.46.9.231
 Prog. State: Programmed
 Relay: Relay-1

Universal Relay - Digital Elements Tab

The Elements tab displays user-defined name and current status of the sixteen digital elements in the UR. The status indicator color is amber if an element is enabled, gray if it is disabled. The B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 devices are supported.

Digital Counter Tab

UR_51



Device Name: UR_51
 Group Name: \$System
 Order Code: T60-D00-HCH-F8A-H6E-M5F-P5E-V6H

Product Version: 240
 Serial #: MBHC99000002
 Mfr Date: 06/16/1999
 Mod #: 0
 Modbus Addr: 51
 IP Addr: 3.46.9.234
 Prog. State: Programmed
 Relay: Relay-1

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Digital Counter Tab

| # | Status | Enable/Disable | Name | Frozen Value | Time Stamp | |
|---|--------------------------|----------------|-----------|--------------|------------|-----------------|
| 1 | <input type="checkbox"/> | Enable | Counter 1 | 1160596790 | 01/30/1987 | 03:38:08,111203 |
| 2 | <input type="checkbox"/> | Enable | Counter 2 | 1177374774 | 01/30/1987 | 03:38:08,959459 |
| 3 | <input type="checkbox"/> | Enable | Counter 3 | 1194153304 | 01/30/1987 | 03:38:08,808464 |
| 4 | <input type="checkbox"/> | Enable | Counter 4 | 1479366454 | 01/30/1987 | 03:38:08,538976 |
| 5 | <input type="checkbox"/> | Enable | Counter 5 | 1210064928 | 01/30/1987 | 03:38:08,929539 |
| 6 | <input type="checkbox"/> | Enable | Counter 6 | 538976288 | 01/30/1987 | 03:38:08,105482 |
| 7 | <input type="checkbox"/> | Enable | Counter 7 | 538976288 | 01/30/1987 | 03:38:08,626524 |
| 8 | <input type="checkbox"/> | Enable | Counter 8 | 538976288 | 01/30/1987 | 01:22:21,166831 |

Counter Xform

Universal Relay - Digital Counter Tab

The digital counter tab supports B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 device types, showing information about the eight digital counters provided in each UR.

Status – this indicator is amber if the counter is enabled, gray if disabled.

Enable/Disable – this button gives the user the ability to enable or disable the specified counter.

Name – displays the user-defined name assigned to the counter.

Frozen Value – shows the counter’s value when last frozen.

Time Stamp – shows the time and date when the frozen count was acquired.

Virtual Inputs Tab

Virtual Input

| Input | State | Name | Input | State | Name |
|-------|---------|-----------|-------|---------|------------|
| 1 | Enable | Virt Ip 1 | 9 | Enable | Virt Ip 9 |
| 2 | Disable | Virt Ip 2 | 10 | Disable | Virt Ip 10 |
| 3 | Enable | Virt Ip 3 | 11 | Enable | Virt Ip 11 |
| 4 | Enable | Virt Ip 4 | 12 | Disable | Virt Ip 12 |
| 5 | Disable | Virt Ip 5 | 13 | Enable | Virt Ip 13 |
| 6 | Enable | Virt Ip 6 | 14 | Disable | Virt Ip 14 |
| 7 | Enable | Virt Ip 7 | 15 | Enable | Virt Ip 15 |
| 8 | Disable | Virt Ip 8 | 16 | Disable | Virt Ip 16 |

Virtual Input Control

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| State | Off | Off | Off | Off | On | Off | Off | Off | Off | Off | On | Off | Off | Off | Off | Off |
| ON/OFF | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| State | Off | Off | Off | Off | On | Off | Off | Off | Off | Off | On | Off | Off | Off | Off | Off |
| ON/OFF | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |

Events Trend Help
 Setup Wave Exit

Metering Quality Control Elements VInputs VOutput >>

Universal Relay - Virtual Inputs Tab

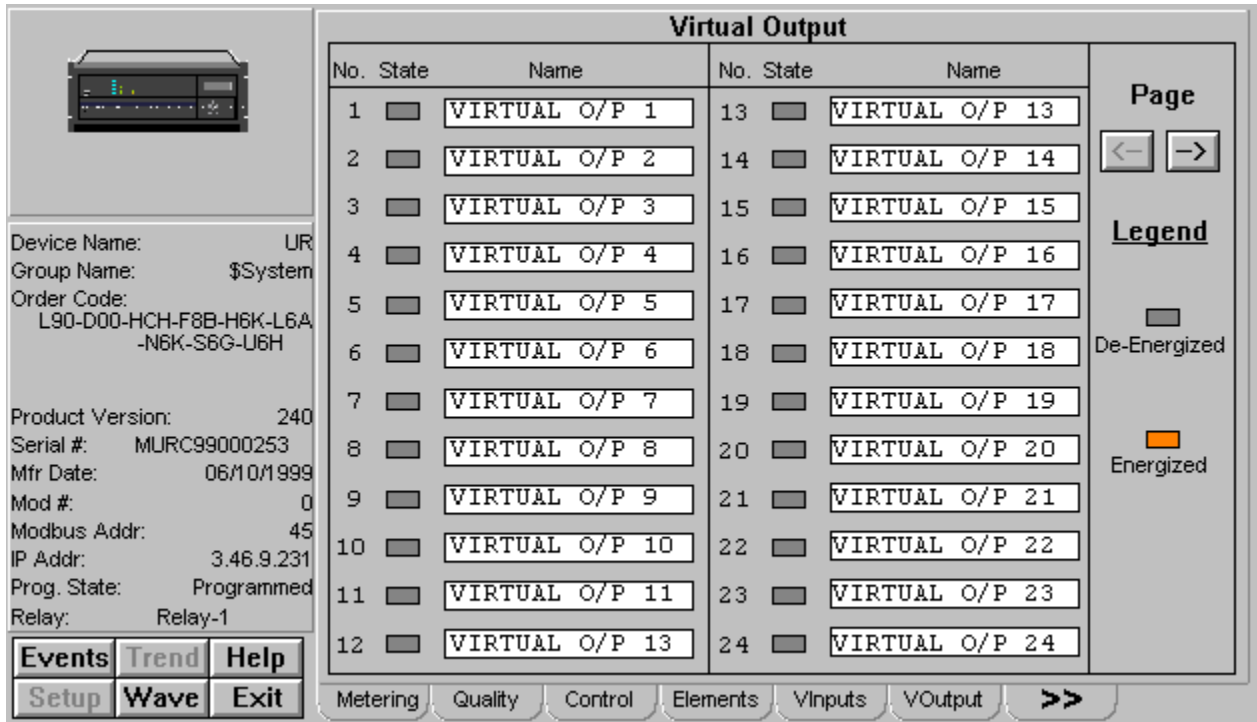
The Virtual Inputs (VInputs) tab allows the user to enable/disable all configured virtual inputs in the connected device and provides indication of their status. The 32 virtual inputs can be manually operated with the pushbuttons provided at the bottom of the screen. This tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 devices.

Virtual Inputs

The enable/disable controls and status indicators are presented as a series of pages. To view the virtual inputs, the use the Page arrow keys provided to navigate between the pages. The arrow keys are disabled when the virtual inputs are not being displayed.

The state of each virtual input can be controlled with the pushbuttons along the bottom of the screen. Clicking one of these buttons toggles the status of the virtual input, changing its state as shown in the indicator blocks associated with each button. Note that a virtual input must be enabled before the toggling action will take effect in the relay.

Virtual Outputs Tab



The screenshot displays the 'Virtual Output' tab of a software interface. On the left, there is a device icon and a panel with the following information:

- Device Name: UR
- Group Name: \$System
- Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H
- Product Version: 240
- Serial #: MURC99000253
- Mfr Date: 06/10/1999
- Mod #: 0
- Modbus Addr: 45
- IP Addr: 3.46.9.231
- Prog. State: Programmed
- Relay: Relay-1

Below this information are buttons for 'Events', 'Trend', 'Help', 'Setup', 'Wave', and 'Exit'. The main area is a table titled 'Virtual Output' with two columns of data:

| No. | State | Name | No. | State | Name |
|-----|--------------------------|----------------|-----|--------------------------|----------------|
| 1 | <input type="checkbox"/> | VIRTUAL O/P 1 | 13 | <input type="checkbox"/> | VIRTUAL O/P 13 |
| 2 | <input type="checkbox"/> | VIRTUAL O/P 2 | 14 | <input type="checkbox"/> | VIRTUAL O/P 14 |
| 3 | <input type="checkbox"/> | VIRTUAL O/P 3 | 15 | <input type="checkbox"/> | VIRTUAL O/P 15 |
| 4 | <input type="checkbox"/> | VIRTUAL O/P 4 | 16 | <input type="checkbox"/> | VIRTUAL O/P 16 |
| 5 | <input type="checkbox"/> | VIRTUAL O/P 5 | 17 | <input type="checkbox"/> | VIRTUAL O/P 17 |
| 6 | <input type="checkbox"/> | VIRTUAL O/P 6 | 18 | <input type="checkbox"/> | VIRTUAL O/P 18 |
| 7 | <input type="checkbox"/> | VIRTUAL O/P 7 | 19 | <input type="checkbox"/> | VIRTUAL O/P 19 |
| 8 | <input type="checkbox"/> | VIRTUAL O/P 8 | 20 | <input type="checkbox"/> | VIRTUAL O/P 20 |
| 9 | <input type="checkbox"/> | VIRTUAL O/P 9 | 21 | <input type="checkbox"/> | VIRTUAL O/P 21 |
| 10 | <input type="checkbox"/> | VIRTUAL O/P 10 | 22 | <input type="checkbox"/> | VIRTUAL O/P 22 |
| 11 | <input type="checkbox"/> | VIRTUAL O/P 11 | 23 | <input type="checkbox"/> | VIRTUAL O/P 23 |
| 12 | <input type="checkbox"/> | VIRTUAL O/P 13 | 24 | <input type="checkbox"/> | VIRTUAL O/P 24 |

To the right of the table is a 'Page' section with left and right arrow buttons. Below that is a 'Legend' section showing a grey square for 'De-Energized' and an orange square for 'Energized'. At the bottom of the interface are tabs for 'Metering', 'Quality', 'Control', 'Elements', 'VInputs', and 'VOutput', along with a double-right arrow button.

Universal Relay - Virtual Outputs Tab


The Virtual Outputs (VOutput) tab allows the user to view the status (energized/de-energized) of all available virtual outputs on the device. The user can also assign a textual name to each of the outputs. Up to 64 virtual outputs can be displayed. This tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 devices.

Virtual Outputs

The outputs and their status indicators are presented as a series of pages. To view the virtual outputs, the use the Page arrow keys provided to navigate between the pages.

To assign a name to a virtual output, click in the text field to the right of the output number label. The field becomes editable; make any desired changes, then press Enter.

Contact Inputs Tab



Device Name: DeviceNm
 Group Name: \$System
 Order Code: L90-D00-HCH-F8A-H6E-M5F-P5E-W6H
 Product Version: 240
 Serial #: MBHC99000002
 Mfr Date: 06/16/1999
 Mod #: 0
 Modbus Addr: 51
 IP Addr: 3.46.9.234
 Prog. State: Programmed
 Relay: L90 Universal Relay

| Contact Input | | | | | | | | |
|---------------|-------------------------------------|--------------|-----|--------------------------|------|-----|--------------------------|------|
| No. | Status | Name | No. | Status | Name | No. | Status | Name |
| 1 | <input checked="" type="checkbox"/> | C123456789 1 | 13 | <input type="checkbox"/> | N/A | 25 | <input type="checkbox"/> | N/A |
| 2 | <input checked="" type="checkbox"/> | Cont Ip 2 | 14 | <input type="checkbox"/> | N/A | 26 | <input type="checkbox"/> | N/A |
| 3 | <input checked="" type="checkbox"/> | Cont Ip 3 | 15 | <input type="checkbox"/> | N/A | 27 | <input type="checkbox"/> | N/A |
| 4 | <input checked="" type="checkbox"/> | Cont Ip 4 | 16 | <input type="checkbox"/> | N/A | 28 | <input type="checkbox"/> | N/A |
| 5 | <input checked="" type="checkbox"/> | Cont Ip 5 | 17 | <input type="checkbox"/> | N/A | 29 | <input type="checkbox"/> | N/A |
| 6 | <input checked="" type="checkbox"/> | Cont Ip 6 | 18 | <input type="checkbox"/> | N/A | 30 | <input type="checkbox"/> | N/A |
| 7 | <input checked="" type="checkbox"/> | Cont Ip 7 | 19 | <input type="checkbox"/> | N/A | 31 | <input type="checkbox"/> | N/A |
| 8 | <input checked="" type="checkbox"/> | Cont Ip 8 | 20 | <input type="checkbox"/> | N/A | 32 | <input type="checkbox"/> | N/A |
| 9 | <input checked="" type="checkbox"/> | Cont Ip 9 | 21 | <input type="checkbox"/> | N/A | 33 | <input type="checkbox"/> | N/A |
| 10 | <input checked="" type="checkbox"/> | Cont Ip 10 | 22 | <input type="checkbox"/> | N/A | 34 | <input type="checkbox"/> | N/A |
| 11 | <input checked="" type="checkbox"/> | Cont Ip 11 | 23 | <input type="checkbox"/> | N/A | 35 | <input type="checkbox"/> | N/A |
| 12 | <input checked="" type="checkbox"/> | Cont Ip 12 | 24 | <input type="checkbox"/> | N/A | 36 | <input type="checkbox"/> | N/A |

Legend: Off On

Page

Source5 Source6 CInput Demand Line Breaker << >>

Universal Relay - Contact Input Tab

The Contact Input tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows the contact inputs installed on the selected relay. Up to 96 contact inputs may be displayed.

Contact Inputs

The contacts are presented as a series of pages. To view the contact inputs, use the Prev(ious) and Next keys provided to navigate among the pages. The number of contact inputs available is determined from the Order Code read from the device, and is dependent on the number of digital I/O cards installed in the relay. If a contact input is not available in the connected relay, the associated control button is grayed and disabled, and the input name field shows "N/A". If the corresponding Contact Input State is Energized then the LED is lit with an amber color; otherwise the LED remains gray (un-energized).

Contact Output Tab

The screenshot displays the 'Contact Output' tab for a Universal Relay. On the left, there is a device image and a list of device information including Device Name (UR), Group Name (\$System), Order Code (L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H), Product Version (240), Serial # (MURC99000253), Mfr Date (06/10/1999), Mod # (0), Modbus Addr (45), IP Addr (3.46.9.231), Prog. State (Programmed), and Relay (Relay-1). Below this is a grid of navigation buttons: Events, Trend, Help, Setup, Wave, and Exit. The main area is a table titled 'Contact Output' with two columns of data. Each row represents a contact output, showing its number, state (indicated by a checkbox), and name. The table is currently displaying 24 outputs, all of which are in a 'De-Energized' state. To the right of the table are 'Page' navigation buttons (left and right arrows) and a 'Legend' section showing a gray box for 'De-Energized' and an orange box for 'Energized'. At the bottom, there are buttons for 'COutput', 'CVD', 'RTD', and a double-left arrow button.

| No. | State | Name | No. | State | Name |
|-----|--------------------------|------------|-----|--------------------------|------------|
| 1 | <input type="checkbox"/> | Cont Op 1 | 13 | <input type="checkbox"/> | Cont Op 13 |
| 2 | <input type="checkbox"/> | Cont Op 2 | 14 | <input type="checkbox"/> | Cont Op 14 |
| 3 | <input type="checkbox"/> | Cont Op 3 | 15 | <input type="checkbox"/> | Cont Op 15 |
| 4 | <input type="checkbox"/> | Cont Op 4 | 16 | <input type="checkbox"/> | Cont Op 16 |
| 5 | <input type="checkbox"/> | Cont Op 5 | 17 | <input type="checkbox"/> | Cont Op 17 |
| 6 | <input type="checkbox"/> | Cont Op 6 | 18 | <input type="checkbox"/> | Cont Op 18 |
| 7 | <input type="checkbox"/> | Cont Op 7 | 19 | <input type="checkbox"/> | Cont Op 19 |
| 8 | <input type="checkbox"/> | Cont Op 8 | 20 | <input type="checkbox"/> | Cont Op 20 |
| 9 | <input type="checkbox"/> | Cont Op 9 | 21 | <input type="checkbox"/> | Cont Op 21 |
| 10 | <input type="checkbox"/> | Cont Op 10 | 22 | <input type="checkbox"/> | Cont Op 22 |
| 11 | <input type="checkbox"/> | Cont Op 11 | 23 | <input type="checkbox"/> | Cont Op 23 |
| 12 | <input type="checkbox"/> | Cont Op 12 | 24 | <input type="checkbox"/> | Cont Op 24 |

Universal Relay - Contact Output Tab

The Contact Output tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows the contact outputs installed on the selected relay. Up to 64 contact outputs may be displayed.

Contact Output

The contacts are presented as a series of pages. To view the contact outputs, use the Page arrow keys provided to navigate among the pages. The number of contact outputs available is determined from the Order Code read from the device, and is dependent on the number of digital I/O cards installed in the relay. If a contact output is not available in the connected relay, the associated control button is grayed and disabled, and the output name field shows "N/A".

DCMA Tab

The screenshot displays the DCMA Tab interface. On the left, there is a device image and a list of device parameters. The main area shows a table of DCMA inputs with columns for No., State, ID, Value, and Units. Each input has an 'Enable' button. On the right, there are 'Page' navigation buttons and a legend for the State column. At the bottom, there are tabs for Counter, Power, DCMA, Source2, Source3, and Source4, along with left and right arrow buttons.

| No. | State | ID | Value | Units |
|-----|--------|-----|-------|-------|
| 1 | Enable | N/A | N/A | N/A |
| 2 | Enable | N/A | N/A | N/A |
| 3 | Enable | N/A | N/A | N/A |
| 4 | Enable | N/A | N/A | N/A |
| 5 | Enable | N/A | N/A | N/A |
| 6 | Enable | N/A | N/A | N/A |
| 7 | Enable | N/A | N/A | N/A |
| 8 | Enable | N/A | N/A | N/A |
| 9 | Enable | N/A | N/A | N/A |
| 10 | Enable | N/A | N/A | N/A |
| 11 | Enable | N/A | N/A | N/A |
| 12 | Enable | N/A | N/A | N/A |

Device Name: UR
 Group Name: \$System
 Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H
 Product Version: 240
 Serial #: MURC99000253
 Mfr Date: 06/10/1999
 Mod #: 0
 Modbus Addr: 45
 IP Addr: 3.46.9.231
 Prog. State: Programmed
 Relay: Relay-1

Events Trend Help
 Setup Wave Exit

Counter Power DCMA Source2 Source3 Source4 << >>

Page <- ->
 Legend
 Disabled
 Enabled

Universal Relay - DCMA Tab


The Direct Current MilliAmperes (DCMA) tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows the state of the relay's DCMA inputs. DCMA inputs are analog inputs used to read external transducer values. An example might be rotational speed on a generator, translated into a 4-20 mA current loop. Up to 24 inputs may be enabled or disabled.

DCMA Inputs

The DCMA inputs and their parameters are presented as a series of pages. To view the inputs, the use the Page arrow keys provided to navigate between the pages.

For each DCMA input, its ID number, value, and units are displayed as read from the device. To enable or disable a selected input, click the Enable button next to its ID number.

Source Tabs



Device Name: D60
 Group Name: \$System
 Order Code: D60-D00-HCH-F8B-H6B-M6D
 -P6K-W6H
 Product Version: 0
 Serial #: MABC99000003
 Mfr Date: 06/14/1999
 Mod #: 0
 Modbus Addr: 3
 IP Addr: 3.46.9.233
 Prog. State: Not Programmed
 Relay: Relay-1

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| 2nd Source Tab | | | | | | | |
|----------------|------------|------------------|------------------|-----------|----------|----------------|-----------------|
| Phase | Current | | | Phase | Voltage | | |
| | RMS (Amps) | Magnitude (Amps) | Angle (Deg) | | RMS (kV) | Magnitude (kV) | Angle (Deg) |
| A | 0.40 | 0.40 | $\angle -118.20$ | AG | N/A | N/A | N/A |
| B | 0.40 | 0.40 | $\angle -358.40$ | BG | N/A | N/A | N/A |
| C | 0.40 | 0.40 | $\angle -238.40$ | CG | N/A | N/A | N/A |
| Ground | 0.00 | 0.00 | $\angle 0.00$ | AB | 0.12 | 0.12 | $\angle 148.20$ |
| Neutral | 0.00 | 0.00 | $\angle 0.00$ | BC | 0.12 | 0.12 | $\angle -29.90$ |
| | | | | CA | 0.12 | 0.12 | $\angle 267.20$ |
| | | | | Auxiliary | N/A | N/A | N/A |
| Phase | Power | | | | | | |
| | Real | | Reactive | | Apparent | | p.f. |
| A | N/A | | N/A | | N/A | | N/A |
| B | N/A | | N/A | | N/A | | N/A |
| C | N/A | | N/A | | N/A | | N/A |
| 3-Phase | N/A | | N/A | | N/A | | N/A |

Metering
Quality
Control
Elements
Inputs
Counter

Power

Source2

Universal Relay - Source Tab Example

Similar in operation to the metering tab (except that frequency information is not displayed), there are five identical "Source" tabs (2 – 6) which display actual values information specific to the indicated source. There is no "Source 1" tab, since the Metering tab serves as the "Source 1" display. The B30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR device types are supported.

The display rules for the metering tab also apply to each Source tab.

Demand Tab

Device Name: UR
Group Name: \$System
Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H
Product Version: 240
Serial #: MURC99000253
Mfr Date: 06/10/1999
Mod #: 0
Modbus Addr: 45
IP Addr: 3.46.9.231
Prog. State: Programmed
Relay: Relay-1

Demand

| | | | | |
|---------------------------|-------|--------------------------|------------|----------|
| Data Logger Channel Count | 0 | Oldest available samples | 08/16/2000 | 02:42:00 |
| Data Logger Duration | 0 | Newest available samples | 08/16/2000 | 02:42:00 |
| Data Logger Rate | 1 Min | Demand Current Method | N/A | |
| | | Demand Power Method | N/A | |
| | | Demand Interval | N/A | |

Source 1 Energy

| | | | |
|-------------------|-----|------------------|-----|
| Positive Watthour | N/A | Positive Varhour | N/A |
| Negative Watthour | N/A | Negative Varhour | N/A |

| Source 1 | Demand | Peak Demand | Peak Demand Date |
|-------------|--------|-------------|------------------|
| Ia | N/A | N/A | N/A |
| Ib | N/A | N/A | N/A |
| Ic | N/A | N/A | N/A |
| Watt | N/A | N/A | N/A |
| Var | N/A | N/A | N/A |
| Va | N/A | N/A | N/A |

Universal Relay - Demand Tab

The Demand tab supports the B30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows a variety of energy measurements and demand parameters for a selected source.

These values are displayed for up to six sources, which may be toggled between using the S1 - S6 buttons. The Clear Demand button clears the values for the selected source. Note: Energy data is displayed as N/A for the L90 and L60 device types, and data logger data is displayed as N/A for the B30 device type.

Demand Values

The Demand panel shows the Data Logger parameters, which may be cleared using the Clear Data Logger button, the time/date stamps of the oldest and newest samples available, and information on the Demand Current and Demand Power Methods, and Demand Interval (if applicable).

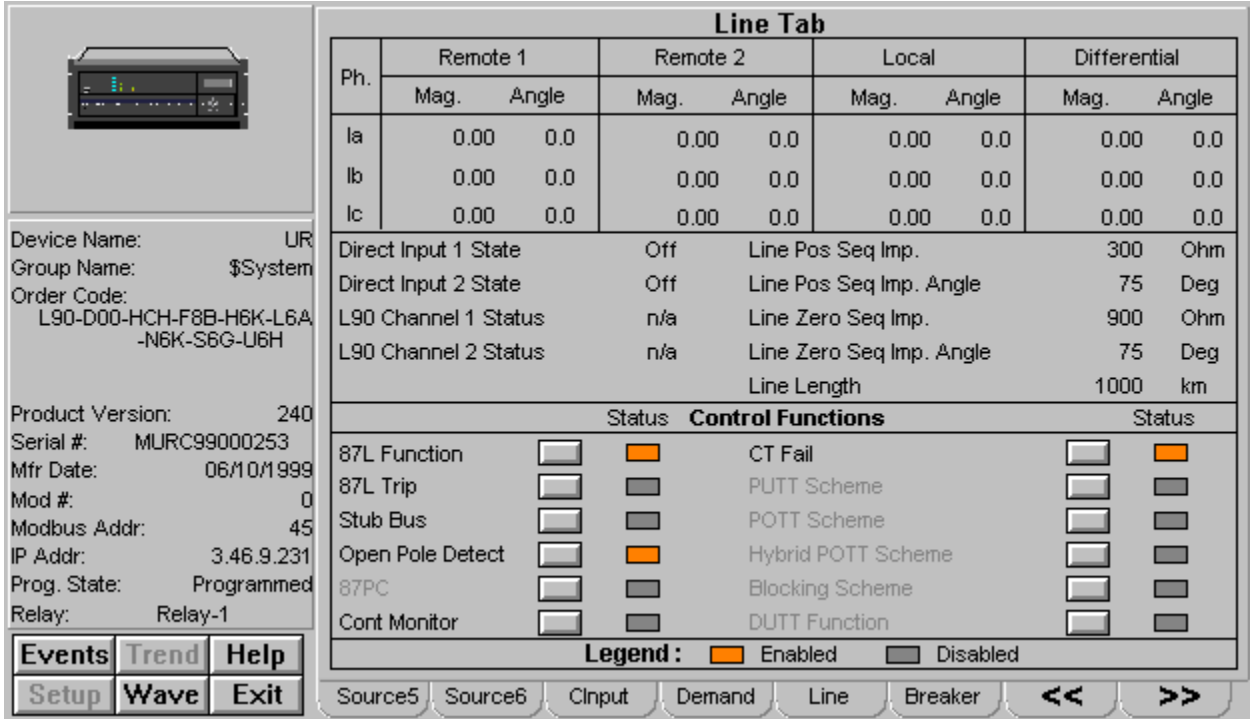
Source (x) Energy

Displays positive and negative Watthour and Varhour values for the selected source.

Source (x) Demand, Peak Demand, Peak Demand Date

Displays Demand, Peak Demand, and Peak Demand Date values for a variety of measurements for the selected source.

Line Tab



The screenshot displays the 'Line Tab' interface. On the left, there is a device image and a list of device details: Device Name: UR, Group Name: \$System, Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H, Product Version: 240, Serial #: MURC99000253, Mfr Date: 06/10/1999, Mod #: 0, Modbus Addr: 45, IP Addr: 3.46.9.231, Prog. State: Programmed, and Relay: Relay-1. Below this are buttons for 'Events', 'Trend', 'Help', 'Setup', 'Wave', and 'Exit'. The main area is a table titled 'Line Tab' with columns for 'Remote 1', 'Remote 2', 'Local', and 'Differential', each with 'Mag.' and 'Angle' sub-columns. The table shows values for phases 'Ia', 'Ib', and 'Ic'. Below the table are status indicators for 'Direct Input 1 State', 'Direct Input 2 State', 'L90 Channel 1 Status', and 'L90 Channel 2 Status'. A 'Control Functions' section contains various settings like '87L Function', '87L Trip', 'Stub Bus', 'Open Pole Detect', '87PC', 'Cont Monitor', 'CT Fail', 'PUTT Scheme', 'POTT Scheme', 'Hybrid POTT Scheme', 'Blocking Scheme', and 'DUTT Function', each with a status indicator (orange for Enabled, grey for Disabled). A legend at the bottom explains the status indicators. At the very bottom, there are buttons for 'Source5', 'Source6', 'CInput', 'Demand', 'Line', 'Breaker', and navigation arrows.

| Ph. | Remote 1 | | Remote 2 | | Local | | Differential | |
|-----|----------|-------|----------|-------|-------|-------|--------------|-------|
| | Mag. | Angle | Mag. | Angle | Mag. | Angle | Mag. | Angle |
| Ia | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 |
| Ib | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 |
| Ic | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 |

Universal Relay - Line Tab

The Line tab supports the D60, F30, F60, G60, L60, L90 and UR devices, and shows a variety of energy measurements and demand parameters for a selected source.

These values are displayed for up to six sources, which may be toggled between using the S1 - S6 buttons. The Clear Demand button clears the values for the selected source.

Line Tab

Displays (for Remote 1, Remote 2, Local, and Differential) the magnitude and angle on phase A, B, and C.

Also displays information on various Direct Inputs, L90 Channels 1 and 2, and Line Position and Line Zero values.

Control Functions

The Control Functions panel displays status (enabled/disabled) and allows control of various relay elements, for example 87L and 87PC protection elements. Elements are greyed out if not installed or applicable to the device type. Each element's may be enabled or disabled by clicking the button next to its name.

Breaker Tab

Breaker Tab

Arcing

| Breaker | Amp (kA2-cyc) | | | Clear Current Arcing | |
|---------|---------------|---------|---------|--|--|
| | Phase A | Phase B | Phase C | Breaker 1 | Breaker 2 |
| 1 | 0 | 0 | 0 | <input type="button" value="Breaker 1"/> | <input type="button" value="Breaker 2"/> |
| 2 | 0 | 0 | 0 | | |

Breaker Status

1. Brkr 1 Brkr. 1 Arcing Amp Function

2. Brkr 2 Brkr. 2 Arcing Amp Function

Select Settings Group: 1 2 3 4 5 6 7 8

Brkr. Failure 1 Function

Brkr. Failure 2 Function

Auto Reclose

| Function | Count | Function | Count |
|--|-------|---|-------|
| 1 <input type="checkbox"/> <input checked="" type="checkbox"/> | 0 | 4 <input type="checkbox"/> <input type="checkbox"/> | 0 |
| 2 <input type="checkbox"/> <input type="checkbox"/> | 0 | 5 <input type="checkbox"/> <input type="checkbox"/> | 0 |
| 3 <input type="checkbox"/> <input type="checkbox"/> | 0 | 6 <input type="checkbox"/> <input type="checkbox"/> | 0 |

Legend: Disabled Enabled

Source5 Source6 Clnput Demand Line Breaker << >>

Device Name: UR
Group Name: \$System
Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H
Product Version: 240
Serial #: MURC99000253
Mfr Date: 06/10/1999
Mod #: 0
Modbus Addr: 45
IP Addr: 3.46.9.231
Prog. State: Programmed
Relay: Relay-1

Events Trend Help
Setup Wave Exit

Universal Relay - Breaker Tab

The Breaker tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows a variety amperage measurements and breaker status, as well as allowing control of breaker functions and auto reclosers.

Arcing

Amperage at Breaker 1 and 2 is displayed for Phases A, B, and C. The Clear Current Arcing functions allow current arcing conditions to be cleared.

Breaker Arcing Current features are available for Breakers 1 and 2. This element calculates an estimate of the per-phase wear on the breaker contacts by measuring and integrating the current squared passing through the breaker contacts as an arc. These per-phase values are added to accumulated totals for each phase and compared to a programmed threshold value. When the threshold is exceeded in any phase, the relay can set an output operand to "1". The accumulated value for each phase can be displayed as an actual value.

Breaker Functions

Breaker control can be enabled or disabled using these controls, and the Breaker Arcing Amp function can be enabled or disabled for Breakers 1 and 2. These controls will be disabled if the connected device does not support breaker control.

Breaker Status

Selecting a settings group changes the display of functions. Up to 8 settings groups are available for display.

Auto Reclose

If the breaker is so equipped, the status of and reclose count for up to six Auto Reclose functions can be displayed, and each recloser may be enabled or disabled. Click the button next to each ID number to enable/disable the autorecloser.

Contact Output Current States Tab

| No. | State | Name | No. | State | Name |
|-----|--------------------------|----------------|-----|--------------------------|----------------|
| 1 | <input type="checkbox"/> | Contact o/p 1 | 13 | <input type="checkbox"/> | Contact o/p 13 |
| 2 | <input type="checkbox"/> | Contact o/p 2 | 14 | <input type="checkbox"/> | Contact o/p 14 |
| 3 | <input type="checkbox"/> | Contact o/p 3 | 15 | <input type="checkbox"/> | Contact o/p 15 |
| 4 | <input type="checkbox"/> | Contact o/p 4 | 16 | <input type="checkbox"/> | Contact o/p 16 |
| 5 | <input type="checkbox"/> | Contact o/p 5 | 17 | <input type="checkbox"/> | Contact o/p 17 |
| 6 | <input type="checkbox"/> | Contact o/p 6 | 18 | <input type="checkbox"/> | Contact o/p 18 |
| 7 | <input type="checkbox"/> | Contact o/p 7 | 19 | <input type="checkbox"/> | Contact o/p 19 |
| 8 | <input type="checkbox"/> | Contact o/p 8 | 20 | <input type="checkbox"/> | Contact o/p 20 |
| 9 | <input type="checkbox"/> | Contact o/p 9 | 21 | <input type="checkbox"/> | Contact o/p 21 |
| 10 | <input type="checkbox"/> | Contact o/p 10 | 22 | <input type="checkbox"/> | Contact o/p 22 |
| 11 | <input type="checkbox"/> | Contact o/p 11 | 23 | <input type="checkbox"/> | Contact o/p 23 |
| 12 | <input type="checkbox"/> | Contact o/p 12 | 24 | <input type="checkbox"/> | Contact o/p 24 |

Universal Relay - Contact Output Current States Tab

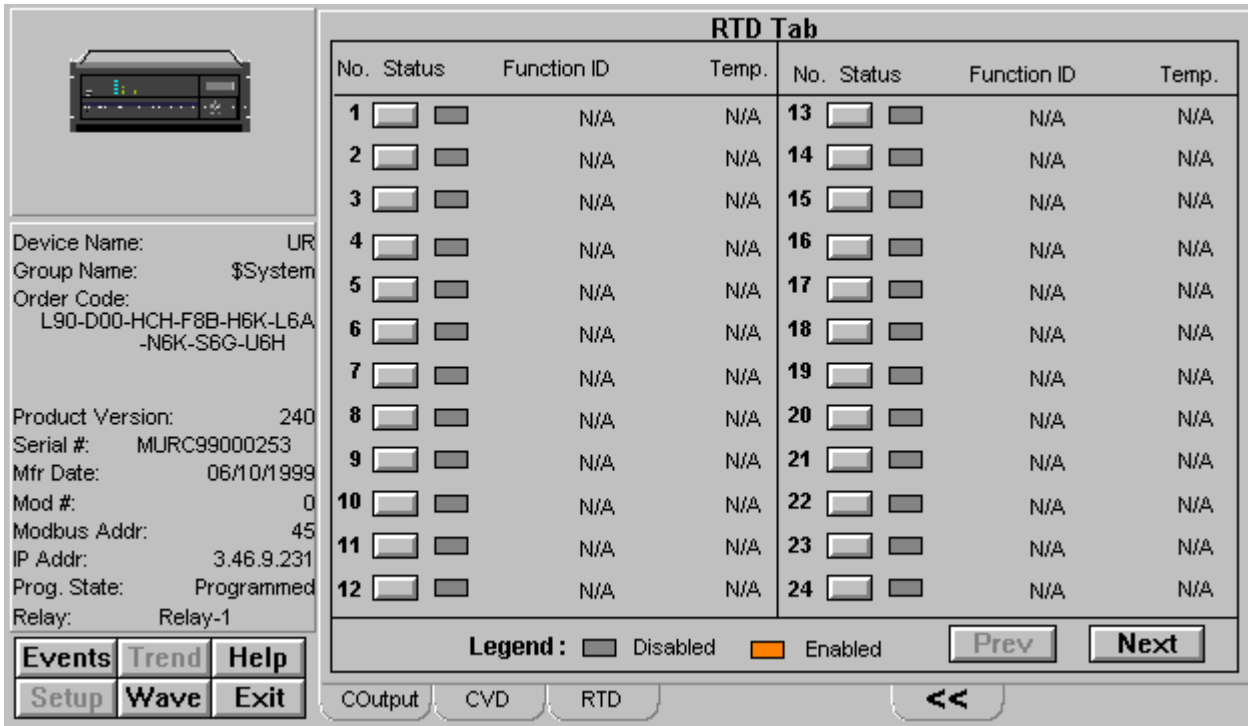
The Contact Output Current State tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and indicates the current state of the contact outputs installed on the selected relay. Up to 64 contact outputs may be displayed.

Contact Output Current State

The Current, Voltage, and Detect buttons enable the user to shift the viewing mode of the contacts displayed.

The contacts are presented as a series of pages. To view the contact outputs, use the Page arrow keys provided to navigate among the pages. The number of contact outputs available is determined from the Order Code read from the device, and is dependent on the number of digital I/O cards installed in the relay. If a contact output is not available in the connected relay, the associated control button is grayed and disabled, and the output name field shows "N/A".

Remote Temperature Detection Tab



RTD Tab

| No. | Status | Function ID | Temp. | No. | Status | Function ID | Temp. |
|-----|--------------------------|-------------|-------|-----|--------------------------|-------------|-------|
| 1 | <input type="checkbox"/> | N/A | N/A | 13 | <input type="checkbox"/> | N/A | N/A |
| 2 | <input type="checkbox"/> | N/A | N/A | 14 | <input type="checkbox"/> | N/A | N/A |
| 3 | <input type="checkbox"/> | N/A | N/A | 15 | <input type="checkbox"/> | N/A | N/A |
| 4 | <input type="checkbox"/> | N/A | N/A | 16 | <input type="checkbox"/> | N/A | N/A |
| 5 | <input type="checkbox"/> | N/A | N/A | 17 | <input type="checkbox"/> | N/A | N/A |
| 6 | <input type="checkbox"/> | N/A | N/A | 18 | <input type="checkbox"/> | N/A | N/A |
| 7 | <input type="checkbox"/> | N/A | N/A | 19 | <input type="checkbox"/> | N/A | N/A |
| 8 | <input type="checkbox"/> | N/A | N/A | 20 | <input type="checkbox"/> | N/A | N/A |
| 9 | <input type="checkbox"/> | N/A | N/A | 21 | <input type="checkbox"/> | N/A | N/A |
| 10 | <input type="checkbox"/> | N/A | N/A | 22 | <input type="checkbox"/> | N/A | N/A |
| 11 | <input type="checkbox"/> | N/A | N/A | 23 | <input type="checkbox"/> | N/A | N/A |
| 12 | <input type="checkbox"/> | N/A | N/A | 24 | <input type="checkbox"/> | N/A | N/A |

Legend : Disabled Enabled

Buttons: Events, Trend, Help, Setup, Wave, Exit, COutput, CVD, RTD, Prev, Next, <<

Device Name: UR
 Group Name: \$System
 Order Code: L90-D00-HCH-F8B-H6K-L6A-N6K-S6G-U6H
 Product Version: 240
 Serial #: MURC99000253
 Mfr Date: 06/10/1999
 Mod #: 0
 Modbus Addr: 45
 IP Addr: 3.46.9.231
 Prog. State: Programmed
 Relay: Relay-1

Universal Relay - Contact Output Tab


The RTD tab supports the B30, C30, C60, D60, F30, F35, F60, G60, L60, L90, M60 and T60 UR devices, and shows the RTD sensors installed on the selected relay. Up to 48 input sensors may be displayed.

RTD Tab

Each RTD sensor's status, function (name), and current temperature are shown. Individual RTD's may be disabled or enabled using the control button next to the RTD number.

The sensors are presented as a series of pages. To view each page of RTD's, use the Prev(ious) and Next keys provided to navigate among the pages. The number of parameters displayed is determined from the Order Code read from the device, and is dependent on the number of RTD sensors wired to the relay. If a sensor is not available in the connected relay, the associated control button is grayed and disabled, and the name field shows "N/A".

Bus Tab



Communications Failed

BUS Tab

| Ph. | BUS 1 | | | | BUS 2 | | | |
|-----------|---------------------|----------------------|-----------------------------|------------------------------|---------------------|----------------------|-----------------------------|------------------------------|
| | Diff Mag. (Amp.) | Diff Angle (Deg.) | Diff Rest Mag. (Amp.) | Diff Rest Angle (Deg.) | Diff Mag. (Amp.) | Diff Angle (Deg.) | Diff Rest Mag. (Amp.) | Diff Rest Angle (Deg.) |
| Ia | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Ib | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Ic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Device Name: DeviceNm
 Group Name: \$System
 Order Code:

Product Version: 0
 Serial #:
 Mfr Date: Not Valid
 Mod #: 0
 Modbus Addr: 0
 IP Addr: 0.0.0.0
 Prog. State: Not Programmed
 Relay:

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| Direction | BUS 1 (Deg.) | BUS 2 (Deg.) | |
|-----------|-----------------|-----------------|--|
| A | N/A | N/A | <input type="button" value="Enable"/> <input type="checkbox"/> Bus 1 Zone Function |
| B | N/A | N/A | <input type="button" value="Enable"/> <input type="checkbox"/> Bus 2 Zone Function |
| C | N/A | N/A | |

Legend : Disabled Enabled

RTD
BUS
<<

Universal Relay - Bus Tab

The Bus tab is supported for the B30 UR device only. It displays Phase Magnitude and Angle measurements on Bus 1 and Bus 2 for phases A, B, and C.

Current direction is shown in degrees for each phase, and the Zone function can be enabled or disabled on each Bus.

239 Motor Protection Relay

The 239 does not support Waveform Capture or Event generation, therefore these buttons are disabled beneath the Info box.

The 239 Tabular Data Screen's command buttons are described below:

| Tab | Button | Function |
|-----------|------------------|---|
| Metering | Reset Device | Issues a RESET command to the 239 |
| | External Restart | Issues an External Restart command to the 239 |
| Trip Data | Clear Trip Data | Clears the last 5 trip causes from the 239's memory |

Table 24. 239 Tabular data screen commands.

- The Status tab displays 35 Pickup LEDs (amber) and 35 Alarm LEDs (red), along with a text string for each alarm condition on the Status tab.

See the 239 Motor Protection Relay Instruction Manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Metering tab

Multilin 239 Metering

| <u>Current</u> (Amps) | | <u>Temperature</u> °C | |
|----------------------------|--------|-----------------------|---------------|
| Phase A: | 0 | RTD 1: (Stator) | - No RTD - |
| Phase B: | 0 | RTD 2: (Bearing) | - No RTD - |
| Phase C: | 0 | RTD 3: (Bearing) | - No RTD - |
| Ground: | 0.0 | Thermistor: | Not Connected |
| Unbalance (%): | 0 | | |
| Motor Max. Starting Curr.: | 6553.5 | | |

| <u>Status:</u> | | <u>Switches</u> | |
|---------------------------------|-------------------------|-----------------------------|--------|
| Trip Cause: | Trip Parameters Not Set | Switch 1 Access: | Closed |
| Calc. Trip Time (seconds): | 0.0 | Switch 2 Emergency Restart: | Open |
| | | Switch 3 External Reset: | Open |
| Motor Status: | Stopped | OPTION SWITCH 1 | (Off): |
| Motor Load (% FLC): | 0 | OPTION SWITCH 2 | (Off): |
| Thermal Cap. Used (%): | 0 | | |
| Motor Running Time (Hr): | 144284057.5 | | |
| Motor Ph. Cur. Scal. Factor: | 10 | | |
| Time to Over Load Reset (Min.): | 0.0 | | |

| <u>Program Rev</u> | <u>Mod Files</u> |
|--------------------|------------------|
| Main: 2.51 | 1: 000 |
| Boot: 2.00 | 2: 000 |
| Super: 1.02 | 3: 000 |
| Calib: 09/06/2000 | 4: 000 |
| Manf: 09/06/2000 | 5: 000 |

| <u>Output Relays</u> | | |
|--|------------------------------------|---------------------------------|
| <input checked="" type="checkbox"/> Trip | <input type="checkbox"/> Auxiliary | <input type="checkbox"/> Pickup |
| <input type="checkbox"/> Alarm | <input type="checkbox"/> Service | |

Selected Setpoint Group: Main Group

Reset Device **Emergency Restart**


Metering Setpoints Status TripData

The Multilin 239 Metering screen shows:

- Current
- RTD Status and Temperature
- Motor Status
- Switches
- Output Relays

The **Reset Device** button, when clicked, will issue a RESET command to the 239.
 The **Emergency Restart** button, when clicked, will issue a RESTART command to the 239.

Status Tab

| Multilin 239 Status | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|-------------------|-------------------|---|---------------------------------|---------------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|------------------------------------|------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---|--------------------------------|--|--|--|-------------------------------------|-------------------------------------|---------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--|--|--|--|---|--|--|--|---|---|--|--|---------------------------------------|--|--|--|--|--|--|--|---|--|--|
|  | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Alarm Status Flags</th> <th style="text-align: left;">Trip Status Flags</th> <th style="text-align: left;">Aux. Status Flags</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> Immediate Overload</td> <td><input type="checkbox"/> Ground</td> <td><input type="checkbox"/> Undercurrent</td> </tr> <tr> <td><input type="checkbox"/> Undercurrent</td> <td><input type="checkbox"/> Overload</td> <td><input type="checkbox"/> Option Sw. 1</td> </tr> <tr> <td><input type="checkbox"/> Unbalance</td> <td><input type="checkbox"/> Unbalance</td> <td><input type="checkbox"/> Option Sw. 2</td> </tr> <tr> <td><input type="checkbox"/> Ground Fault</td> <td><input type="checkbox"/> Thermistor</td> <td><input type="checkbox"/> Alarms</td> </tr> <tr> <td><input type="checkbox"/> Thermistor</td> <td><input type="checkbox"/> Mechanical Jam</td> <td><input type="checkbox"/> Trips</td> </tr> <tr> <td><input type="checkbox"/> Thermistor Open</td> <td><input type="checkbox"/> Short Circuit</td> <td><input type="checkbox"/> Short Circuit</td> </tr> <tr> <td><input type="checkbox"/> Stator RTD</td> <td><input type="checkbox"/> Stator RTD</td> <td><input type="checkbox"/> Ground</td> </tr> <tr> <td><input type="checkbox"/> Bearing RTD</td> <td><input type="checkbox"/> Bearing RTD</td> <td><input type="checkbox"/> Thermistor</td> </tr> <tr> <td><input type="checkbox"/> RTD Failure</td> <td><input checked="" type="checkbox"/> Parameters Not Set</td> <td><input type="checkbox"/> Breaker Failure</td> </tr> <tr> <td><input type="checkbox"/> Comm. Failure</td> <td><input type="checkbox"/> Option Switch 1</td> <td><input type="checkbox"/> Mechanical Jam</td> </tr> <tr> <td><input checked="" type="checkbox"/> Internal Fault</td> <td><input type="checkbox"/> Option Switch 2</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Thermal Capacity</td> <td><input type="checkbox"/> Computer Command</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Option Switch 1</td> <td><input type="checkbox"/> Undercurrent</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Option Switch 2</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> Breaker Failure</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> Mechanical Jam</td> <td></td> <td></td> </tr> </tbody> </table> | Alarm Status Flags | Trip Status Flags | Aux. Status Flags | <input type="checkbox"/> Immediate Overload | <input type="checkbox"/> Ground | <input type="checkbox"/> Undercurrent | <input type="checkbox"/> Undercurrent | <input type="checkbox"/> Overload | <input type="checkbox"/> Option Sw. 1 | <input type="checkbox"/> Unbalance | <input type="checkbox"/> Unbalance | <input type="checkbox"/> Option Sw. 2 | <input type="checkbox"/> Ground Fault | <input type="checkbox"/> Thermistor | <input type="checkbox"/> Alarms | <input type="checkbox"/> Thermistor | <input type="checkbox"/> Mechanical Jam | <input type="checkbox"/> Trips | <input type="checkbox"/> Thermistor Open | <input type="checkbox"/> Short Circuit | <input type="checkbox"/> Short Circuit | <input type="checkbox"/> Stator RTD | <input type="checkbox"/> Stator RTD | <input type="checkbox"/> Ground | <input type="checkbox"/> Bearing RTD | <input type="checkbox"/> Bearing RTD | <input type="checkbox"/> Thermistor | <input type="checkbox"/> RTD Failure | <input checked="" type="checkbox"/> Parameters Not Set | <input type="checkbox"/> Breaker Failure | <input type="checkbox"/> Comm. Failure | <input type="checkbox"/> Option Switch 1 | <input type="checkbox"/> Mechanical Jam | <input checked="" type="checkbox"/> Internal Fault | <input type="checkbox"/> Option Switch 2 | | <input type="checkbox"/> Thermal Capacity | <input type="checkbox"/> Computer Command | | <input type="checkbox"/> Option Switch 1 | <input type="checkbox"/> Undercurrent | | <input type="checkbox"/> Option Switch 2 | | | <input type="checkbox"/> Breaker Failure | | | <input type="checkbox"/> Mechanical Jam | | |
| Alarm Status Flags | Trip Status Flags | Aux. Status Flags | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Immediate Overload | <input type="checkbox"/> Ground | <input type="checkbox"/> Undercurrent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Undercurrent | <input type="checkbox"/> Overload | <input type="checkbox"/> Option Sw. 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Unbalance | <input type="checkbox"/> Unbalance | <input type="checkbox"/> Option Sw. 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Ground Fault | <input type="checkbox"/> Thermistor | <input type="checkbox"/> Alarms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Thermistor | <input type="checkbox"/> Mechanical Jam | <input type="checkbox"/> Trips | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Thermistor Open | <input type="checkbox"/> Short Circuit | <input type="checkbox"/> Short Circuit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Stator RTD | <input type="checkbox"/> Stator RTD | <input type="checkbox"/> Ground | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Bearing RTD | <input type="checkbox"/> Bearing RTD | <input type="checkbox"/> Thermistor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> RTD Failure | <input checked="" type="checkbox"/> Parameters Not Set | <input type="checkbox"/> Breaker Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Comm. Failure | <input type="checkbox"/> Option Switch 1 | <input type="checkbox"/> Mechanical Jam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Internal Fault | <input type="checkbox"/> Option Switch 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Thermal Capacity | <input type="checkbox"/> Computer Command | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Option Switch 1 | <input type="checkbox"/> Undercurrent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Option Switch 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Breaker Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Mechanical Jam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---------------------|------------------|
| Device Name: | DeviceNm |
| Group Name: | \$System |
| Device Type: | ML239 |
| Hardware Rev.: | D |
| Program Rev | Mod Files |
| Main: 2.51 | 1: 000 |
| Boot: 2.00 | 2: 000 |
| Super: 1.02 | 3: 000 |
| Calib: 09 /06 /2000 | 4: 000 |
| Manf: 09 /06 /2000 | 5: 000 |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | |
|----------|-----------|--------|----------|
| Metering | Setpoints | Status | TripData |
|----------|-----------|--------|----------|

- The Status tab displays Alarm, Trip, Auxiliary Status Pickup is shown in Amber color and Active Alarm shown in Red, along with a text string for each alarm condition.
- See the 239 Motor Protection Relay Instruction Manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Trip Data

Multilin 239 Last Trip Data

Cause of Last Trip: Parameters Not Set

| | (Amps) | | °C |
|----------------|--------|-----------------|----|
| Phase A: | 0 | Pre-Trip RTD 1: | 0 |
| Phase B: | 0 | Pre-Trip RTD 2: | 0 |
| Phase C: | 0 | Pre-Trip RTD 3: | 0 |
| Ground: | 0.0 | | |
| Unbalance (%): | 0 | | |

Trip Record

Cause of 2nd Last Trip: Parameters Not Set
Cause of 3rd Last Trip: Parameters Not Set
Cause of 4th Last Trip: Parameters Not Set
Cause of 5th Last Trip: Parameters Not Set

Clear Trip Data

Device Name: DeviceNm
Group Name: \$System
Device Type: ML239
Hardware Rev.: D

| Program Rev | Mod Files |
|---------------------|------------------|
| Main: 2.51 | 1: 000 |
| Boot: 2.00 | 2: 000 |
| Super: 1.02 | 3: 000 |
| Calib: 09 /06 /2000 | 4: 000 |
| Manf: 09 /06 /2000 | 5: 000 |

Events Trend Help
Setup Wave Exit


Metering Setpoints Status TripData

The Multilin 239 Last Trip Data screen shows:

- Cause of Last Trip and their corresponding currents and RTD Temperatures at the time of trip.
- Trip Record

The **Clear Trip Data** button, when clicked, will clear all the trip data.

Setpoints Tab



Multilin 239 System Setpoints

| | |
|--|--|
| CT Inputs Phase CT Primary (A): OFF Ground Sensing: OFF Ground CT Primary (A): N/A Nominal Frequency (Hz): 60 | Motor Data Motor Full Load Current (A): OFF Overload Pickup Inhibit (x FLC): 1.00 Locked Rotor Current (x FLC): 6.0 Safe Stall Time Cold (s): 10.0 Hot/Cold Curve Ratio (%): 85 Disable Starts: No Use Overload Pickup Inhibit On: Run |
| Phase Current Overload Overload Curve Number: 4 O/L Level for Trip Time (x FLC): 2.00 Calc. Time to O/L Trip (sec.): 116.6 Overload Lockout Time (min.): 30 | Breaker Failure Off Breaker Failure Pickup: 5 Breaker Failure Pickup Delay: 0 ms Breaker Failure Dropout Delay: 0 ms |
| Immediate Overload Inhibit Sensing On Start For (s): Unlimited | Mechanical Jam Inhibit Sensing On Start For (s): Unlimited |

Device Name: DeviceNm
 Group Name: \$System
 Device Type: ML239
 Hardware Rev.: D

| Program Rev | Mod Files |
|---------------------|-----------|
| Main: 2.51 | 1: 000 |
| Boot: 2.00 | 2: 000 |
| Super: 1.02 | 3: 000 |
| Calib: 09 /06 /2000 | 4: 000 |
| Manf: 09 /06 /2000 | 5: 000 |


| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | |
|----------|-----------|--------|----------|
| Metering | Setpoints | Status | TripData |
|----------|-----------|--------|----------|

The Multilin 239 System Setpoints screen shows:

- CT Inputs
- Motor Data
- Phase Current Overload
- Breaker Failure
- Immediate Overload
- Mechanical Jam

269 Plus Motor Management Relay



Device Name: ML269
 Group Name: \$System
 Device Type: Unknown: 0x0
 Hardware Rev.: N/A
 Firmware Rev.: 0.0
 Firmware Mod.: None

Multilin 269 Metering Values

| | | | |
|-----------------------------|---------|---------------------------|------|
| Amps A: | 45 | Volts AB: | 0 |
| Amps B: | 44 | Volts BC: | 78 |
| Amps C: | 45 | Volts CA: | 77 |
| Average Amps: | 45 | kW: | 78 |
| Unbalance Ratio: | 0 | kVAR: | 4 |
| Ground Fault Amps: | 0.0 | PF: | 0.04 |
| Motor Status: | Stopped | Frequency: | 56.0 |
| Starts/Hour Timer 1 (Min.): | 0 | Est. Time to Trip (Sec.): | 0 |
| Starts/Hour Timer 2 (Min.): | 0 | Motor Load (%): | 0 |
| Starts/Hour Timer 3 (Min.): | 0 | Ther. Cap. Used (%): | 0 |
| Starts/Hour Timer 4 (Min.): | 0 | | |
| Starts/Hour Timer 5 (Min.): | 0 | | |

Learned Values

| | | | |
|---------------------------|-----|---------------------------|-----|
| Istart Avg. (Amps): | 0 | Stopped Cool Time (Min.): | 0 |
| Last Istart (Amps): | 0 | Acceleration Time (Sec.): | 0.0 |
| K Factor: | 0.0 | Start Capacity (%): | 0 |
| Running Cool Time (Min.): | 0 | | |

Event
Logger

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Wave

Help
Exit

Metering
Statistics
Alarms
Setup 1
Setup 2
Setup 3
Setup 4
Setup 5
Setup 6

The 269 Tabular Data Screen wizard provides two reset push buttons on the Setup 6 tab.

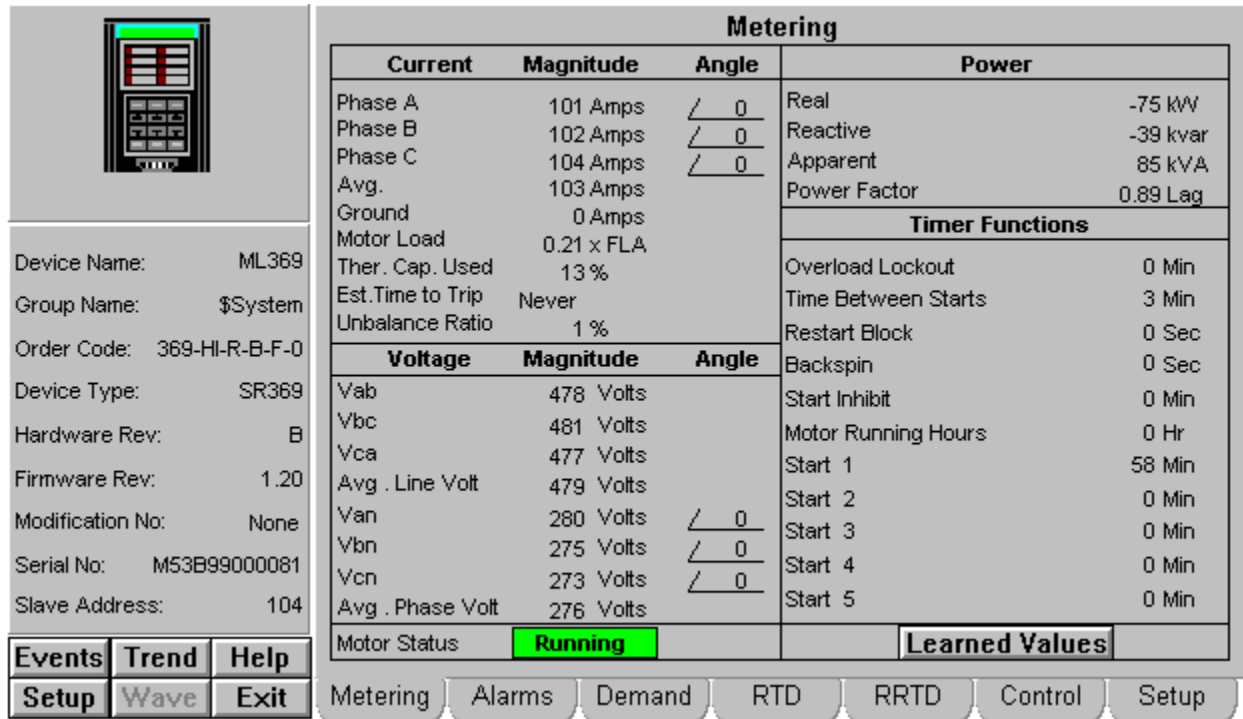
| Tab | Button | Function |
|----------|--------------------------|---|
| Status 6 | Clear Last RTD Data | Clears the RTD last access registers |
| | Clear Commissioning Data | Clears the commissioning data registers |

Table 25. 269+ Tabular data screen commands.

For complete explanations of parameters, refer to the 269+ *Users Guide*.

369 Motor Management Relay

Metering Tab



| Device Name: ML369 Group Name: \$System Order Code: 369-HI-R-B-F-0 Device Type: SR369 Hardware Rev: B Firmware Rev: 1.20 Modification No: None Serial No: M53B99000081 Slave Address: 104 | | | | |
|---|----------------|-------|-----------------------|--------|
| Metering | | | | |
| Current | Magnitude | Angle | Power | |
| Phase A | 101 Amps | ∠ 0 | Real -75 kW | |
| Phase B | 102 Amps | ∠ 0 | Reactive -39 kvar | |
| Phase C | 104 Amps | ∠ 0 | Apparent 85 kVA | |
| Avg. | 103 Amps | | Power Factor 0.89 Lag | |
| Ground | 0 Amps | | Timer Functions | |
| Motor Load | 0.21 x FLA | | Overload Lockout | 0 Min |
| Ther. Cap. Used | 13 % | | Time Between Starts | 3 Min |
| Est. Time to Trip | Never | | Restart Block | 0 Sec |
| Unbalance Ratio | 1 % | | Backspin | 0 Sec |
| Voltage | Magnitude | Angle | Start Inhibit | 0 Min |
| Vab | 478 Volts | | Motor Running Hours | 0 Hr |
| Vbc | 481 Volts | | Start 1 | 58 Min |
| Vca | 477 Volts | | Start 2 | 0 Min |
| Avg. Line Volt | 479 Volts | | Start 3 | 0 Min |
| Van | 280 Volts | ∠ 0 | Start 4 | 0 Min |
| Vbn | 275 Volts | ∠ 0 | Start 5 | 0 Min |
| Vcn | 273 Volts | ∠ 0 | | |
| Avg. Phase Volt | 276 Volts | | | |
| Motor Status | Running | | Learned Values | |

Events Trend Help
 Setup Wave Exit

Metering Alarms Demand RTD RRTD Control Setup

369 - Metering Data Screen

The Metering tab displays the following metered values from the 369 device: Actual Values for Voltage, Current, Power, Power Factor, and Frequency. These values are detailed below.

Current

- Per phase magnitude and angle
- Phase average
- Ground current
- Motor Load as a percentage of the Full Load Current rating defined in setpoints.
- Thermal Capacity used in percent
- Estimated time to trip
- Current Unbalance ratio

Voltage

Voltage values are only displayed if the Metering or Backspin option is installed in the relay, and if a voltage transformer (VT) connection has been programmed in the relay.

Line - Line voltage magnitude.

Average Line-Line voltage.

Line – Neutral voltage magnitude and angle (only shown for wye configurations)

Average Line-Neutral voltage. (only shown for wye configurations)

Power

Power values are displayed only if the Metering or Backspin option is installed in the relay and a VT connection has been programmed.

- Real power
- Reactive power
- Apparent power
- Power Factor

Motor Status

The current status of the motor is shown in a colored indicator block

Timer Functions & Learned Values

The lower right quadrant of the metering tab has two pages – Timer Functions and Learned Values. You can toggle between these two displays by clicking on the button located in the bottom right corner of the metering tab display.

Timer Functions: this section displays the current values of several internal timers within the device. Most of these functions must be programmed in the relay in order to function. Refer to the device manual for specific usage details.

Learned Values: this section displays items tracked by the relay. For full details on their usage, consult the relay manual.

Backspin features – these are only enabled when the Backspin option is installed in the relay.

Learned cool time constants – these are enabled only if the "Enable Learned Cool Times" feature is programmed.

Learned k factor is only enabled by setting the unbalance biasing of thermal capacity to on/learned.

Clearing Motor Data (see control tab) will set all these values to their defaults.

Alarms Tab

Alarms

Alarm Status

| | | | |
|--------------------------|-------------------------------------|--|---|
| Spare Switch | <input type="checkbox"/> | Lead Power Factor | <input type="checkbox"/> |
| Emergency Restart Switch | <input type="checkbox"/> | Lag Power Factor | <input checked="" type="checkbox"/> |
| Differential Switch | <input type="checkbox"/> | Positive kvar | <input type="checkbox"/> |
| Speed Switch | <input type="checkbox"/> | Negative kvar | <input type="checkbox"/> |
| Reset Switch | <input type="checkbox"/> | Underpower | <input type="checkbox"/> |
| Thermal Capacity | <input checked="" type="checkbox"/> | Reverse Power | <input type="checkbox"/> |
| Overload | <input type="checkbox"/> | Lost Remote RTD Comm. | <input type="checkbox"/> |
| Mechanical Jam | <input type="checkbox"/> | Trip Counters | <input type="checkbox"/> |
| Undercurrent | <input type="checkbox"/> | Starter Failure | <input type="checkbox"/> |
| Current Unbalance | <input type="checkbox"/> | Self Test | <input type="checkbox"/> |
| Ground Fault | <input type="checkbox"/> | Broken / Open RTD | <input checked="" type="checkbox"/> |
| Undervoltage | <input type="checkbox"/> | Short / Low Temp. | <input type="checkbox"/> |
| Overvoltage | <input checked="" type="checkbox"/> | Legend | |
| Underfrequency | <input type="checkbox"/> | <input checked="" type="checkbox"/> Timing Out | <input checked="" type="checkbox"/> Latched |
| Overfrequency | <input type="checkbox"/> | <input type="checkbox"/> Not Active | <input checked="" type="checkbox"/> Active (Blinking) |

369 Relay - Alarms Tab

The Alarms tab consists of three pages – Status, Trip Data, and Trip Counters. You can navigate between pages by clicking the buttons located along the lower edge of the tab display.

Alarm Status

This page displays the current status of the alarm functions within the relay.

If a function is disabled or not programmed, its label appears as dark gray text, and its associated indicator will be dark gray at all times.

If a function is enabled, its label appears as black text, and its indicator will show the current status of that function.

Trip Data

This page displays information about the last trip event.

Voltage, power, and power factor values are only indicated if the Metering or Backspin option is installed and a VT connection has been programmed in the relay.


Line-Neutral voltages are only displayed when the VT is connected in a wye configuration.

The Hottest Stator RTD field is only shown if a Stator RTD is programmed.

Trip Counters

This page displays information about the accumulated trips experienced by the relay. Data on this page can be cleared using the Clear Last Trip Data button on the Control tab.

Demand Tab



Device Name: ML369
 Group Name: \$System
 Order Code: 369-HI-R-B-F-0
 Device Type: SR369
 Hardware Rev: B
 Firmware Rev: 1.20
 Modification No: None
 Serial No: M53B99000081
 Slave Address: 104

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Demand

| | | | |
|---------------------|---------|--|--|
| Positive Watt Hours | 0 MWh | | |
| Positive Varhours | 0 kvarh | | |
| Negative Varhours | 0 kvarh | | |

| | Demand | Peak Demand | Alarm |
|----------------|--------|-------------|--------------------------|
| Current | 0 Amps | 0 Amps | <input type="checkbox"/> |
| Real Power | 0 kW | 0 kW | <input type="checkbox"/> |
| Reactive Power | 0 kvar | 0 kvar | <input type="checkbox"/> |
| Apparent Power | 0 kVA | 0 kVA | <input type="checkbox"/> |

Legend :

| | | | |
|--------------------------|------------|--------------------------|-------------------|
| <input type="checkbox"/> | Not Active | <input type="checkbox"/> | Active (Blinking) |
| <input type="checkbox"/> | Timing Out | <input type="checkbox"/> | Latched |

Metering
Alarms
Demand
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RRTD
Control
Setup

369 Relay - Demand Tab


This tab displays current and power demand metering information.

Current demand is indicated regardless of options/VT settings.

Power demand values are only available when the Metering or Backspin option is installed on the relay and a VT connection is programmed.

Peak demand values may be cleared using the Clear Peak Demand Data button on the Control tab.

Local RTD Tab



Device Name: ML369
 Group Name: \$System
 Order Code: 369-HI-R-B-F-0
 Device Type: SR369
 Hardware Rev: B
 Firmware Rev: 1.20
 Modification No: None
 Serial No: M53B99000081
 Slave Address: 104

| Local RTD | | | | | |
|-----------|--------------------------|---------------|--------------------|-------------|--------|
| RTD No. | Alarm / High Alarm | Temp. (Deg C) | Max. Temp. (Deg C) | Application | Name |
| 1 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| 2 | <input type="checkbox"/> | -42 | -40 | Stator | RTD 2 |
| 3 | <input type="checkbox"/> | -42 | -40 | Bearing | RTD 3 |
| 4 | <input type="checkbox"/> | -42 | -40 | Ambient | RTD 4 |
| 5 | <input type="checkbox"/> | -42 | -40 | Other | RTD 5 |
| 6 | <input type="checkbox"/> | -42 | -40 | Stator | RTD 6 |
| 7 | <input type="checkbox"/> | -42 | -40 | Stator | RTD 7 |
| 8 | <input type="checkbox"/> | -42 | -40 | Stator | RTD 8 |
| 9 | <input type="checkbox"/> | -42 | -40 | Bearing | RTD 9 |
| 10 | <input type="checkbox"/> | -42 | -40 | Stator | RTD 10 |
| 11 | <input type="checkbox"/> | -42 | -40 | Stator | RTD 11 |
| 12 | <input type="checkbox"/> | -42 | -40 | Ambient | RTD 12 |

Legend : Hottest Stator Temperature Highlighted in **red**
 Not Active Alarm Latched High Alarm Latched
 Timing Out Alarm Active (Blinking) High Alarm Active (Blinking)

Events

Trend

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Exit

Metering

Alarms

Demand

RTD

RRTD

Control

Setup

369 Relay - Local RTD Tab


This tab displays information about any RTD temperature probes connected directly to the device. Information on this tab is only available if the RTD option is installed in the relay.

Information and alarm indication for each RTD is only available when that RTD is programmed for operation. If an RTD's Application is set to "none" then all fields for that RTD display "N/A".

The hottest Stator RTD indicates which RTD is currently returning the highest temperature. This condition is indicated by red text in the Temperature field.

Only one alarm condition can be displayed at a time – highest priority alarms are displayed in the alarm indicator. For example, if a "High Alarm" was triggered and latched and the RTD value returned to the "Alarm Active" state, the "High Alarm" latched indicator would persist.

Remote RTD Tab



Device Name: ML369
 Group Name: \$System
 Order Code: 369-HI-R-B-F-0
 Device Type: SR369
 Hardware Rev: B
 Firmware Rev: 1.20
 Modification No: None
 Serial No: M53B99000081
 Slave Address: 104

| Remote RTD | | | | | | |
|--|---------|--------------------------|--------------|-------------------|-------|------|
| RRTD 1 | RTD No. | RTD Alarm | Temp. (Deg.) | Max. Temp. (Deg.) | Appl. | Name |
| Status | 1 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Trip <input type="checkbox"/> | 2 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Alarm <input type="checkbox"/> | 3 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Aux 1 <input type="checkbox"/> | 4 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Aux 2 <input type="checkbox"/> | 5 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| RTD Failure <input type="checkbox"/> | 6 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Comm. Failure <input type="checkbox"/> | 7 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Legend: | | 8 | N/A | N/A | None | N/A |
| Deenergized <input type="checkbox"/> | 9 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| Energized <input type="checkbox"/> | 10 | <input type="checkbox"/> | N/A | N/A | None | N/A |
| | | 11 | N/A | N/A | None | N/A |
| | | 12 | N/A | N/A | None | N/A |

RRTD Selection

RTD Alarms legend

Not Active Alarm Active (Blinking)

Timing Out Hi Alarm Latched

Alarm Latched Hi Alarm Active (Blinking)

Hottest Temp. Stator is Highlighted in red

369 Relay - Remote RTD Tab

This tab displays information about any RTD temperature probes connected to one or more Remote RTD units. These external accessories connect via Modbus to the 369 relay. A maximum of four RRTD modules can be connected to a 369 relay – each module is assigned a page on this tab. Use the RRTD Selection buttons in the lower left corner of the tab to navigate between pages. Information on this tab is only available if an RRTD module is connected to the relay.

Information and alarm indication for each RTD is only available when that RTD is programmed for operation. If an RTD's Application is set to "none" then all fields for that RTD display "N/A".

The hottest Stator RTD indicates which RTD is currently returning the highest temperature. This condition is indicated by red text in the Temperature field.

Only one alarm condition can be displayed at a time – highest priority alarms are displayed in the alarm indicator. For example, if a "High Alarm" was triggered and latched and the RTD value returned to the "Alarm Active" state, the "High Alarm" latched indicator would persist.

The Status indicators are dedicated to the indicated RRTD module, except for the Comm. Failure indicator – this will be energized if any configured RRTD module stops communicating.

Control Tab

Control Tab

| Status | Preset Values | |
|---|-----------------|---|
| Trip <input checked="" type="checkbox"/> | Digital Counter | <input type="text" value="0"/> <input type="button" value="Set"/> |
| Alarm <input checked="" type="checkbox"/> | MWh | <input type="text" value="678"/> <input type="button" value="Set"/> |
| Aux. 1 <input type="checkbox"/> | Positive kVarh | <input type="text" value="90"/> <input type="button" value="Set"/> |
| Aux. 2 <input type="checkbox"/> | Negative kVarh | <input type="text" value="90"/> <input type="button" value="Set"/> |
| Spare <input type="checkbox"/> | | |
| Speed <input checked="" type="checkbox"/> | | |
| Differential <input type="checkbox"/> | | |
| Reset <input type="checkbox"/> | | |
| Emergency <input type="checkbox"/> | | |
| Access <input checked="" type="checkbox"/> | | |
| Legend | | |
| Energized <input checked="" type="checkbox"/> | Motor Status | <input checked="" type="text" value="Running"/> |
| Deenergized <input type="checkbox"/> | | |

| Control | | Clear Data | |
|--|--|---|--|
| <input type="button" value="Reset 369"/> | | <input type="button" value="All Data"/> | |
| <input type="button" value="Start Motor"/> | | <input type="button" value="Motor Data"/> | |
| <input type="button" value="Stop Motor"/> | | <input type="button" value="Trip Counters"/> | |
| | | <input type="button" value="Event Records"/> | |
| | | <input type="button" value="Peak Demand Data"/> | |
| | | <input type="button" value="Last Trip Data"/> | |
| | | <input type="button" value="RTD Maximums"/> | |

| | | |
|---------------------------------------|--------------------------------------|-------------------------------------|
| <input type="button" value="Events"/> | <input type="button" value="Trend"/> | <input type="button" value="Help"/> |
| <input type="button" value="Setup"/> | <input type="button" value="Wave"/> | <input type="button" value="Exit"/> |

| | | | | | | |
|---|---------------------------------------|---------------------------------------|------------------------------------|-------------------------------------|--|--------------------------------------|
| <input type="button" value="Metering"/> | <input type="button" value="Alarms"/> | <input type="button" value="Demand"/> | <input type="button" value="RTD"/> | <input type="button" value="RRTD"/> | <input type="button" value="Control"/> | <input type="button" value="Setup"/> |
|---|---------------------------------------|---------------------------------------|------------------------------------|-------------------------------------|--|--------------------------------------|

369 Relay - Control Tab

This tab provides limited control functionality over Modbus.


Status – indicates the current status of the output relays and general digital inputs.

Preset Values – shows the current value of the indicated field. Note that these values are only updated when the tab is first displayed – not continuously. To preset a new value, click the white box containing the value you want to change. The Intouch Calculator window appears – type in the new value and click OK. The new value is now displayed in the Control tab, but has not yet been sent to the device. Click the Set button to store the new value in the device.

Control – These buttons are disabled unless the Serial Communications Control setpoint in the relay is programmed to "On". These buttons are subject to Intouch user level security. The security level is set during wizard configuration.

Clear Data – These buttons clear the designated values within the device. All buttons are subject to Intouch user level security which is set during wizard configuration.

Setup Tab



Device Name: ML369
 Group Name: \$System
 Order Code: 369-HI-R-B-F-0
 Device Type: SR369
 Hardware Rev: B
 Firmware Rev: 1.20
 Modification No: None
 Serial No: M53B99000081
 Slave Address: 104

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Setup

| System Settings | | Motor Settings | | |
|-------------------------|---------------|---------------------------|-------------|------------|
| VT Connection Type | Wye | Full Load Amps(FLA) | 500 Amps | |
| VT Ratio | 2.31:1 | Rated Voltage | 480 Volts | |
| Single VT Operation | Off | Cooling time Constant: | | |
| | | Running | 20 Min. | |
| | | Stopped | 30 Min. | |
| Ground CT Type | 5 A Secondary | Hot/Cold Safe Stall Ratio | 0.10 | |
| Ground CT Primary(Amps) | 100 | RTD Settings | | |
| Phase CT Primary(Amps) | 1000 | Biasing | On | |
| Nominal Frequency(Hz) | 60 | Min. Bias | 40 Deg C | |
| Phase Sequence | ABC | Midpoint | 120 Deg C | |
| | | Max. Bias | 155 Deg C | |
| Communications | | | | |
| Channel | Parity | Baud Rate | Application | Connection |
| 1 | None | 19200 baud | ---- | ---- |
| 2 | None | 19200 baud | ---- | ---- |
| 3 | None | 19200 baud | MODBUS | RS 485 |

Metering
Alarms
Demand
RTD
RRTD
Control
Setup

369 Relay - Setup Tab

This tab displays selected setpoints from the device. All fields on this tab are read-only. Setpoints may be changed via the relay's own setup program or manually via the front panel.

SR469 Motor Management Relay

All six function buttons under the Info area are enabled for the SR469.

The SR469 Tabular Data Screen wizard has nine command buttons, described below.

| Tab | Button | Function |
|-------------|---------------------------------|---|
| Metering | Reset Device | Issues a RESET command to the SR469 |
| | Clear MWh and Mvarh | Clears these values from the SR469's memory |
| | Clear Peak Demand | Clears this data from memory |
| Status | Motor Start/Motor Stop | Issues Motor Start or Motor Stop commands |
| | Clear RTD Maximums | Resets the RTD Maximums data |
| Trip | Clear Last Trip Data | Clears this data from memory |
| I/O | Clear Analog Input Min/Max Data | Clears this data from memory |
| Maintenance | Preset Digital Counter | Allows presetting of digital counters. |
| | Clear Trip Counters | Clears the trip count data from memory. |

Table 26. SR469 Tabular data screen commands.

See the SR469 Motor Management Relay manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Metering Tab

Device Name: ML469

Group Name: \$System

Device Type: SR469

Hardware Rev.: E

Firmware Rev.: 30E280A8.000

Boot Program Rev.: 30E210A0.000

Multilin SR469 Metering Values

| | | | | |
|------------------------|---------|--------------------|-----------|--|
| Amps A: | 1∠359° | Volts AB: | 100 | RTDs °C Hottest Stator: No RTD 1: No RTD 2: No RTD 3: No RTD 4: No RTD 5: No RTD 6: No RTD 7: No RTD 8: No RTD 9: No RTD 10: No RTD 11: No RTD 12: No RTD Torque Metering: Disabled Torque: Disabled |
| Amps B: | 1∠121° | Volts BC: | 100 | |
| Amps C: | 1∠241° | Volts CA: | 100 | |
| Average Amps: | 1 | Avg Line Voltage: | 100 | |
| Current Unbalance (%): | 0 | Volts An: | - N/A - | |
| Ground Amps: | 0.00 | Volts Bn: | - N/A - | |
| Motor Load (FLA): | 1.00 | Volts Cn: | - N/A - | |
| U/B Bias Motor Load: | 1.00 | Avg Phase Voltage: | - N/A - | |
| Differential Amps A: | - N/A - | Frequency (Hz): | 60.00 | |
| Differential Amps B: | - N/A - | Tachometer RPM: | - N/A - | |
| Differential Amps C: | - N/A - | PF: | 0.87 Lead | |
| Demand (Amps): | 2 | kW: | 0 | |
| Demand (kW): | 0 | HP: | 0 | |
| Demand (kVAR): | 0 | kVAR: | 0 | |
| Demand (kVA): | 0 | kVA: | 0 | |
| Peak Demand (Amps): | 2 | + MWh hours: | 0.000 | |
| Peak Demand (kW): | 0 | + Mvar hours: | 0.000 | |
| Peak Demand (kVAR): | 0 | - Mvar hours: | 0.000 | |
| Peak Demand (kVA): | 0 | | | |

| | | | | | | | | | |
|--------|-------|------|-------------------|-------------------|--------------|------|----|--------|----|
| Events | Trend | Help | Clear Peak Demand | Clear MWh & Mvarh | RESET Device | | | | |
| Setup | Wave | Exit | Metering | Status | Alarms | Trip | IO | Maint. | >> |

The Multilin SR469 Metering Values screen shows the metering values, for example, Amps A, Amps B and Amps C; and Volts AB, Volts BC and Volts CA. Also shows Power, Energy, Motor Data and RTD information. The **Clear Peak Demand** button will clear all Peak Demand data. The **Clear MWh & Mvarh** button will clear all MWh and Mvarh values. The **RESET Device** button will issue a RESET command to the SR469.

Status Tab

Multilin SR469 Status

| | | | |
|---------------------------------------|---------------|--|------------|
| Learned Acceleration Time (s): | 200.0 | Real Time Clock | |
| Learned Starting Amps: | 3329 | Date: | 12/31/2001 |
| Learned Starting Capacity (%): | 3 | Time: | 13:07:05 |
| Learned Average Motor Load: | 1.02 | RTD Maximums °C | |
| Last Starting Current: | 1 | 1: | No RTD |
| Last Starting Capacity: | 3 | 2: | No RTD |
| Start Blocks | | 3: | No RTD |
| SR469 Programmed: | Yes | 4: | No RTD |
| Overload Lockout (m): | N/A | 5: | No RTD |
| Start Inhibit Block (m): | N/A | 6: | No RTD |
| Starts/Hour Block Lockout Time (m): | N/A | 7: | No RTD |
| Time Between Starts Lockout Time (m): | N/A | 8: | No RTD |
| Restart Block (s): | N/A | 9: | No RTD |
| Motor Status | | 10: | No RTD |
| Motor Status: | - Running - | 11: | No RTD |
| Motor Thermal Capacity Used (%): | 0 | 12: | No RTD |
| Estimated Time to Trip (s): | Never | Clear RTD Maximums | |
| Motor Speed: | - Low Speed - | <input type="button" value="Motor Start"/> <input type="button" value="Motor Stop"/> | |

The Multilin SR469 Status screen shows:

- Start Blocks
- Motor Status
- Real Time Clock
- RTD Maximums

The **Clear RTD Maximums** button will clear all maximum RTD values.

Alarms Tab

Multilin SR469 Alarm Status

| | | | |
|--------------------------|---------------|--------------------------|-----|
| Remote Alarm: | Off | Open RTD Sensor Alarm: | Off |
| Pressure Switch Alarm: | Off | Sensor / Low Temp Alarm: | Off |
| Vibration Switch Alarm: | Off | RTD #1 Alarm: | Off |
| Digital Counter Alarm: | Off | RTD #2 Alarm: | Off |
| Tachometer Alarm: | Off | RTD #3 Alarm: | Off |
| Thermal Capacity Alarm: | Off | RTD #4 Alarm: | Off |
| Overload Alarm: | Active | RTD #5 Alarm: | Off |
| Undercurrent Alarm: | Not Active | RTD #6 Alarm: | Off |
| Current Unbalance Alarm: | Not Active | RTD #7 Alarm: | Off |
| Ground Fault Alarm: | Not Active | RTD #8 Alarm: | Off |
| Undervoltage Alarm: | Not Active | RTD #9 Alarm: | Off |
| Overvoltage Alarm: | Not Active | RTD #10 Alarm: | Off |
| System Frequency Alarm: | Not Active | RTD #11 Alarm: | Off |
| Power Factor Alarm: | Off | RTD #12 Alarm: | Off |
| Reactive Power Alarm: | Off | Analog Input 1 Alarm: | Off |
| Underpower Alarm: | Active | Analog Input 2 Alarm: | Off |
| Trip Counter Alarm: | Off | Analog Input 3 Alarm: | Off |
| Starter Failure Alarm: | Off | Analog Input 4 Alarm: | Off |
| Current Demand Alarm: | Off | General Switch A Alarm: | Off |
| kW Demand Alarm: | Off | General Switch B Alarm: | Off |
| kvar Demand Alarm: | Off | General Switch C Alarm: | Off |
| kVA Demand Alarm: | Off | General Switch D Alarm: | Off |
| Reverse Power Alarm: | Not Active | | |

Events **Trend** **Help**
Setup **Wave** **Exit**

Metering Status Alarms Trip IO Maint. >>

The Multilin SR469 Alarm Status screen shows the status of various alarms such as Overload Alarm and Underpower Alarm.

Trip Tab

Multilin SR469 Last Trip Data

| | | | |
|----------------------------------|----------------------------|--------------------------|------------|
| Cause of Trip: | No Event / No Trip To Date | Trip Time: | 09:00:00 |
| Motor Speed During Trip: | - Low Speed - | Trip Date: | 01/01/1995 |
| Pre-Trip Amps A: | 0 | Pre-Trip Tachometer RPM | - N/A - |
| Pre-Trip Amps B: | 0 | Pre-Trip Volts AB: | 0 |
| Pre-Trip Amps C: | 0 | Pre-Trip Volts BC: | 0 |
| Pre-Trip Motor Load (FLA): | 0.00 | Pre-Trip Volts CA: | 0 |
| Pre-Trip Current Unbalance (%): | 0 | Pre-Trip Volts An | - N/A - |
| Pre-Trip Ground Amps: | 0.00 | Pre-Trip Volts Bn: | - N/A - |
| Pre-Trip Differential Amps A: | - N/A - | Pre-Trip Volts Cn: | - N/A - |
| Pre-Trip Differential Amps B: | - N/A - | Pre-Trip Frequency (Hz): | 0.00 |
| Pre-Trip Differential Amps C: | - N/A - | Pre-Trip kW: | 0 |
| | | Pre-Trip kVAR: | 0 |
| | °C | Pre-Trip kVA: | 0 |
| Pre-Trip Hottest Stator RTD # 0 | | Pre-Trip PF: | 0.00 Lag |
| Pre-Trip Hottest Bearing RTD # 0 | | Pre-Trip Analog Input 1: | - N/A - |
| Pre-Trip Hottest Other RTD # 0 | | Pre-Trip Analog Input 2: | - N/A - |
| Pre-Trip Hottest Amb. RTD # 0 | | Pre-Trip Analog Input 3: | - N/A - |
| | | Pre-Trip Analog Input 4: | - N/A - |

Clear Last Trip Data

>>

The Multilin SR469 Trip screen shows the values of last trip data.
 The **Clear Last Trip Data** button will clear all values of the last trip data.

IO Tab

Multilin SR469 Inputs & Outputs

Output Relays

R1 TRIP R3 AUXILIARY R5 BLOCK START
 R2 AUXILIARY R4 ALARM R6 SERVICE

Digital Input Switches

Access Switch: - Shorted - Assignable Input 1: - Open -
Test Switch: - Open - Assignable Input 2: - Open -
Starter Switch: - Open - Assignable Input 3: - Open -
Emer. Restart Switch: - Open - Assignable Input 4: - Open -
Remote Reset Switch: - Open - Trip Coil Supervision: - No Coil -

Analog Inputs

| | | Min | Max |
|-----------------------|---------------|------------|------------|
| Analog I/P 1 | - N/A - Units | - N/A - | - N/A - |
| Analog I/P 2 | - N/A - Units | - N/A - | - N/A - |
| Analog I/P 3 | - N/A - Units | - N/A - | - N/A - |
| Analog I/P 4 | - N/A - Units | - N/A - | - N/A - |
| Analog Input Diff 1-2 | | 0 | 100 |
| Analog Input Diff 3-4 | | 0 | 100 |

Clear Analog I/P Min/Max

Device Name: ML469
Group Name: \$System
Device Type: SR469
Hardware Rev.: E
Firmware Rev.: 30E280A8.000
Boot Program Rev.: 30E210A0.000

Events Trend Help
Setup Wave Exit

Metering Status Alarms Trip IO Maint. >>

The Multilin SR469 Inputs & Outputs screen shows values related to:

- Output Relays
- Digital Input Switches
- Analog Inputs

The **Clear Analog I/P Min/Max** button will clear all minimum and maximum values of Analog I/P.

Maintenance Tab

Multilin SR469 Maintenance

Device Information:
 Device Name: ML469
 Group Name: \$System
 Device Type: SR469
 Hardware Rev.: E
 Firmware Rev.: 30E280A8.000
 Boot Program Rev.: 30E210A0.000

| <u>Trip Counters</u> | | | |
|----------------------------|---|----------------------------|------|
| Total Number of Trips: | 0 | Undervoltage Trips: | 0 |
| Reverse Power Trips: | 0 | Overvoltage Trips: | 0 |
| Incomplete Sequence Trips: | 0 | Phase Reversal Trips: | 0 |
| Input Switch Trips: | 0 | Voltage Frequency Trips: | 0 |
| Tachometer Trips: | 0 | Power Factor Trips: | 0 |
| Overload Trips: | 0 | Reactive Power Trips: | 0 |
| Short Circuit Trips: | 0 | Underpower Trips: | 0 |
| Mechanical Jam Trips: | 0 | Analog Diff 1-2 Trips: | 0 |
| Undercurrent Trips: | 0 | Analog Diff 3-4 Trips: | 0 |
| Current Unbalance Trips: | 0 | | |
| Ground Fault Trips: | 0 | <u>Timers</u> | |
| Phase Differential Trips: | 0 | Motor Running Hours: | 305 |
| Acceleration Timer Trips: | 0 | Time Between Starts (min): | 0 |
| Stator RTD Trips: | 0 | Start Timer 1 (min): | 0 |
| Bearing RTD Trips: | 0 | Start Timer 2 (min): | 0 |
| Other RTD Trips: | 0 | Start Timer 3 (min): | 0 |
| Ambient RTD Trips: | 0 | Start Timer 4 (min): | 0 |
| Analog Input #1 Trips: | 0 | Start Timer 5 (min): | 0 |
| Analog Input #2 Trips: | 0 | <u>General Counters</u> | |
| Analog Input #3 Trips: | 0 | No. Motor Starts: | 1919 |
| Analog Input #4 Trips: | 0 | No. Emergency Restarts: | 0 |
| | | No. Starter Operations: | 1905 |

Buttons: Clear Trip Counters, Preset Digital Ctr, Digital Counter: - N/A - Units

Navigation: Events, Trend, Help, Setup, Wave, Exit, Metering, Status, Alarms, Trip, IO, Maint., >>

The Multilin SR469 Maintenance screen shows values related to:

- Trip Counters
- Timers
- General Counters

The **Clear Trip Counters** button will clear all values of trip counters and the Preset Digital Ctr will preset trip counters.

Analog Tab

Multilin SR469 Analog Input Differential

Analog Input Diff 1-2

| | |
|-------------------|--------------|
| Comparison: | % Difference |
| Logic: | 1<->2 |
| Active When: | Always |
| Block from Start: | 0s |

| | | | |
|-----------------|-------|----------------|------|
| Alarm: | Off | Trip: | Off |
| Alarm Relays: | Alarm | Trip Relays: | Trip |
| Percent Alarm: | 10% | Percent Trip: | 10% |
| Absolute Alarm: | 10 | Absolute Trip: | 10 |
| Alarm Delay: | 1.0s | Trip Delay: | 1.0s |
| Alarm Events: | OFF | | |

Analog Input Diff 3-4

| | |
|-------------------|--------------|
| Comparison: | % Difference |
| Logic: | 1<->2 |
| Active When: | Always |
| Block from Start: | 0s |

| | | | |
|-----------------|-------|----------------|------|
| Alarm: | Off | Trip: | Off |
| Alarm Relays: | Alarm | Trip Relays: | Trip |
| Percent Alarm: | 10% | Percent Trip: | 10% |
| Absolute Alarm: | 10 | Absolute Trip: | 10 |
| Alarm Delay: | 1.0s | Trip Delay: | 1.0s |
| Alarm Events: | OFF | | |

Device Name: ML469
 Group Name: \$System
 Device Type: SR469
 Hardware Rev.: E
 Firmware Rev.: 30E280A8.000
 Boot Program Rev.: 30E210A0.000

Events Trend Help
 Setup Wave Exit

Setpoints Analog RTDHI <<

The Multilin SR469 Analog Input Differential screen shows:

- Analog Input Diff 1-2
- Analog Input Diff 3-4

RTD HI Tab

Multilin SR469 HI Alarm Status

| | | | |
|-------------------------|-----|--------------------------|-------|
| RTD #1 HI Alarm: | Off | RTD #1 HI Alarm: | Off |
| RTD #1 HI Alarm Level: | 130 | RTD #1 HI Alarm Relays: | Alarm |
| RTD #2 HI Alarm: | Off | RTD #2 HI Alarm: | Off |
| RTD #2 HI Alarm Level: | 130 | RTD #2 HI Alarm Relays: | Alarm |
| RTD #3 HI Alarm: | Off | RTD #3 HI Alarm: | Off |
| RTD #3 HI Alarm Level: | 130 | RTD #3 HI Alarm Relays: | Alarm |
| RTD #4 HI Alarm: | Off | RTD #4 HI Alarm: | Off |
| RTD #4 HI Alarm Level: | 130 | RTD #4 HI Alarm Relays: | Alarm |
| RTD #5 HI Alarm: | Off | RTD #5 HI Alarm: | Off |
| RTD #5 HI Alarm Level: | 130 | RTD #5 HI Alarm Relays: | Alarm |
| RTD #6 HI Alarm: | Off | RTD #6 HI Alarm: | Off |
| RTD #6 HI Alarm Level: | 130 | RTD #6 HI Alarm Relays: | Alarm |
| RTD #7 HI Alarm: | Off | RTD #7 HI Alarm: | Off |
| RTD #7 HI Alarm Level: | 80 | RTD #7 HI Alarm Relays: | Alarm |
| RTD #8 HI Alarm: | Off | RTD #8 HI Alarm: | Off |
| RTD #8 HI Alarm Level: | 80 | RTD #8 HI Alarm Relays: | Alarm |
| RTD #9 HI Alarm: | Off | RTD #9 HI Alarm: | Off |
| RTD #9 HI Alarm Level: | 80 | RTD #9 HI Alarm Relays: | Alarm |
| RTD #10 HI Alarm: | Off | RTD #10 HI Alarm: | Off |
| RTD #10 HI Alarm Level: | 80 | RTD #10 HI Alarm Relays: | Alarm |
| RTD #11 HI Alarm: | Off | RTD #11 HI Alarm: | Off |
| RTD #11 HI Alarm Level: | 80 | RTD #11 HI Alarm Relays: | Alarm |
| RTD #12 HI Alarm: | Off | RTD #12 HI Alarm: | Off |
| RTD #12 HI Alarm Level: | 60 | RTD #12 HI Alarm Relays: | Alarm |

Device Name: ML469
Group Name: \$System
Device Type: SR469
Hardware Rev.: E
Firmware Rev.: 30E280A8.000
Boot Program Rev.: 30E210A0.000

Events Trend Help
Setup Wave Exit

Setpoints Analog RTDHI <<

The Multilin SR469 HI Alarm Status screen shows various RTD values.

Setpoints Tab

Multilin SR469 System Setpoints

| Thermal Model | | Current Sensing | |
|-----------------------------------|----------|--------------------------------|---------------------|
| Curve Style: | Standard | Phase CT Primary: | 1 |
| Overload Pickup Level (FLA): | 1.01 | Motor Full Load Amps: | 1 |
| Unbalance k Factor: | 0 | Ground CT Type: | Multilin 50:0.025 |
| Cool Time Constant Running (min): | 15 | Ground CT Primary: | 100 |
| Cool Time Constant Stopped (min): | 30 | Phase Diff. CT Type: | None |
| Hot/Cold Safe Stall Ratio: | 1.00 | Phase Differential CT Primary: | 100 |
| RTD Biasing: | Off | Enable Two Speed Motor Option: | On |
| RTD Bias Minimum (*C): | 40 | Speed Two Phase CT Primary: | 100 |
| RTD Bias Center Point (*C): | 130 | Speed Two Motor Full Load: | 1 |
| RTD Bias Maximum (*C): | 155 | Voltage Sensing | |
| Thermal Capacity Alarm: | Off | One VT Connection: | AN (Wye) AB (Delta) |
| T. C. Alarm Relays: | Alarm | VT Connection Type: | Open Delta |
| Thermal Capacity Level (% used): | 75 | Voltage Transformer Ratio: | 1.00 |
| Thermal Capacity Events: | Off | Motor Nameplate Voltage: | 100 |
| Overload Trip Relays: | Trip | Power System | |
| Serial Communication Control: | Off | Nominal Frequency: | 60 Hz |
| | | System Phase Sequence: | ABC |

Device Name: ML469
Group Name: \$System
Device Type: SR469
Hardware Rev.: E
Firmware Rev.: 30E280A8.000
Boot Program Rev.: 30E210A0.000

Events Trend Help
Setup Wave Exit

Setpoints Analog RTDHI <<

The Multilin SR469 System Setpoints screen shows values of Thermal Model, Current, Voltage Sensing, Power System

SR489 Generator Management Relay

All the SR489's function buttons below the Info box are enabled.

The SR489 Tabular Data Screen wizard has nine command buttons, described below.

| Tab | Button | Function |
|-------------|-------------------------------|---|
| Metering | Reset Device | Issues a RESET command to the device. |
| | Clear Peak Demand | Clears the peak demand data from memory. |
| | Clear MWh and Mvarh | Clears the MWh and Mvarh data from memory. |
| | Clear Max RTD Data | Clears the maximum RTD data from memory. |
| Trip Data | Clear Last Trip Data | Clears the last trip data from memory. |
| I/O | Clear Analog I/P Min/Max Data | Clears the analog input minimum/maximum data from memory. |
| Maintenance | Clear Trip Counters | Clears the trip counter data from memory. |
| | Clear Generator Information | Clears the generator data from memory. |
| | Clear Breaker Information | Clears the breaker data from memory. |

Table 27. SR489 Tabular data screen commands.

See the SR489 Generator Management Relay manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Metering Tab

Multilin SR489 Metering Values

| Current | A | B | C | Average Amps: | 4 |
|-------------------------|--|-----------------------|-----------------------|--------------------|-----------------------|
| Amps | 4< 359 ⁰ | 4< 119 ⁰ | 4< 239 ⁰ | Neg. Seq. (% FLA): | 0 |
| Neutral Amps | 0< 0 ⁰ | 0< 0 ⁰ | 0< 0 ⁰ | Ground Amps: | 0.00< 0 ⁰ |
| Diff. Amps | 4< 0 ⁰ | 4< 0 ⁰ | 4< 0 ⁰ | Vab / lab: | 496< 359 ⁰ |
| Voltage | Volts An: | | 502< 0 ⁰ | Speed (RPM): | - N/A - |
| Volts AB: | 868< 330 ⁰ | Volts Bn: | 501< 120 ⁰ | RTD Temp | ⁰ C (Max) |
| Volts BC: | 869< 90 ⁰ | Volts Cn: | 502< 240 ⁰ | Hottest Stator: | No RTD |
| Volts CA: | 870< 210 ⁰ | Avg Phase: | 502 | 1: | No RTD No RTD |
| Avg Line: | 869 | Neut. Volts Fund: | 0.0 | 2: | No RTD No RTD |
| Per Unit V/Hz: | 8.67 | Neut. 3rd Harm.: | 0.1 | 3: | No RTD No RTD |
| Freq. (Hz): | 60.00 | Term. 3rd Harm.: | 0.9 | 4: | No RTD No RTD |
| Generator Status: | Online | Gen. Load (% FLA): | 0 | 5: | No RTD No RTD |
| Est. O/L Trip Time (s): | 65535 | Therm. Cap. Used (%): | 0 | 6: | No RTD No RTD |
| Demand (Amps): | 4 <th>Power</th> <td colspan="3"></td> | Power | | | |
| Demand (MW): | 0.005 | Power Factor: | 1.00 Lag | 7: | No RTD No RTD |
| Demand (MVAR): | 0.000 | MW: | 0.005 | 8: | No RTD No RTD |
| Demand (MVA): | 0.005 | MVAR: | 0.000 | 9: | No RTD No RTD |
| Pk Dmnd (Amps): | 6 | MVA: | 0.005 | 10: | No RTD No RTD |
| Pk Dmnd (MW): | 0.008 | + MW hours: | 0.296 | 11: | No RTD No RTD |
| Pk Dmnd (MVAR): | 0.000 | + Mvar hours: | 0.000 | 12: | No RTD No RTD |
| Pk Dmnd (MVA): | 0.008 | - Mvar hours: | 0.000 | | |

Buttons: **Clear Peak Demand** **Clear MWh & Mvarh** **Clear Max RTD Data** **RESET Device**

Navigation: **Events** **Trend** **Help** **Setup** **Wave** **Exit**

Tabular Data Screen Wizard: **Metering** **Pickups** **Alarms** **TripData** **IO** **Maint** **Setpoints**

The Multilin SR489 Metering Values screen shows various metering values:

- Current

- Voltage
- Demand
- Power
- RTD Information
- Motor Data

The **Clear Peak Demand** button clears all peak demand values.
 The **Clear MWh & Mvarh** button clears all MWh and Mvarh data
 The **Clear Max RTD Data** button clears the maximum RTD data and
 The **RESET Device** button will issue a RESET command to the device.

Pickup Tab

| Multilin SR489 Pickups | | | | | |
|------------------------------|-------------|--------------------------|-------------|----------|-------------|
| Input A: | Not Enabled | Analog I/P 1: | Inactive | RTD #5: | Not Enabled |
| Input B: | Not Enabled | Analog I/P 2: | Inactive | RTD #6: | Not Enabled |
| Input C: | Not Enabled | Analog I/P 3: | Inactive | RTD #7: | Not Enabled |
| Input D: | Not Enabled | Analog I/P 4: | Inactive | RTD #8: | Not Enabled |
| Input E: | Not Enabled | RTD #1: | Not Enabled | RTD #9: | Not Enabled |
| Input F: | Not Enabled | RTD #2: | Not Enabled | RTD #10: | Not Enabled |
| Input G: | Not Enabled | RTD #3: | Not Enabled | RTD #11: | Not Enabled |
| | | RTD #4: | Not Enabled | RTD #12: | Not Enabled |
| Sequential Trip: | Not Enabled | Volts/Hertz Trip: | Active | | |
| Field-Breaker Discrep. Trip: | Not Enabled | Phase Reversal Trip: | Inactive | | |
| Tachometer Trip: | Not Enabled | Underfrequency Trip: | Not Enabled | | |
| Offline Overcurrent Trip: | Inactive | Overfrequency Trip: | Inactive | | |
| Inadvertent Energy Trip: | Inactive | Neutral O/V (Fund) Trip: | Inactive | | |
| Phase Overcurrent Trip: | Inactive | Neutral U/V (3rd) Trip: | Inactive | | |
| Neg. Seq. Overcurrent Trip: | Inactive | Reactive Power Trip: | Not Enabled | | |
| Ground Overcurrent Trip: | Inactive | Reverse Power Trip: | Not Enabled | | |
| Phase Differential Trip: | Active | Low Forward Power Trip: | Not Enabled | | |
| Undervoltage Trip: | Inactive | Thermal Model Trip: | Not Enabled | | |
| Overvoltage Trip: | Active | More | | | |

Device Name: ML489
 Group Name: \$System
 Device Type: SR489
 Hardware Rev.: G
 Firmware Rev.: 32G141A8.000
 Boot Program Rev.: 32G200A0.000

Events Trend Help
 Setup Wave Exit


Metering Pickups Alarms TripData IO Maint Setpoints

The Multilin SR489 Pickups screen shows:

- Phase Differential Trip
- Overvoltage Trip
- Volts/Hertz Trip

CLICK MORE BUTTON TO SEE MORE PICKUPS

Alarms Tab



Device Name: ML489
 Group Name: \$System
 Device Type: SR489
 Hardware Rev.: G
 Firmware Rev.: 32G141A8.000
 Boot Program Rev.: 32G200A0.000

Events Trend Help
 Setup Wave Exit

Multilin SR489 Alarm Pickups


| | | | | | |
|----------|-------------|---------------|-------------|----------|-------------|
| Input A: | Not Enabled | Analog I/P 1: | Inactive | RTD #5: | Not Enabled |
| Input B: | Not Enabled | Analog I/P 2: | Inactive | RTD #6: | Not Enabled |
| Input C: | Not Enabled | Analog I/P 3: | Inactive | RTD #7: | Not Enabled |
| Input D: | Not Enabled | Analog I/P 4: | Inactive | RTD #8: | Not Enabled |
| Input E: | Not Enabled | RTD #1: | Not Enabled | RTD #9: | Not Enabled |
| Input F: | Not Enabled | RTD #2: | Not Enabled | RTD #10: | Not Enabled |
| Input G: | Not Enabled | RTD #3: | Not Enabled | RTD #11: | Not Enabled |
| | | RTD #4: | Not Enabled | RTD #12: | Not Enabled |

| | | | |
|---------------------------|---------------|-----------------------------|-------------|
| Tachometer Alarm: | Not Enabled | Short/Low Temp Alarm: | Not Enabled |
| Overcurrent Alarm: | Inactive | Thermal Model Alarm: | Not Enabled |
| Neg. Sequence Alarm: | Inactive | Trip Counter Alarm: | Not Enabled |
| Ground Overcurrent Alarm: | Inactive | Breaker Failure Alarm: | Not Enabled |
| Undervoltage Alarm: | Inactive | Trip Coil Monitor Alarm: | Not Enabled |
| Overvoltage Alarm: | Active | VT Fuse Failure Alarm: | Not Enabled |
| Volts/Hertz Alarm: | Active | Current Demand Alarm: | Not Enabled |
| Underfrequency Alarm: | Inactive | M/W Demand Alarm: | Not Enabled |
| Overfrequency Alarm: | Inactive | Mvar Demand Alarm: | Not Enabled |
| Neutral O/V (Fund) Alarm: | Inactive | MVA Demand Alarm: | Not Enabled |
| Neutral U/V (3rd) Alarm: | Inactive | Not Programmed Alarm: | Inactive |
| Reactive Power Alarm: | Not Enabled | Simulation Mode Alarm: | Not Enabled |
| Reverse Power Alarm: | Not Enabled | Output Relays Forced Alarm: | Not Enabled |
| Low Forward Power Alarm: | Not Enabled | Analog Output Forced Alarm: | Not Enabled |
| Open Sensor Alarm: | Not Enabled | Test Switch Shorted Alarm: | Not Enabled |

Metering Pickups Alarms TripData IO Maint Setpoints

The Multilin SR489 Alarm Pickups screen shows all the Alarms.

Trip Data Tab



Device Name: ML489
 Group Name: \$System
 Device Type: SR489
 Hardware Rev.: G
 Firmware Rev.: 32G141A8.000
 Boot Program Rev.: 32G200A0.000

Events Trend Help
 Setup Wave Exit

Multilin SR489 Last Trip Data

Cause of Trip: Differential Trip Trip Time: 10:25:33
 Trip Date: 12/31/2001

Pre-Trip Data

| | A | B | C | |
|----------------------------|---------|---|---|--------------------------------|
| Current (Amps) | 4 | 4 | 4 | |
| Diff. Current (Amps) | 4 | 4 | 4 | |
| Ground Current (Amps): | 0.00 | | | Tachometer (RPM): - N/A - |
| Neg. Seq. Current (% FLA): | 0 | | | Volts AB: 0 |
| Analog I/P 1 | 0 Units | | | Volts BC: 0 |
| Analog I/P 2 | 0 Units | | | Volts CA: 0 |
| Analog I/P 3 | 0 Units | | | Vab/lab (ohms) 0.0 |
| Analog I/P 4 | 0 Units | | | Vab/lab Angle ∅ |
| | °C | | | Neutral Volt Fund: 0.0 |
| Hottest Stator RTD # 0 | | | | Neutral Volt 3rd Harmonic: 0.1 |
| Hottest Bearing RTD # -52 | | | | Frequency (Hz): 60.00 |
| Hottest Other RTD # -52 | | | | Real Power (MW): 0.000 |
| Hottest Amb. RTD # -52 | | | | Reactive Power (MVAR): 0.000 |
| | | | | Apparent Power (MVA): 0.000 |

Clear Last Trip Data

Metering Pickups Alarms TripData IO Maint Setpoints

The Multilin SR489 Last Trip Data screen shows the values of last trip data and the corresponding values at the time of trip.

The **Clear Last Trip Data** button clears all values of the last trip data.

IO Tab

Multilin SR489 Inputs & Outputs

Digital Input Switches

- Access Switch: - Shorted -
- Breaker Status Switch: - Open -
- Assignable Input 1: - Open -
- Assignable Input 2: - Open -
- Assignable Input 3: - Open -
- Assignable Input 4: - Open -
- Assignable Input 5: - Open -
- Assignable Input 6: - Open -
- Assignable Input 7: - Open -
- Trip Coil Supervision: - No Coil -

Digital Input Supervision: YES
Enable Voltage Supervision: NO

Output Relays

- R1 TRIP
- R2 AUXILIARY
- R3 AUXILIARY
- R4 AUXILIARY
- R5 ALARM
- R6 SERVICE

Learned Data Values

| | |
|------------------------------|-----|
| Avg Generator Load (% FLA): | 0 |
| Avg Neg Seq Current (% FLA): | 0 |
| Avg Phase-Phase Volts: | 869 |

Analog Inputs

| | | Min | Max |
|--------------|---------|-----|-----|
| Analog I/P 1 | 0 Units | 0 | 0 |
| Analog I/P 2 | 0 Units | 0 | 0 |
| Analog I/P 3 | 0 Units | 0 | 0 |
| Analog I/P 4 | 0 Units | 0 | 0 |

Clear Analog I/P Min/Max

Device Name: ML489
Group Name: \$System
Device Type: SR489
Hardware Rev.: G
Firmware Rev.: 32G141A8.000
Boot Program Rev.: 32G200A0.000

Events Trend Help
Setup Wave Exit

Metering Pickups Alarms TripData IO Maint Setpoints

The Multilin SR489 Inputs & Outputs screen shows:

- Digital Input Switches
- Analog Inputs
- Output Relays
- Learned Data Values

The **Clear Analog I/P Min/Max** button clears all the minimum and maximum analog I/P.

Maintenance Tab

Multilin SR489 Maintenance

General Timers & Counters

| | | | |
|-------------------------|-----|--------------------------|---|
| Generator Hours Online: | 138 | # of Breaker Operations: | 0 |
| | | # of Thermal Resets: | 0 |

Trip Counters

| | | | |
|---------------------------|----|-----------------------------|------------|
| Total Number of Trips: | 36 | Neutral O/V Fund Trips: | 0 |
| Digital Input Trips: | 0 | Neutral UV 3rd Trips: | 0 |
| Sequential Trips: | 0 | Reactive Power Trips: | 0 |
| Field-Bkr Discrep. Trips: | 0 | Reverse Power Trips: | 0 |
| Tachometer Trips: | 0 | Low Forward Power Trips: | 0 |
| Offline O/C Trips: | 0 | Stator RTD Trips: | 0 |
| Phase O/C Trips: | 0 | Bearing RTD Trips: | 0 |
| Neg. Sequence O/C Trips: | 0 | Other RTD Trips: | 0 |
| Ground O/C Trips: | 0 | Ambient RTD Trips: | 0 |
| Phase Differential Trips: | 7 | Thermal Model Trips: | 0 |
| Undervoltage Trips: | 1 | Inadvertent Energy Trips: | 0 |
| Overvoltage Trips: | 26 | Analog Input #1 Trips: | 0 |
| Volts/Hertz Trips: | 2 | Analog Input #2 Trips: | 0 |
| Phase Reversal Trips: | 0 | Analog Input #3 Trips: | 0 |
| Underfrequency Trips: | 0 | Analog Input #4 Trips: | 0 |
| Overfrequency Trips: | 0 | Trip Counters Last Cleared: | 12/25/2001 |

Next

Clear Trip Counters Clear Generator Info Clear Breaker Info

Events Trend Help
Setup Wave Exit

Metering Pickups Alarms TripData IO Maint Setpoints

The Multilin SR489 Maintenance screen shows:

- General Timers & Counters
- Trip Counters

The Clear Trip Counters button will clear all values of trip counters; the Clear General Info button will clear all general information; and the Clear Breaker Info button will clear all breaker information from the memory.

Setpoints Tab

Multilin SR489 System Setpoints

| | |
|--------------------------------|-----------|
| Phase CT Primary: | 10 |
| Ground CT Type: | None |
| VT Connection Type: | Wye |
| Voltage Transformer Ratio: | 5.00:1 |
| Neutral VT Ratio: | 5.00:1 |
| Voltage Lower Limit | 10 % |
| Voltage Level (x rated) | 0.70 |
| Generator Rated MVA: | 2000.000 |
| Generator Rated PF: | 0.05 |
| Generator Voltage Phase-Phase: | 100 |
| Generator Nominal Frequency: | 60 Hz |
| Generator Phase Sequence: | ABC |
| Step Up Transformer Setup | Delta/Wye |
| Pulse Width (milli seconds) | 200 |

Device Name: ML489
Group Name: \$System
Device Type: SR489
Hardware Rev.: G
Firmware Rev.: 32G141A8.000
Boot Program Rev.: 32G200A0.000

Events Trend Help
Setup Wave Exit

Metering Pickups Alarms TripData IO Maint Setpoints

The Multilin SR489 System Setpoints screen shows various values related to the setpoints such as Phase CT Primary, Ground CT Type, VT Connection Type, Voltage Transformer Ratio etc.

565 Feeder Management Relay

Multilin 565 Wye Metering Values

| | <u>A</u> | <u>B</u> | <u>C</u> | <u>GND</u> |
|---------------------|----------|----------|----------|------------|
| Amps: | 44.70 | 44.83 | 44.91 | 44.65 |
| Volts (kV): | 78.15 | 77.24 | 77.43 | |
| Pretrip Amps: | 0.00 | 0.00 | 0.00 | 0.00 |
| Pretrip Volts (kV): | 0.00 | 0.00 | 0.00 | |
| Peak Demand (Amps): | 0.00 | 0.00 | 0.00 | |
| Accumulated KA: | 0.00 | 0.00 | 0.00 | |

| | | | |
|-------------------------|-------|------------------|--------------|
| PF: | 1.00 | Breaker Status: | CLOSED |
| Frequency (Hz): | 36.83 | AUX 1 Status: | De-Energized |
| MTM Frequency (Hz): | 0.70 | AUX 2 Status: | De-Energized |
| Real Power (KW): | 4 | AUX 3 Status: | De-Energized |
| Reactive Power (KVAR): | 4 | Trip Status: | No Trip |
| Energy (MWH): | 1 | Last Trip Cause: | None |
| ANALOG INPUT (UNIT): | 0.00 | | |
| Peak KVAR Demand: | 0 | | |
| Peak KW Demand: | 0 | | |
| Pretrip Frequency (Hz): | 0.00 | | |

Device Name: ML565
 Group Name: \$System
 Device Type: Unknown
 Hardware Rev.: N/A
 Firmware Rev.: 0.0
 Firmware Mod.: None

Event Logger | Trend | Help | Wave | Exit

Metering | Status | Command | Setup 1 | Setup 2 | Setup 3 | Setup 4

The 565 Tabular Data Screen wizard has the following buttons on the Command tab:

| Tab | Button | Function |
|-----------|---------------------------|----------------------------------|
| Command | Maint Data | Clears the maintenance data |
| | Operation Data | Clears the operation data |
| | Amp Demand | Clears the amp demand registers |
| | KW Demand | Clears the kW demand registers |
| | KVAR Demand | Clears the kVAR demand registers |
| | Events | Clears the events table |
| | Energy | Clears the energy used data |
| | Reset Keypad | Performs a keypad reset |
| | End of Relay Test | Ends the relay test |
| | End of LED Test | Ends the LED test |
| | End of Analog Output Test | Ends the analog output test |
| | Test LCD Display | Sends a test pattern to the LCD |
| Test LEDs | Starts the LED test | |

Table 28. 565 Tabular data screen commands.

The Setup 2 tab has two data input areas. Analog Input Title creates a user label for the analog input used in the device. Analog Input Units performs the same function for the units of the analog input. These labels appear on the Metering tab and on the Large Faceplate wizard when the analog input is displayed. The analog input can be

scaled to display any desired units from the front of the device, but these labels are not sent to the DDE Server.

For complete explanations of parameters, refer to the *565 Users Guide*.

735 Feeder Relay

The Events and Wave function buttons below the Info box are disabled since the 735 does not support Waveform Capture or Event generation.

The 735 Tabular Data Screen wizard has two command buttons, described below.

| Tab | Button | Function |
|----------|----------------------|-----------------------------------|
| Metering | Reset Device | Issues a RESET command to the 735 |
| Trip | Clear Last Trip Data | Clears the trip causes log |

Table 29. 735 Tabular data screen commands.

Metering Tab

Metering Values

| Current | (% of CT) | Output Relays |
|----------|-----------|---|
| Phase A: | 201 | <input type="checkbox"/> Main Trip |
| Phase B: | 201 | <input type="checkbox"/> Auxiliary Trip |
| Phase C: | 200 | <input type="checkbox"/> Service |
| Ground: | 0 | |

| Time Overcurrent Trip | Instantaneous Overcurrent Trip |
|-----------------------------------|-----------------------------------|
| <input type="checkbox"/> Phase A: | <input type="checkbox"/> Phase A: |
| <input type="checkbox"/> Phase B: | <input type="checkbox"/> Phase B: |
| <input type="checkbox"/> Phase C: | <input type="checkbox"/> Phase C: |
| <input type="checkbox"/> Ground: | <input type="checkbox"/> Ground: |

Configuration

| | | | |
|------------------------|-----------|-------------------|-------|
| Curve Shape: | ANSI | Modbus Address: | 28 |
| Blk Instantaneous (s): | Disabled | Baud Rate: | 19200 |
| Aux Trip Relay: | Main Trip | Test Mode Switch: | Off |

RESET/CLEAR Device

Navigation: Metering | Setpoints | Trip

Info Box: Device Name: ML735, Group Name: \$System, Device Type: SR735, Hardware Rev.: D, Firmware Rev.: 1.52, Mod File Number: 000

Buttons: Events, Trend, Help, Setup, Wave, Exit

The 735 Metering screen shows:

- Current and Output Relays
- Time Overcurrent Trip and Instantaneous Overcurrent Trip
- Configuration

The RESET/CLEAR Device button will issue a RESET command to 735.

Trip Data Tab

The screenshot displays the 'Trip Data' tab interface. On the left, there is a device image labeled 'Multilin SR735'. Below it, a list of device details is shown: Device Name: ML735, Group Name: \$System, Device Type: SR735, Hardware Rev.: D, Firmware Rev.: 1.52, and Mod File Number: 000. A navigation menu at the bottom left includes buttons for Events, Trend, Help, Setup, Wave, and Exit. The main area is titled 'Trip Data' and contains two sections: 'Last Trip Data' and 'Trip Record'. The 'Last Trip Data' section lists: Cause of Last Trip: None, Phase A Pretrip (% CT): 0, Phase B Pretrip (% CT): 0, Phase C Pretrip (% CT): 0, Ground Pretrip (% CT): 0, and Last O/C Trip Time (mS): Time not available. The 'Trip Record' section lists: Cause of 2nd Last Trip: None, Cause of 3rd Last Trip: None, Cause of 4th Last Trip: None, and Cause of 5th Last Trip: None. A 'Clear Last 5 Trip Causes' button is located at the bottom of the Trip Record section. At the bottom of the interface, there are buttons for Metering, Setpoints, and Trip.

| Last Trip Data | |
|--------------------------|--------------------|
| Cause of Last Trip: | None |
| Phase A Pretrip (% CT) | 0 |
| Phase B Pretrip (% CT) | 0 |
| Phase C Pretrip (% CT) | 0 |
| Ground Pretrip (% CT) | 0 |
| Last O/C Trip Time (mS): | Time not available |

| Trip Record | |
|-------------------------|------|
| Cause of 2nd Last Trip: | None |
| Cause of 3rd Last Trip: | None |
| Cause of 4th Last Trip: | None |
| Cause of 5th Last Trip: | None |

The 735 Trip Data screen shows trip data information such as:

- Last Trip Data
- Trip Record

The Clear Last 5 Trip Causes button will clear values of last 5 trip causes.

Setpoints Tab

System Setpoints

Dial Settings

| | | | |
|------------------------------|------|------|-------|
| Phase Pickup (% of CT): | | | OFF |
| Phase Curve Shape: | Def. | time | (low) |
| Phase Time Multiplier: | | | 1 |
| Phase Instantaneous (x CT): | | | OFF |
| Ground Pickup (% of CT): | | | OFF |
| Ground Curve Shape: | Def. | time | (low) |
| Ground Time Multiplier: | | | 1 |
| Ground Instantaneous (x CT): | | | OFF |

Option Switches

| | |
|---|----------|
| Phase Time Overcurrent Shift Multiplier: | 1.0 |
| Ground Time Overcurrent Shift Multiplier: | 1.0 |
| System Frequency (Hz): | 60 |
| Custom Scheme: | Disabled |

Device Name: ML735
Group Name: \$System
Device Type: SR735
Hardware Rev.: D
Firmware Rev.: 1.52
Mod File Number: 000

Events Trend Help
Setup Wave Exit

Metering Setpoints Trip

The 735 System Setpoints screen shows setpoints information such as:

- Dial Settings
- Option Switches

SR745 Transformer Management Relay

Under the Info area, the SR745's function buttons are all enabled.

The SR745 Tabular Data Screen wizard has three command buttons:

| Tab | Button | Function |
|-----------|-------------------------|--|
| Metering | Reset Device | Issues a RESET command to the device |
| Demand | Clear Max Demand Data | Clears the maximum demand data from the SR745's memory |
| Harmonics | Clear Loss-of-Life Data | Clears loss-of-life data from the SR745's memory |

Table 30. SR745 Tabular data screen commands.

See the SR745 Transformer Management Relay Instruction Manual (Chapter 6, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A. When configured for only 2 Windings, the Winding 3 fields on the Tabular Data wizard are not visible.

Metering Tab

Multilin SR745 Metering Values

| Current | A | B | C | N | Gnd | Avg |
|----------------------|-------|-------|-------|------|------|-------|
| W1 (Amps): | 20.03 | 19.90 | 19.92 | 0.07 | 0.00 | 19.94 |
| W1 Angle (°lag): | 0 | 120 | 240 | 342 | 0 | |
| W2 (Amps): | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0.00 |
| W2 Angle (°lag): | 0 | 0 | 0 | 0 | 0 | |
| Differential (x CT): | 2.00 | 1.99 | 1.99 | | | |
| Diff. Angle (°lag): | 29 | 150 | 269 | | | |
| Restr. (x CT): | 1.99 | 1.99 | 1.99 | | | |

| | + Seq Cur | | - Seq Cur | | 0 Seq Cur | | Loading | Gnd Diff CT |
|-----|-----------|-------|-----------|-------|-----------|-------|---------|-------------|
| | Amps | ° lag | Amps | ° lag | Amps | ° lag | | |
| W1: | 19.96 | 0 | 0.04 | 344 | 0.04 | 344 | 3% | 0.013x CT |
| W2: | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0% | 0.000x CT |

| Status Flags | State | Phases |
|-----------------------|------------------------------|---------|
| Any Element: | Picked Up, Operated, Latched | A, B, C |
| Percent Differential: | Picked Up, Operated, Latched | A, B, C |
| Instantaneous Diff.: | | |

RESET Device

Metering | Flags | IO | Demand | Harmonic | Setpoints | Power

Device Name: ML745
 Group Name: \$System
 Device Type: SR745
 Hardware Rev: D
 Software Rev: 2.50
 Boot Rev: 1.20
 Version: 000
 Manuf. Date: 08/31/2000

Events | Trend | Help
 Setup | Wave | Exit

The Multilin SR745 Metering Values screen shows:

- Current
- Sequence Current
- Status Flags

The **RESET Device** button will issue a RESET command to the device.

Flags Tab

| Multilin SR745 Element Flags State | | Phases |
|------------------------------------|------------------------------|--------|
| Analog Input Level 1: | | |
| Analog Input Level 2: | | |
| W1 Current Demand: | | |
| W2 Current Demand: | | |
| W3 Current Demand: | | |
| W1 Phase Time O/C: | Picked Up, Operated, Latched | C |
| W2 Phase Time O/C: | | |
| W3 Phase Time O/C: | | |
| W1 Phase Inst O/C 1: | | |
| W2 Phase Inst O/C 1: | | |
| W3 Phase Inst O/C 1: | | |
| W1 Phase Inst O/C 2: | | |
| W2 Phase Inst O/C 2: | | |
| W3 Phase Inst O/C 2: | | |
| W1 Neutral Time O/C: | Latched | |
| W2 Neutral Time O/C: | | |
| W3 Neutral Time O/C: | | |
| W1 Neutral Inst O/C 1: | | |
| W2 Neutral Inst O/C 1: | | |
| W3 Neutral Inst O/C 1: | | |
| W1 Neutral Inst O/C 2: | | |
| W2 Neutral Inst O/C 2: | | |

| | |
|---------------|------------|
| Device Name: | ML745 |
| Group Name: | \$System |
| Device Type: | SR745 |
| Hardware Rev: | D |
| Software Rev: | 2.50 |
| Boot Rev: | 1.20 |
| Version: | 000 |
| Manuf. Date: | 08/31/2000 |

The Multilin SR745 Element Flags screen shows the state and phases of various elements.

IO Tab

| Multilin SR745 Inputs & Outputs | |
|--|---|
| Logic Inputs | Virtual Inputs |
| <input type="checkbox"/> Logic Input 1 | <input type="checkbox"/> Virtual Input 1 |
| <input type="checkbox"/> Logic Input 2 | <input type="checkbox"/> Virtual Input 2 |
| <input type="checkbox"/> Logic Input 3 | <input type="checkbox"/> Virtual Input 3 |
| <input type="checkbox"/> Logic Input 4 | <input type="checkbox"/> Virtual Input 4 |
| <input type="checkbox"/> Logic Input 5 | <input type="checkbox"/> Virtual Input 5 |
| <input type="checkbox"/> Logic Input 6 | <input type="checkbox"/> Virtual Input 6 |
| <input type="checkbox"/> Logic Input 7 | <input type="checkbox"/> Virtual Input 7 |
| <input type="checkbox"/> Logic Input 8 | <input type="checkbox"/> Virtual Input 8 |
| <input type="checkbox"/> Logic Input 9 | <input type="checkbox"/> Virtual Input 9 |
| <input type="checkbox"/> Logic Input 10 | <input type="checkbox"/> Virtual Input 10 |
| <input type="checkbox"/> Logic Input 11 | <input type="checkbox"/> Virtual Input 11 |
| <input type="checkbox"/> Logic Input 12 | <input type="checkbox"/> Virtual Input 12 |
| <input type="checkbox"/> Logic Input 13 | <input type="checkbox"/> Virtual Input 13 |
| <input type="checkbox"/> Logic Input 14 | <input type="checkbox"/> Virtual Input 14 |
| <input type="checkbox"/> Logic Input 15 | <input type="checkbox"/> Virtual Input 15 |
| <input type="checkbox"/> Logic Input 16 | <input type="checkbox"/> Virtual Input 16 |
| Output Relays | |
| Solid State Trip | <input type="checkbox"/> |
| Trip 1 | <input type="checkbox"/> |
| Trip 2 | <input type="checkbox"/> |
| Volts/Hertz Trip | <input type="checkbox"/> |
| Overflux Alarm | <input type="checkbox"/> |
| Frequency Trip 1 | <input type="checkbox"/> |
| Frequency Trip 2 | <input type="checkbox"/> |
| Frequency Trip 3 | <input type="checkbox"/> |
| Self-Test Relay | <input type="checkbox"/> |
| Virtual Outputs | |
| Virtual Output 1: | <input type="checkbox"/> |
| Virtual Output 2: | <input type="checkbox"/> |
| Virtual Output 3: | <input type="checkbox"/> |
| Virtual Output 4: | <input type="checkbox"/> |
| Virtual Output 5: | <input type="checkbox"/> |
| Legend: | |
| <input checked="" type="checkbox"/> Asserted | <input checked="" type="checkbox"/> Energized |
| <input type="checkbox"/> Not Asserted | <input type="checkbox"/> Not Energized |
| Analog Input | µA |
| ANALOG INPUT | 0 |

| | |
|---------------|------------|
| Device Name: | ML745 |
| Group Name: | \$System |
| Device Type: | SR745 |
| Hardware Rev: | D |
| Software Rev: | 2.50 |
| Boot Rev: | 1.20 |
| Version: | 000 |
| Manuf. Date: | 08/31/2000 |

The Multilin SR745 Inputs & Outputs screen shows:

- Logic Inputs
- Virtual Inputs
- Output Relays
- Virtual Outputs
- Analog Input

Demand Tab

Multilin SR745 Demand Data

Configuration
 Current Demand Meter Type: Block Interval
 Time Interval (min.): 20

| Present Values | A | B | C |
|-------------------|-------|-------|-------|
| Winding 1 (Amps): | 20.01 | 19.89 | 19.91 |
| Winding 2 (Amps): | 0.00 | 0.00 | 0.00 |

| Maximums | Phase | Amps | Date | Time |
|------------|-------|-------|------------|-----------|
| Winding 1: | C | 29.91 | 12/10/2001 | 21:00:01 |
| Winding 2: | A | 0.00 | 12/10/2001 | 17:39:180 |

Clear Max Demand Data Demand Last Reset: 12/10/2001 17:39:180

Events Trend Help
 Setup Wave Exit

Metering Flags IO Demand Harmonic Setpoints Power

The Multilin SR745 Demand Data screen shows:

- Configuration
- Present Values
- Maximums

The **Clear Max Demand Data** button will clear all maximum values of the demand data.

Harmonic Tab

Multilin SR745 Harmonic & Misc. Data

| Harmonic Data | Winding 1 | Winding 2 |
|------------------------------|-----------|-----------|
| Phase A THD %: | 0.0 | 0.0 |
| Phase B THD %: | 0.0 | 0.0 |
| Phase C THD %: | 0.0 | 0.0 |
| THD Minimum Harmonic Number: | 0 | |
| THD Maximum Harmonic Number: | 19 th | |

Misc.

| | | | |
|---------------------------------|------|--|-------|
| System Voltage (kV): | 0.00 | Frequency (Hz): | 60.00 |
| Volts per Hertz: | 0.00 | Freq. Decay Rate (Hz/s): | 0.00 |
| Ambient Temp. (C) ⁰ | N/A | Hottest Spot Winding (C) ⁰ | 0 |
| Tap Changer Position: | 0 | Total Loss of Life (%): | 0.0 |

Reset Loss of Life

Events Trend Help
 Setup Wave Exit


Metering Flags IO Demand Harmonic Setpoints Power

The Multilin SR745 Harmonic & Misc Data screen shows:

- Harmonic Data
- Misc

The **Reset Loss of Life** button will clear loss-of-life data from the SR745's memory.

Setpoints Tab



Multilin SR745 System Setpoints

| | <u>W1</u> | <u>W2</u> |
|--------------------------------------|-----------|-----------|
| Nominal Phase to Phase Voltage (kV): | 0.1 | 0.1 |
| Rated Load (MVA): | 0.1 | 0.1 |
| Series 3 Phase Resistance (Ohms): | 10.700 | 2.100 |


| | | |
|--------------------------------|-----------|--------------------------------|
| Transformer Type: | Y/d30° | Analog Outputs |
| Phase Sequence: | ABC | |
| Nominal Frequency (Hz): | 60 | |
| Voltage Sensing: | Enabled | Analog Output 1: W1 aA Current |
| Nominal VT Secondary Volts: | 100.0 | Analog Output 2: W1 aB Current |
| VT Ratio: | 10 :1 | Analog Output 3: W1 aC Current |
| Winding with Tap Changer: | Winding 1 | Analog Output 4: W1 Loading |
| # of Tap Positions: | 33 | Analog Output 5: Voltage |
| Active Setpoints Group: | 2 | Analog Output 6: Frequency |
| | | Analog Output 7: Tap Position |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

Metering
Flags
IO
Demand
Harmonic
Setpoints
Power

The Multilin SR745 System Setpoints screen shows information such as Nominal Phase to Phase Voltage, Rated Load (MVA), Transformer Type and Analog Outputs.

Power Tab



Multilin SR745 Power & Energy

| Power | Winding 1 | Winding 2 |
|-----------------|-----------|-----------|
| Real (MW) | 0.00 | 0.00 |
| Reactive (MVar) | 0.00 | 0.00 |
| Apparent (MVA) | 0.00 | 0.00 |
| Power Factor | 0.00 | 0.00 |

| Energy | Winding 1 | Winding 2 |
|-------------------------|-----------|-----------|
| Source Watthours (MWh) | 0.00 | 0.00 |
| Load Watthours (MWh) | 0.00 | 0.00 |
| Source Varhours (Mvarh) | 0.00 | 0.00 |
| Load Varhours (Mvarh) | 0.00 | 0.00 |

| Aging Factor | Tap Changer |
|--------------------------|-------------------------|
| Aging Factor: 0.0 | |
| Limit Pickup: 2.0 | |
| Limit Function: Disabled | Fail Function: Disabled |
| Limit Target: Self-Reset | Fail Target: Self-Reset |
| Limit Delay: 10 min. | Fail Delay: 5.00 sec |
| Limit Block: Disabled | Fail Block: Disabled |

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | | | | |
|----------|-------|----|--------|----------|-----------|-------|
| Metering | Flags | IO | Demand | Harmonic | Setpoints | Power |
|----------|-------|----|--------|----------|-----------|-------|

The Multilin SR745 Power & Energy screen shows:

- Power
- Energy
- Aging Factor
- Tap Changer

SR750/760 Feeder Management Relay

The SR750 and SR760 are very similar devices and share a common Tabular Data Screen wizard. During wizard configuration, select which type of device the wizard represents (SR750 or SR760) by selecting the corresponding radio button in the Tabular Data Screen Configuration dialog box.

Under the Info area, the SR750/760's function buttons are all enabled.

The SR750/760 Tabular Data Screen wizard has eight command buttons:

| Tab | Button | Function |
|----------|----------------------|---|
| Metering | Clear Energy | Resets the energy counters to zero. |
| | Reset Device | Issues a RESET command to the SR750/760. |
| Demand | Reset Max Demand | Clears the Max Demand data from the SR750/760's memory. |
| Trip | Reset Trip Counters | Resets the SR750/760's trip counters to zero. |
| I/O | Open Breaker | Issues Open Breaker command. |
| | Close Breaker | Issues Close Breaker command. |
| | Reset Count | Resets the SR750/760's reclosure counter to zero. |
| Fault | Reset Arcing Current | Resets the arcing current data. |

Table 31. SR750/760 Tabular data screen commands.

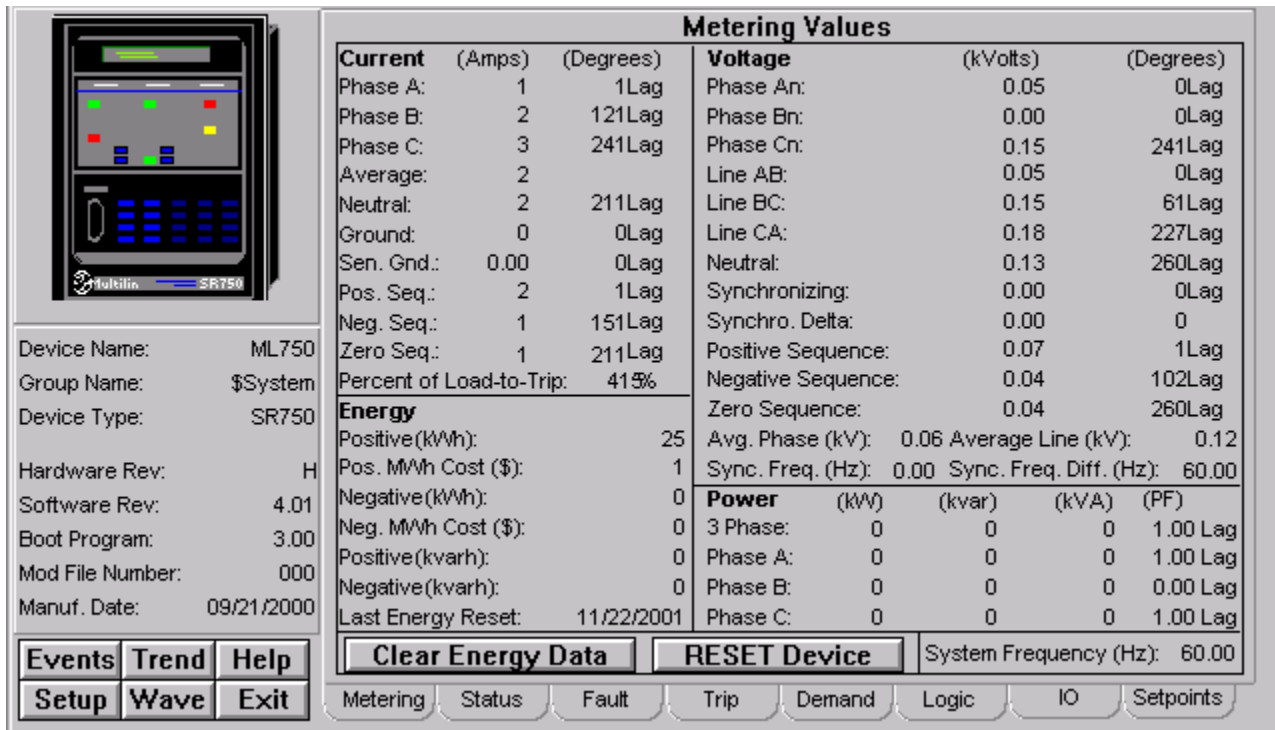
The SR750/760 Tabular screen offers a tab labeled LOGIC. This tab allows you to access the SR750/760's 20 logic inputs. You can use these logic inputs to operate a variety of logic functions for circuit breaker control, external trips, blocking of protection elements, etc., and use the PCMS Wizard to monitor the status of the logic inputs. For more information, refer to the SR750 or SR760 user manual, in the section titled *Setpoints - S3 Logic Inputs*.

The SR750/SR760 Tabular Data Screen Wizard supports the Lockout/Tagout wizard. Please refer to the section titled **Using and Configuring PMCS Wizards: Lockout/Tagout Wizard** for details.

If a Danger or Ground Lockout/Tagout symbol is installed on this wizard, attempts to issue a Breaker Open or Breaker Close command will generate an error message.

See the SR750/760 Feeder Management Relay Instruction Manual (Chapter 5, *Actual Values*) for information on the display of data values under different device configurations. Values not configured for use are displayed as N/A.

Metering Tab



The screenshot displays the Metering Tab interface for a device. On the left, there is a small image of the device and a list of configuration details. The main area is titled "Metering Values" and contains several data sections: Current, Voltage, Energy, and Power. At the bottom, there are navigation buttons for "Clear Energy Data" and "RESET Device", along with a row of status indicators (Metering, Status, Fault, Trip, Demand, Logic, IO, Setpoints) and a "System Frequency (Hz): 60.00" display.

| Metering Values | | | | | | | |
|--------------------------|------------|--------|------------------------|----------------|-------------------------------|-------|----------|
| Current | | (Amps) | (Degrees) | Voltage | | | |
| Phase A: | 1 | 1Lag | Phase An: | 0.05 | 0Lag | | |
| Phase B: | 2 | 121Lag | Phase Bn: | 0.00 | 0Lag | | |
| Phase C: | 3 | 241Lag | Phase Cn: | 0.15 | 241Lag | | |
| Average: | 2 | | Line AB: | 0.05 | 0Lag | | |
| Neutral: | 2 | 211Lag | Line BC: | 0.15 | 61Lag | | |
| Ground: | 0 | 0Lag | Line CA: | 0.18 | 227Lag | | |
| Sen. Gnd.: | 0.00 | 0Lag | Neutral: | 0.13 | 260Lag | | |
| Pos. Seq.: | 2 | 1Lag | Synchronizing: | 0.00 | 0Lag | | |
| Neg. Seq.: | 1 | 151Lag | Synchro. Delta: | 0.00 | 0 | | |
| Zero Seq.: | 1 | 211Lag | Positive Sequence: | 0.07 | 1Lag | | |
| Percent of Load-to-Trip: | 41% | | Negative Sequence: | 0.04 | 102Lag | | |
| Energy | | | Zero Sequence: | 0.04 | 260Lag | | |
| Positive(kWh): | 25 | | Avg. Phase (kV): | 0.06 | Average Line (kV): 0.12 | | |
| Pos. MWh Cost (\$): | 1 | | Sync. Freq. (Hz): | 0.00 | Sync. Freq. Diff. (Hz): 60.00 | | |
| Negative(kWh): | 0 | | Power | | | | |
| Neg. MWh Cost (\$): | 0 | | (kW) | (kvar) | (kVA) | (PF) | |
| Positive(kvarh): | 0 | | 3 Phase: | 0 | 0 | 0 | 1.00 Lag |
| Negative(kvarh): | 0 | | Phase A: | 0 | 0 | 0 | 1.00 Lag |
| Last Energy Reset: | 11/22/2001 | | Phase B: | 0 | 0 | 0 | 0.00 Lag |
| | | | Phase C: | 0 | 0 | 0 | 1.00 Lag |
| | | | System Frequency (Hz): | | | 60.00 | |

The SR750/760 Metering screen shows:

- Current
- Energy
- Voltage
- Power

The **Clear Energy Data** button will clear all values of energy data. The **RESET Device** button will issue a RESET command to the device.

Status Tab

Device Information:

- Device Name: ML750
- Group Name: \$System
- Device Type: SR750
- Hardware Rev: H
- Software Rev: 4.01
- Boot Program: 3.00
- Mod File Number: 000
- Manuf. Date: 09/21/2000

Active Conditions:

- General: Transfer Not Ready
- Alarm: Phase Time Overcurrent 1
- Alarm: Phase Inst Overcurrent 1
- Alarm: Phase Inst Overcurrent 2
- Trip: Bus Undervoltage 2
- ?: 0x9: Unknown: 0x9000
- Alarm: Phase Current Level
- Alarm: Neutral Current Level
- Alarm: Out Of Synchronization
- Alarm: Breaker Operation
- Alarm: Trip Coil Failure
- Alarm: Neg. Seq. Overvoltage
- Alarm: Phase Time Overcurrent 2
- Alarm: Neg. Seq. is Reverse
- Alarm: Neutral Displacement

The SR750/760 Status screen shows Active Conditions.

Fault Tab

Fault & Maintenance Data

Fault Locations

| # | Date | Time | Distance (km) | Z-pos (Ω) | Type of Fault |
|---|------------|--------------|---------------|-----------|---------------|
| 0 | 12/14/2001 | 10:23:24.717 | 184.81 | 18.48 | B to Gnd |
| 1 | 12/14/2001 | 10:22:45.134 | -0.85 | 0.08 | C to Gnd |
| 2 | 12/14/2001 | 10:22:33.752 | 3.29 | 0.33 | A to Gnd |
| 3 | 12/13/2001 | 11:48:47.740 | -67.82 | 6.78 | B to Gnd |
| 4 | 12/13/2001 | 08:52:40.563 | 0.01 | 0.00 | C to Gnd |
| 5 | 12/12/2001 | 18:07:59.035 | 0.01 | 0.00 | A to B to C |
| 6 | 12/11/2001 | 16:48:57.438 | -0.77 | 0.08 | A to B to C |
| 7 | 12/11/2001 | 16:46:53.691 | -0.93 | 0.09 | A to B to C |
| 8 | 12/11/2001 | 16:36:37.888 | -19.96 | 2.00 | A to B to C |
| 9 | 12/10/2001 | 19:51:32.441 | 102.99 | 10.30 | A to B |

Total Arcing Current (kA² cyc)

- Phase A Total: 0
- Phase B Total: 0
- Phase C Total: 0

Last Arcing Current Reset: 11/22/2001

Reset Arcing Current

The SR750/760 Fault & Maintenance Data screen shows:

- Fault Locations
- Total Arcing Current

The **Reset Arcing Current** button will reset all values of the arcing current.

Trip Tab

The screenshot displays the 'Trip Data' screen for an SR750 device. On the left is a small image of the physical device. The main area is divided into two sections: 'Last Trip Data' and 'Trip Counters'. A 'Reset Trip Counters' button is located at the bottom of the Trip Counters section. At the bottom of the screen are navigation buttons for 'Events', 'Trend', 'Help', 'Setup', 'Wave', 'Exit', 'Metering', 'Status', 'Fault', 'Trip', 'Demand', 'Logic', 'IO', and 'Setpoints'.

| Device Information | |
|--------------------|------------|
| Device Name: | ML750 |
| Group Name: | \$System |
| Device Type: | SR750 |
| Hardware Rev: | H |
| Software Rev: | 4.01 |
| Boot Program: | 3.00 |
| Mod File Number: | 000 |
| Manuf. Date: | 09/21/2000 |

| Last Trip Data | | | |
|--------------------------------|--------------|----------------------------|-------|
| Trip Cause: Bus Undervoltage 2 | | | |
| Trip Type: Trip | | | |
| Phases at Fault: | A | B | C |
| Trip Date: | 12/12/2001 | | |
| Trip Time: | 18:07:51.349 | | |
| kVolts AN: | 0.05 | Amps A: | 0 |
| kVolts BN: | 0.05 | Amps B: | 0 |
| kVolts CN: | 0.05 | Amps C: | 0 |
| kVolts Neutral: | 0.15 | Neutral Current (A): | 0 |
| ANALOG INPUT | 0 uA | Ground Current (A): | 0 |
| | | Sensitive Gnd Current (A): | 0.00 |
| | | System Frequency (Hz): | 60.00 |


| Trip Counters | |
|--------------------------|------------|
| Breaker Trips: | 0 |
| Neutral O/C Trips: | 0 |
| Ground O/C Trips: | 0 |
| Neg. Seq. O/C Trips: | 0 |
| Sensitive Gnd O/C Trips: | 0 |
| Single Phase Trips: | 0 |
| Two Phase Trips: | 0 |
| Three Phase Trips: | 0 |
| Trip Ctrs Last Reset: | 11/22/2001 |

The SR750/760 Trip Data screen shows:

- Last Trip Data
- Trip Counters

The **Reset Trip Counters** button will reset all values of the trip counters.

Demand Tab



| Demand | | | | | | |
|-----------------|----------|----------------|---------------|------------------|-------------|--|
| Configuration | Function | Meas. Type | Relays | Pickup Threshold | Time (min.) | |
| Current: | Alarm | Thermal Exp. | 3, 4, 5, 6, 7 | 1000 Amps | 15 | |
| Real Power: | Alarm | Block Interval | 3, 4, 5, 6, 7 | 100 kW | 20 | |
| Reactive Power: | Alarm | Block Interval | None | 100 kvar | 20 | |
| Apparent Power: | Control | Block Interval | 3, 4, 5, 6, 7 | 100 kVA | 20 | |

| Values | Present | Max | Date | Time |
|----------------------|---------|-----|------------|--------------|
| Phase A (Amps): | 0 | 1 | 12/10/2001 | 19:47:38.143 |
| Phase B (Amps): | 1 | 1 | 12/10/2001 | 19:49:40.473 |
| Phase C (Amps): | 2 | 2 | 12/10/2001 | 19:58:02.038 |
| Real Power (kW): | 0 | 0 | 11/22/2001 | 13:15:54.021 |
| React. Power (kvar): | 0 | 0 | 11/22/2001 | 13:15:54.021 |
| Appar. Power (kVA): | 0 | 0 | 11/22/2001 | 13:15:54.021 |

Reset Max Demand
Demand Last Reset: 11/22/2001

Events

Trend

Help

Setup

Wave

Exit

Metering
Status
Fault
Trip
Demand
Logic
IO
Setpoints

The SR750/760 Demand screen shows details of:

- Configuration
- Values

The **Reset Max Demand** button will reset all maximum values of demand.

Logic Tab

| | |
|------------------|------------|
| Device Name: | ML750 |
| Group Name: | \$System |
| Device Type: | SR750 |
| Hardware Rev: | H |
| Software Rev: | 4.01 |
| Boot Program: | 3.00 |
| Mod File Number: | 000 |
| Manuf. Date: | 09/21/2000 |

| Contact Inputs | Virtual Inputs | Logic Input States |
|-------------------------------------|---|---|
| <input type="checkbox"/> Contact 1 | <input type="checkbox"/> Virtual Input 1 | <input type="checkbox"/> Logic Input 1 |
| <input type="checkbox"/> Contact 2 | <input type="checkbox"/> Virtual Input 2 | <input type="checkbox"/> Logic Input 2 |
| <input type="checkbox"/> Contact 3 | <input type="checkbox"/> Virtual Input 3 | <input type="checkbox"/> Logic Input 3 |
| <input type="checkbox"/> Contact 4 | <input type="checkbox"/> Virtual Input 4 | <input type="checkbox"/> Logic Input 4 |
| <input type="checkbox"/> Contact 5 | <input type="checkbox"/> Virtual Input 5 | <input type="checkbox"/> Logic Input 5 |
| <input type="checkbox"/> Contact 6 | <input type="checkbox"/> Virtual Input 6 | <input type="checkbox"/> Logic Input 6 |
| <input type="checkbox"/> Contact 7 | <input type="checkbox"/> Virtual Input 7 | <input type="checkbox"/> Logic Input 7 |
| <input type="checkbox"/> Contact 8 | <input type="checkbox"/> Virtual Input 8 | <input type="checkbox"/> Logic Input 8 |
| <input type="checkbox"/> Contact 9 | <input type="checkbox"/> Virtual Input 9 | <input type="checkbox"/> Logic Input 9 |
| <input type="checkbox"/> Contact 10 | <input type="checkbox"/> Virtual Input 10 | <input type="checkbox"/> Logic Input 10 |
| <input type="checkbox"/> Contact 11 | <input type="checkbox"/> Virtual Input 11 | <input type="checkbox"/> Logic Input 11 |
| <input type="checkbox"/> Contact 12 | <input type="checkbox"/> Virtual Input 12 | <input type="checkbox"/> Logic Input 12 |
| <input type="checkbox"/> Contact 13 | <input type="checkbox"/> Virtual Input 13 | <input type="checkbox"/> Logic Input 13 |
| <input type="checkbox"/> Contact 14 | <input type="checkbox"/> Virtual Input 14 | <input type="checkbox"/> Logic Input 14 |
| | <input type="checkbox"/> Virtual Input 15 | <input type="checkbox"/> Logic Input 15 |
| | <input type="checkbox"/> Virtual Input 16 | <input type="checkbox"/> Logic Input 16 |
| | <input type="checkbox"/> Virtual Input 17 | <input type="checkbox"/> Logic Input 17 |
| | <input type="checkbox"/> Virtual Input 18 | <input type="checkbox"/> Logic Input 18 |
| | <input type="checkbox"/> Virtual Input 19 | <input type="checkbox"/> Logic Input 19 |
| | <input type="checkbox"/> Virtual Input 20 | <input type="checkbox"/> Logic Input 20 |

Legend:
 Open / Not Asserted
 Closed / Asserted

Metering Status Fault Trip Demand Logic IO Setpoints

The SR750/760 Logic screen shows:

- Contact Inputs
- Virtual Inputs
- Logic Input States

IO Tab

| | |
|------------------|------------|
| Device Name: | ML750 |
| Group Name: | \$System |
| Device Type: | SR750 |
| Hardware Rev: | H |
| Software Rev: | 4.01 |
| Boot Program: | 3.00 |
| Mod File Number: | 000 |
| Manuf. Date: | 09/21/2000 |

| Output Relays | | | |
|-----------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> R1 TRIP | <input type="checkbox"/> R3 AUXILIARY | <input type="checkbox"/> R5 AUXILIARY | <input type="checkbox"/> R7 AUXILIARY |
| <input type="checkbox"/> R2 CLOSE | <input type="checkbox"/> R4 AUXILIARY | <input type="checkbox"/> R6 AUXILIARY | <input type="checkbox"/> R8 SERVICE |

| Analog Input | uA | Hardware Input Coils |
|------------------------------|-----|--------------------------|
| ANALOG INPUT | 0 | Trip Coil Circuit: Open |
| A.I. Change Rate per minute: | 0.0 | Close Coil Circuit: Open |
| A.I. Change Rate per hour: | 0.0 | |

Open Breaker

Close Breaker

Breaker Operation

Breaker Open

Breaker Closed

Local Mode

Metering Status Fault Trip Demand Logic IO Setpoints

The SR750/760 Inputs & Outputs screen shows:

- Output Relays
- Analog Input
- Hardware Input Coils
- Breaker Operation

The **Open Breaker** button will issue an Open Breaker command. The **Close Breaker** button will issue a Close Breaker command.

Setpoints Tab

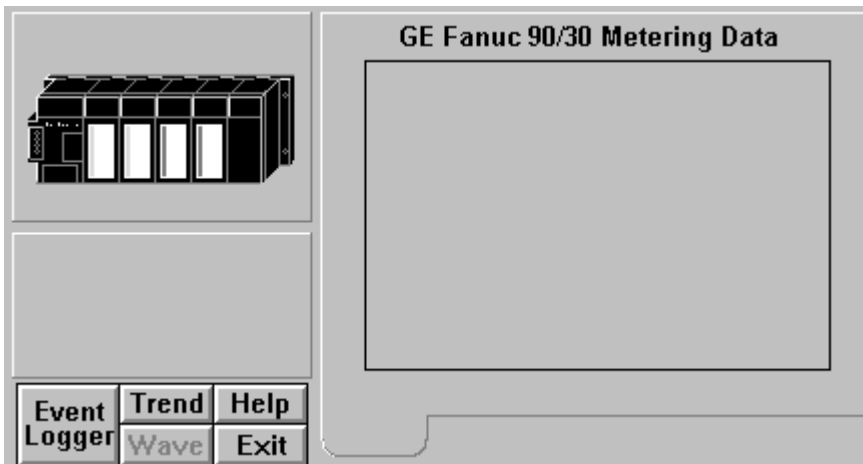
| System Setup | | Analog Output Configuration | |
|-----------------------------------|----------|------------------------------|--|
| Phase CT Primary (Amps): | 1 | A/O 1: Phase A Current | |
| Ground CT Primary (Amps): | 1 | A/O 2: Phase B Current | |
| Sensitive Gnd. CT Primary (Amps): | 1 | A/O 3: Phase C Current | |
| VT Connection Type: | Wye | A/O 4: Average Phase Current | |
| Nominal VT Secondary Volts: | 120.0 | A/O 5: % of Load to Trip | |
| Voltage Transformer Ratio: | 1.0:1 | A/O 6: Neutral Current | |
| Nominal Frequency (Hz): | 60 | A/O 7: Phase A-N Voltage | |
| Cost of Energy (cents/kWh): | 5.0 | A/O 8: Phase A Current | |
| Line VT Connection: | Vbn | | |
| Line Nominal VT Secondary Volts: | 120.0 | | |
| Line VT Ratio: | 1.0:1 | | |
| Phase Sequence: | ABC | | |
| Active Setpoints Group: | 1 | | |

Navigation buttons: Metering, Status, Fault, Trip, Demand, Logic, IO, Setpoints

The SR750/760 System Setpoints screen shows:

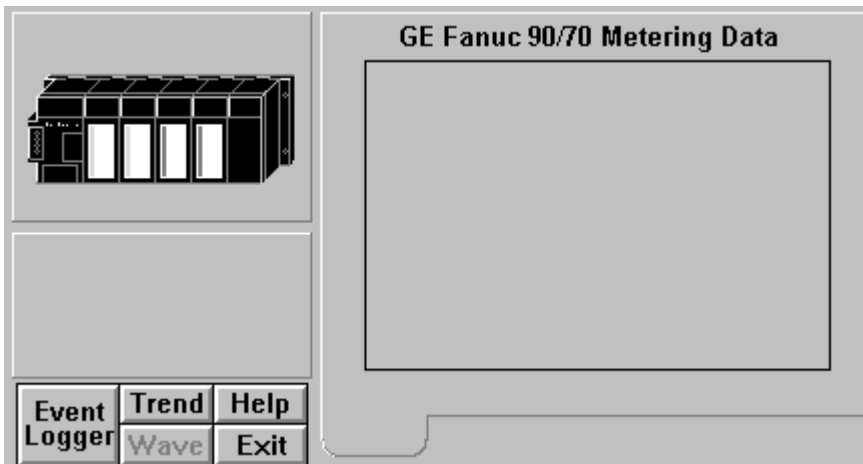
- System Setup
- Analog Output Configuration

Fanuc 90/30



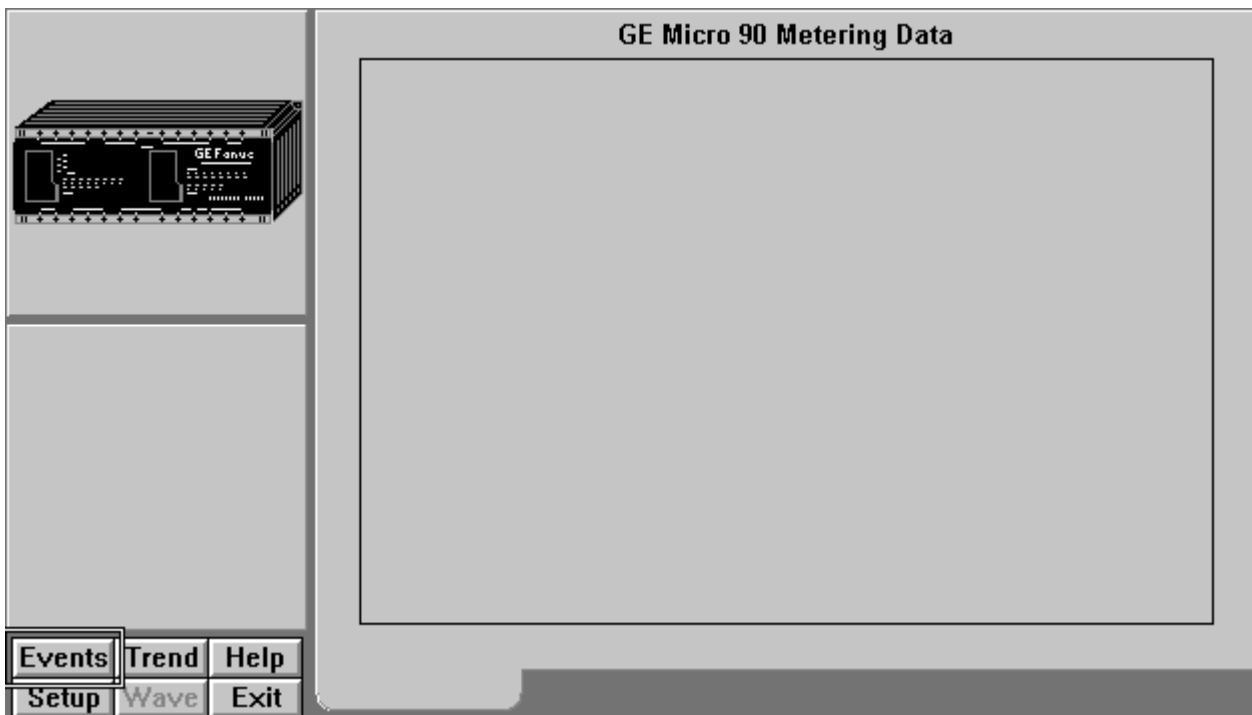
The Fanuc 90/30 Tabular Data Screen wizard is blank. This allows any desired data to be placed on the screen.

Fanuc 90/70



The Fanuc 90/70 Tabular Data Screen wizard is blank. This allows any desired data to be placed on the screen.

Fanuc Micro 90



The GE Fanuc Micro 90 Tabular Data Screen is blank. This allows for any desired data to be placed on the screen.

MX200

The MX 200 device is an Automatic Transfer Switch. The Tabular Data Screen wizard has several special features. You can use the Setup screen to change the meter configuration. Values displayed in white boxes are changeable. Clicking on the displayed value changes some, while clicking on the box changes others. The Download and Refresh buttons on the setup screen upload and download all of the setpoints from the device.


To change setpoints at the device, first press the refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired then press the download button to send all setpoints to the unit. In the following pages, each of the MX 200 Meter's Tabular Data Screen Wizards' tabs will be displayed and detailed.

Metering Tab

InTouch - WindowViewer - D:\PROGRAM FILES\FACTORYSUITE\INTOUCH\NEWAPP

File Logic Special

MX



Device Name: MX
Group Name: \$System
Serial #: 45573

Metering Tab

| Voltage (Volts) | Normal | Emergency | Communications | |
|---------------------------------|--------|---------------|--------------------------|---------|
| Ph1 - Ph2 | 209 | 0 | MX200 - Mod Card- | Comm OK |
| Ph2 - Ph3 | 206 | 0 | Communication Error | |
| Ph3 - Ph1 | 208 | 0 | Status | |
| Frequency (Hz) | 59.9 | 0.0 | Q3 Input | |
| No. Of Phases on Source | Three | Three | Auxiliary 2 Input | |
| Position Status | | | Auxiliary 1 Input | |
| Phase Rotation | | | Automatic Transfer Relay | |
| Timer Function | | Not Invoked | SN Limit Switch | |
| Timer Active | | Timer Stopped | SE Limit Switch | |
| Timer Countdown Value | | 0 | SNO Limit Switch | |
| Time On Emergency | | 0.3 | SEO Limit Switch | |
| No. Of Transfers | | 3 | S5 Selector | |
| Nominal FS Vol. Value | | 208 | S12 Selector | |
| ATS Mode | | Not in Auto | Load Shed Input | |
| Fault Present | | YES | Q7 Input | |
| Exerciser Enabled | | Enabled | | |
| Load Test Running | | Running | | |
| Load, No Load, Fast Load Status | | Running | | |

Legend

| | | | | | |
|----------------------|--------|------------|----------------------|----|-----|
| Source: | Avail. | Not Avail. | Ph. Rotation: | ON | OFF |
| Posi. Status: | Normal | Emergency | Status: | ON | OFF |

Events Trend Help
Setup Wave Exit

Metering Setup

The Metering tab displays the following metered values from the MX 200 device.

Voltages

Normal and Emergency Voltage values for all the phases.

Timer Functions

- Timer Active
- Timer Countdown Value
- Time on Emergency
- No. of Transfers
- Nominal FS Vol. Value
- ATS Mode
- Fault Present
- Exerciser Enabled
- Load Test Running
- Load, No Load, Fast Load Status

Communications

- MX-200 – Modcard – Communication Status
Displays communication status, for example, Comm OK

Status

- Q3 Input
- Auxiliary 2 Input
- Auxiliary 1 Input
- Automatic Transfer Relay
- SN Limit Switch
- SE Limit Switch
- SNO Limit Switch
- SEO Limit Switch
- S5 Selector
- S12 Selector
- Load Shed Input
- Q7 Input

The status is either ON or OFF. If the relay is ON, the status is displayed in green and if relay is OFF, it is displayed in red.

Others

The tab shows frequency and number of phases on source:

- Position Status
- Phase Rotation

The status for Source is displayed as Available (displayed in green) or Not Available (displayed in red). The Position Status is displayed as Normal (displayed in green) or Emergency (displayed in red). The Phase Rotation is displayed as ON (displayed in green) or OFF (displayed in red).

Setup Tab

MX

Device Name: MX
Group Name: \$System
Serial #: 45573

Setup Tab

| Control | Status | Option | Value | Voltage (%) |
|----------------|-------------------------------------|---------------------------|----------------|-----------------------|
| YE | <input checked="" type="checkbox"/> | T3 Timer Bypass | Not Configured | Normal Pickup 215 |
| YN | <input checked="" type="checkbox"/> | T3 Timer | Configured | Normal Dropout 90 |
| No Load Test | <input type="checkbox"/> | W3 Timer Bypass | Not Configured | Emer. Pickup 100 |
| Load Test | <input checked="" type="checkbox"/> | W3 Timer | Configured | Emer. Dropout 123 |
| Fast Load Test | <input type="checkbox"/> | T Timer Bypass | Configured | Frequency (%) |
| S5 | <input type="checkbox"/> | W Timer Bypass | Configured | Normal Pickup 100 |
| S12 | <input type="checkbox"/> | In Ph. Mon./Closed Trans. | Configured | Emer. Pickup 100 |
| LS | <input type="checkbox"/> | ATS Type | Standard ATS | Time (Seconds) |
| Q7 | <input checked="" type="checkbox"/> | S12 Auto/Manual | Not Configured | P Time 10 |
| Q3 | <input type="checkbox"/> | S5 Auto/Manual Bypass | Not Configured | W Time 300 |
| AUX2 | <input type="checkbox"/> | Phase Sequence Check | Not Configured | W3 Time 0 |
| AUX1 | <input checked="" type="checkbox"/> | Eng Over Frequency | Configured | DW Time 600 |
| | | Eng Over Voltage | Configured | T Time 3600 |
| | | Normal Over Frequency | Configured | T3 Time 60 |
| | | Normal Under Frequency | Configured | DT Time 600 |
| | | Normal Over Voltage | Configured | U Time 3600 |

Legend ON OFF

Down Load Refresh

Metering Setup

Events Trend Help
Setup Wave Exit

The Setup tab displays the following demand values from MX 200 device.

Control

- YE
- YN
- No Load Test
- Load Test
- Fast Load Test
- S5
- S12
- LS
- Q7
- Q3
- Aux2
- Aux1

The legend is ON and OFF. If ON, it is indicated by amber and if OFF by gray color.

Options

- T3 Timer Bypass
- T3 Timer
- W3 Timer Bypass
- W3 Timer
- T Timer Bypass
- W Timer Bypass
- In Ph. Mon/Closed Trans
- ATS Type
- S12 Auto/Manual
- S5 Auto/Manual Bypass
- Phase Sequence Check
- Emg Over Frequency
- Emg Over Voltage
- Normal Over Frequency
- Normal Under Frequency
- Normal Over Voltage

The value against each option is displayed as either as Confirmed or Not Confirmed.

Voltage (Volts)

- Normal Pickup
- Normal Dropout
- Emer Pickup
- Emer Dropout

The user can enter values against each parameter.

Frequency (Hz)

- Normal Pickup
- Emer Pickup

The user can enter values against each parameter.

Time (Seconds)

- P Time
- W Time
- W3 Time
- DW Time
- T Time
- T3 Time
- DT Time
- U Time

The Setup tab also provides push buttons for performing the following commands:

Download – Executes a script to check for values that have changed and downloads those values to the device

Refresh – Executes a script to upload all of the meter values for the settings on the screen.

Note: Be sure to click the Refresh button prior to changing or downloading any settings to the MX 200, as the latest settings may not be displayed.

MX250/MX150

The MX 250/MX150 devices are Automatic Transfer Switch. The Tabular Data Screen wizard has several special features. You can use the Setup screen to change the meter configuration. Values displayed in white boxes are changeable. Clicking on the displayed value changes some, while clicking on the box changes others. The Download and Refresh buttons on the setup screen upload and download all of the setpoints from the device.

To change setpoints at the device, first press the refresh button to upload current setpoint values from the device (otherwise the defaults are shown and used for download). Modify setpoints as desired then press the download button to send all setpoints to the unit. In the following pages, each of the MX 250/MX150 Meter's Tabular Data Screen Wizards' tabs will be displayed and detailed.

Metering Tab

The Metering tab displays the following metered values from the MX 250 device.

The screenshot shows the 'Metering Tab' interface for an MX250 device. It includes a small thumbnail of the device screen, device identification fields (Device Name: avmx250, Group Name: \$System, Serial #: 1400000), and a main data table. The table is divided into sections: Voltage (Volts), Frequency (Hz), No. Of Phases on Source, Position Status, Phase Rotation, Timer Function, and Communications. A legend at the bottom explains the color coding for Source and Position Status. Navigation buttons (Events, Trend, Help, Setup, Wave, Exit) and tabs (Metering, Setup) are also visible.

| Metering Tab | | | |
|---------------------------------------|---|-------------------------------------|--|
| Voltage (Volts) | Normal | Emergency | Communications |
| Ph1 - Ph2 | 115 | 0 | MX150 - Mod Card- Communication Error |
| Ph2 - Ph3 | 0 | 0 | |
| Ph3 - Ph1 | 0 | 0 | |
| Frequency (Hz) | 60.0 | 0.0 | Status |
| No. Of Phases on Source | Single [Green] | Single [Red] | Q3 Input [Green] |
| Position Status | [Red] | [Red] | TMS Control [Green] |
| Phase Rotation | CW | CW | SN Limit Switch [Green] |
| Timer Function | Not Invoked | | SE Limit Switch [Green] |
| Timer Active | Timer Stopped | | SNO Limit Switch [Green] |
| Timer Countdown Value(P, DW, DT or U) | 0 | | SEO Limit Switch [Green] |
| T&W Timer Countdown Value | 0 | | S5 Selector [Red] |
| T3W3 Timer Countdown Value | 0 | | S12 Selector [Red] |
| No. Of Transfers | 9 | | Load Shed Input [Green] |
| Nominal FS Vol. Value | 120 | | Q7 Input [Green] |
| ATS Mode | Not in Auto | | Load Test Running Stopped |
| Fault Present | NO | | Load Status Stopped |
| Exerciser Enabled | Enabled | | |
| Legend | Source: Avail. [Green] Not Avail. [Red] | Status: ON [Green] OFF [Red] | |
| | Posi. Status: Normal [Green] Emergency [Red] | | |

Voltages

Normal and Emergency Voltage values for all the phases.

Timer Functions

- Timer Active
- Timer Countdown Value of P Timer, DW Timer, DT Timer and U Timer
- No. of Transfers

- Nominal FS Vol. Value
- ATS Mode
- Fault Present
- Exerciser Enabled
- Load Test Running
- Load, No Load, Fast Load Status

Communications

- MX-250/MX150 – Modcard – Communication Status
- Displays communication status, for example, Comm OK

Status

- Q3 Input
- TMS Control
- Automatic Transfer Relay
- SN Limit Switch
- SE Limit Switch
- SNO Limit Switch
- SEO Limit Switch
- S5 Selector
- S12 Selector
- Load Shed Input
- Q7 Input

The status is either ON or OFF. If the relay is ON, the status is displayed in green and if relay is OFF, it is displayed in red.

Others

The tab shows frequency and number of phases on source:

- Position Status
- Phase Rotation

The status for Source is displayed as Available (displayed in green) or Not Available (displayed in red). The Position Status is displayed as Normal (displayed in green) or Emergency (displayed in red). The Phase Rotation is displayed as ON (displayed in green) or OFF (displayed in red).

Setup Tab

Device Name: avmx250
Group Name: \$System
Serial #: 1400000

| Control | Status | Option | Value | Voltage (Volts) |
|----------------|-------------------------------------|---------------------------|----------------|-----------------------|
| YE | <input type="checkbox"/> | In Ph. Mon./Closed Trans. | Configured | Normal Pickup 86 |
| YN | <input type="checkbox"/> | ATS Type | Standard ATS | Normal Dropout 80 |
| No Load Test | <input type="checkbox"/> | S12 Auto/Manual | Not Configured | Emer. Pickup 90 |
| Load Test | <input type="checkbox"/> | S5 Auto/Manual Bypass | Configured | Emer. Dropout 87 |
| Fast Load Test | <input type="checkbox"/> | Phase Sequence Check | Not Configured | Frequency (Hz) |
| S5 | <input type="checkbox"/> | Eng Over Frequency | Not Configured | Normal Pickup 0 |
| S12 | <input type="checkbox"/> | Eng Over Voltage | Not Configured | Emer. Pickup 97 |
| LS | <input type="checkbox"/> | Normal Over Frequency | Not Configured | Time (Seconds) |
| Q7 | <input type="checkbox"/> | Normal Under Frequency | Not Configured | P Time 2 |
| Q3 | <input checked="" type="checkbox"/> | Normal Over Voltage | Not Configured | W Time 300 |
| TMS Control | <input type="checkbox"/> | | | W3 /T3Time 2 |
| | | | | DW Time 0 |
| | | | | T Time 3600 |
| | | | | DT Time 0 |
| | | | | U Time 1800 |

Legend ON OFF

Buttons: Events, Trend, Help, Setup, Wave, Exit, Metering, Setup, Down Load, Refresh

The Setup tab displays the following demand values from MX 250 device.

Control

- YE
- YN
- No Load Test
- Load Test
- Fast Load Test
- S5
- S12
- LS
- Q7
- Q3
- Aux2
- Aux1

The legend is ON and OFF. If ON, it is indicated by amber and if OFF by gray color.

Options

- Closed Transition
- In Phase Monitor
- ATS Type

- S12 Auto/Manual
- S5 Auto/Manual Bypass
- Phase Sequence Check
- Emg Over Frequency
- Emg Over Voltage
- Normal Over Frequency
- Normal Under Frequency
- Normal Over Voltage

The value against each option is displayed as either as Configured or Not Configured.

Voltage (Volts)

- Normal Pickup
- Normal Dropout
- Emer Pickup
- Emer Dropout

The user can enter values against each parameter.

Frequency (Hz)

- Normal Pickup
- Emer Pickup

The user can enter values against each parameter.

Time (Seconds)

- P Time
- W Time
- W3 / T3 Time
- DW Time
- T Time
- DT Time
- U Time

The Setup tab also provides push buttons for performing the following commands:

Download – Executes a script to check for values that have changed and downloads those values to the device

Refresh – Executes a script to upload all of the meter values for the settings on the screen.

Note: Be sure to click the Refresh button prior to changing or downloading any settings to the MX 250, as the latest

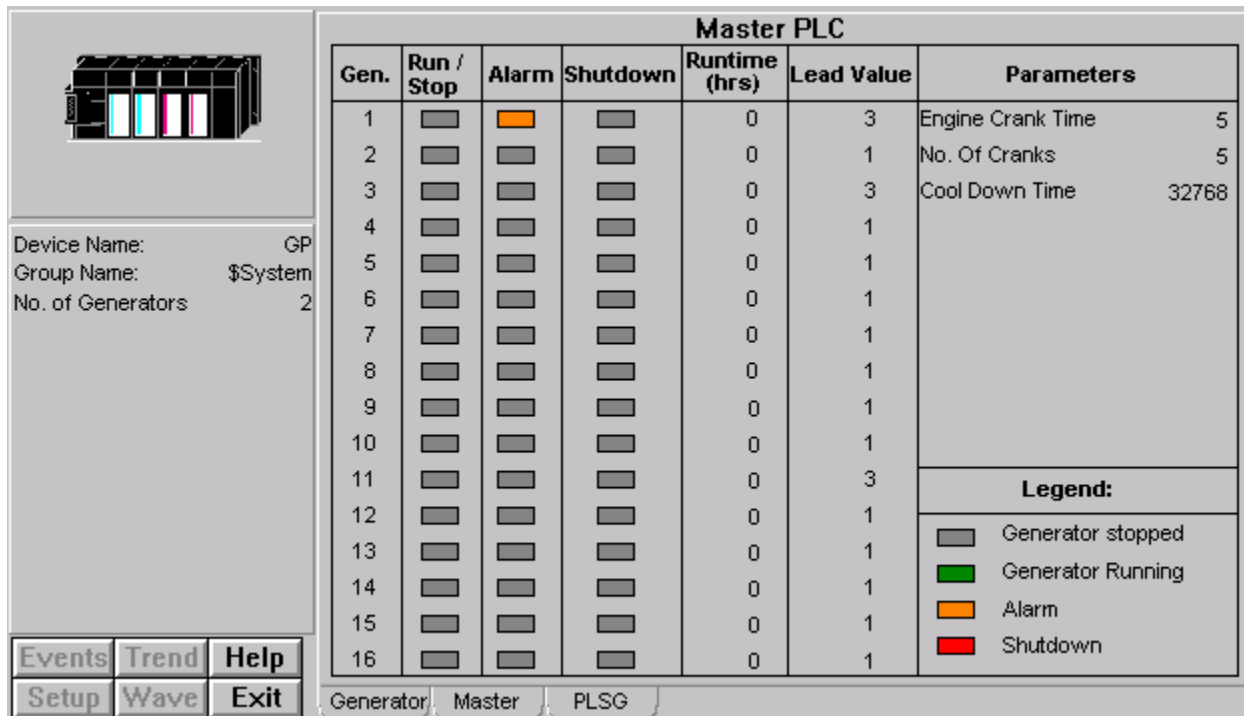
settings may not be displayed.

GEN PLC

The Generator Programmable Logic Controller (PLC) is a specially programmed PLC with specific number of I/O modules, controlled by a Master PLC program up to maximum number of 16 Generators.

GEN PLC Tabular wizard mainly have 3 tabs as described below.

Master Tab



The screenshot displays the 'Master PLC' interface. On the left, there is a device icon and configuration details: Device Name: GP, Group Name: \$System, and No. of Generators: 2. Below this are buttons for 'Events', 'Trend', 'Help', 'Setup', 'Wave', and 'Exit'. The main area is a table with columns for Gen., Run / Stop, Alarm, Shutdown, Runtime (hrs), Lead Value, and Parameters. A legend at the bottom right explains the status indicators: gray for 'Generator stopped', green for 'Generator Running', orange for 'Alarm', and red for 'Shutdown'. The table shows 16 generators, with generator 1 having an alarm and generator 3 having a lead value of 3. Parameters for generator 3 include Engine Crank Time (5), No. of Cranks (5), and Cool Down Time (32768).

| Gen. | Run / Stop | Alarm | Shutdown | Runtime (hrs) | Lead Value | Parameters |
|------|--------------------------|-------------------------------------|--------------------------|---------------|------------|----------------------|
| 1 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 0 | 3 | Engine Crank Time 5 |
| 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | No. Of Cranks 5 |
| 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 3 | Cool Down Time 32768 |
| 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 6 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 7 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 8 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 9 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 10 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 11 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 3 | |
| 12 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 13 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 14 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 15 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |
| 16 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0 | 1 | |

Legend:

- Generator stopped
- Generator Running
- Alarm
- Shutdown

The Master PLC lists 16 generators displaying status for each generator separately. The status types are:

- Run/Stop
- Alarm
- Shutdown
- Runtime (in hours)
- Lead Value

If a particular generator is stopped, it is displayed in gray color; if a generator is running, in green; if there is an alarm, in amber; and shutdown of a generator in red.

The parameters of generators are:

- Engine Crank Time (In seconds)
- No. of Cranks
- Cool Down Time (In seconds)

Generator Tab

Generator 2 Parameters

| Status | Alarm | Shutdown |
|--|---|--|
| Gen. Brkr. Aux. Contact <input type="checkbox"/> | Undervoltage <input type="checkbox"/> | Overcrank <input type="checkbox"/> |
| Breaker Close Ready <input type="checkbox"/> | Hi Water Temp. Warn. <input type="checkbox"/> | Overspeed <input type="checkbox"/> |
| Not in Auto <input type="checkbox"/> | Battery Charger Failure <input type="checkbox"/> | High Water Temp. <input type="checkbox"/> |
| CPU Running <input type="checkbox"/> | Low FUEL Day Tank <input type="checkbox"/> | Oil Pressure <input type="checkbox"/> |
| Engine in Cooldown <input type="checkbox"/> | Oil Pressure Warning <input type="checkbox"/> | Overvoltage <input type="checkbox"/> |
| Engine Run Contact <input type="checkbox"/> | Low Water Temp. <input type="checkbox"/> | Reverse Power <input type="checkbox"/> |
| | Low Coolant Level <input type="checkbox"/> | Breaker Locked Out <input type="checkbox"/> |
| | Day Tank Critically - Low FUEL Level <input type="checkbox"/> | Fail to Synchronize <input type="checkbox"/> |
| | Day Tank Hi FUEL Level <input type="checkbox"/> | Gen. Failure <input type="checkbox"/> |
| | Day Tank FUEL Leak <input type="checkbox"/> | Emergency Stop <input type="checkbox"/> |
| | Summary Alarm <input type="checkbox"/> | EMCP Diagnostic Failure <input type="checkbox"/> |
| | | Gen. Set Breaker <input type="checkbox"/> |
| | | Air Damper Switch <input type="checkbox"/> |
| | | Lock Out 489 Relay <input type="checkbox"/> |
| | | Fail Safe 489 Relay <input type="checkbox"/> |

Generators G1 G2 G3 G4 G5 G6 G7 G8
G9 G10 G11 G12 G13 G14 G15 G16

Legend : ■ Status Stop ■ Not in Auto ■ Alarm ■ Shutdown

Generator Master PLSG

Events Trend Help
Setup Wave Exit

This tab displays generator parameters for 16 generators represented as G1 to G16 (buttons). When a button is clicked, the parameters of that generator are displayed on the screen. The parameters are:

Status

- Gen Brkr Aux Contact
- Breaker Close Ready
- Not in Auto
- CPU Running
- Engine in Cooldown
- Engine Run Contact

If a generator is running, the status is displayed in gray and if it is Status Stop, it is displayed as green. The status Not In Auto is displayed in red.

Alarm

- Undervoltage
- Hi Water Temp Warn
- Battery Charger Failure
- Low Fuel Day Tank
- Oil Pressure Warning
- Low Water Temp
- Low Water Level
- Day Tank Critically – Low Fuel Level
- Day Tank Hi Fuel Level
- Day Tank Fuel Leak
- Summary Alarm

Any alarm in generator's status is displayed in amber. Otherwise the status is displayed in gray.

Shutdown

- Overcrank
- Overspeed
- High Water Temp
- Oil Pressure
- Overvoltage
- Reverse Power
- Breaker Locked Out
- Fail to Synchronize
- General Failure
- Emergency Stop
- EMCP Diagnostic Failure
- Gen Set Breaker
- Air Damper Switch
- Lock Out 489 Relay
- Fail Safe 489 Relay

Note: Any kind of shutdown is displayed in red.

PSG

| Paralleling Switch Gear Status | |
|-----------------------------------|--|
| Latched Under Frequency | <input type="checkbox"/> System Not in Auto |
| Latched Over Frequency | <input type="checkbox"/> System Under Test |
| Communication Failure | <input type="checkbox"/> Remote Start Signal Received |
| Main Tank Low FUEL Level | <input type="checkbox"/> System in Load Demand Mode |
| Main Tank Critical Low FUEL Level | <input type="checkbox"/> System Test with Load Bank |
| Main Tank High FUEL Level | <input type="checkbox"/> Remote Peak Shave Signal Received |
| Main Tank FUEL Leaked | <input type="checkbox"/> Load Add Priority |
| Load Bank Breaker Bell Alarm | <input type="checkbox"/> Load Add Priority 3 |
| | <input type="checkbox"/> Load Add Priority 4 |
| | <input type="checkbox"/> Load Shed Priority 2 |
| | <input type="checkbox"/> Load Shed Priority 3 |
| | <input type="checkbox"/> Load Shed Priority 4 |

Legend : ■ Alarm ■ Normal

Generator Master PLSG

The screen shows Paralleling SwitchGear Status of generators.

Status

- Latched Under Frequency
- Latched Over Frequency
- Communication Failure
- Main Tank Low Fuel Level
- Main Tank Critical Low Fuel Level
- Main Tank High Fuel Level
- Main Tank Fuel Leaked
- Load Bank Breaker Bell Alarm
- System Not in Auto
- System Under Test
- Remote Start Signal Received
- System in Load Demand Mode
- System Test With Load Bank
- Remote Peak Shave Signal Received
- Load Add Priority
- Load Add Priority 3
- Load Add Priority 4
- Load Shed Priority 2
- Load Shed Priority 3
- Load Shed Priority 4

Note: Any alarm is displayed in amber, otherwise normal status is shown in gray color.

EPM5300P

This device belongs to Electro Industries family, which is tightly integrated device in to PMCS product. This device contains the following tabs.

Metering Tab

EPM5300P Tabular Wizard

Device Name: DeviceNm
 Group Name: \$System
 Modbus Addr: 1
 Baud Rate: 9600

Metering Tab

| Current(Amps) | | | Voltage(Volts) | | Phase | THD Current | THD Voltage |
|---------------|-------|------|----------------|--------|---------------------|--------------|--------------|
| Phase | Inst. | Max. | Phase | Inst. | | Inst. (Amps) | Inst.(Volts) |
| A | 0.40 | 0.00 | AN | 119.50 | A | 0.03 | 0.60 |
| B | 0.40 | 0.00 | BN | 119.90 | B | 0.03 | 0.50 |
| C | 0.40 | 0.00 | CN | 119.90 | C | 0.03 | 0.60 |
| Neut. | 0.04 | 0.00 | AB | 206.40 | Frequency (Hz) | | 60.00 |
| | | | BC | 207.10 | Phase Imbalance (%) | | 1.8 |
| | | | CA | 207.40 | Phase Reversal | | A-B-C |

Energy

| | | | | | |
|-----------|------------|---------|------------|----------|---------|
| WATT Hour | 1971189600 | VA Hour | 2147483647 | VAR Hour | 7260000 |
|-----------|------------|---------|------------|----------|---------|

Power

| Ph. | Real (Watt) | | Reactive (VAR) | | Apparent (VA) | | PF |
|------|-------------|----------|----------------|----------|---------------|----------|------|
| | Inst. | Max. | Inst. | Max. | Inst. | Max. | |
| A | -16286.00 | 16383.00 | -16252.00 | 0.00 | 16278.00 | 16383.00 | 0.58 |
| B | 16169.00 | 16383.00 | -16130.00 | 0.00 | 16333.00 | 16383.00 | 0.87 |
| C | 446.00 | 16383.00 | 16219.00 | 16383.00 | 16220.00 | 16383.00 | 0.87 |
| 3 Ph | 584.00 | 16383.00 | 476.00 | 513.00 | 16320.00 | 16383.00 | 0.87 |

Events Trend Help
 Setup Wave Exit

Metering1 SetupOne SetupTwo

The screen explains various parameters of the device:

Current (Amps)

- Phase (A, B, C and Neutral)
- Inst
- Max

Voltage (Volts)

- Phase (AN, BN, CN, AB, BC and CA)
- Inst
- THD Current
- THD Voltage

Energy

- WATT Hour
- VA Hour
- VAR Hour

Power

- Real (WATT)
- Reactive (VAR)
- Apparent (VA)
- PF

Setup One Tab

| Configuration | | Relay 1 | Relay 2 |
|----------------------|-------------------------------------|-----------------|--------------------------|
| Kilo Volt Inputs | <input checked="" type="checkbox"/> | Phase Reversal | <input type="checkbox"/> |
| Kilo Amp Input | <input checked="" type="checkbox"/> | Phase Imbalance | <input type="checkbox"/> |
| Mega Watt Input | <input checked="" type="checkbox"/> | Delay on(Sec) | 255 |
| Phase Reverse Limits | <input type="checkbox"/> | Delay Off(Sec) | 200 |
| Meter Setup | Non Open Delta | | 10 |
| Limits Set By | Instantaneous | | 10 |

| Decimal Placement | | Reset | |
|----------------------------|------|-----------|--------------------------|
| Volts Decimal Placement | 0 | Watt Hour | <input type="checkbox"/> |
| Amps Decimal Placement | 0 | VAR Hour | <input type="checkbox"/> |
| Watt Decimal Placement | 0 | VA Hour | <input type="checkbox"/> |
| VOLTS Full Scale (kV) | 125 | | |
| AMPS Full Scale (kAmp) | 1000 | | |
| Lim. Threshold for Imb.(%) | 1.0 | | |

Legend :

| | | |
|--|--------------------------------------|------------------------------------|
| <input type="checkbox"/> NOT Configured | <input type="checkbox"/> NOT Enabled | <input type="checkbox"/> NOT Reset |
| <input checked="" type="checkbox"/> Configured | <input type="checkbox"/> Enabled | <input type="checkbox"/> Reset |

The screen explains various parameters in relation with Relay 1 and Relay 2 such as:

Configuration

- Kilo Volt Inputs
- Kilo Amp Input
- Mega Watt Input
- Phase Reverse Limits
- Meter Setup
- Limits Set By

Relay 1 / Relay 2

- Phase Reversal
- Phase Imbalance
- Delay On
- Delay Off

Decimal Placement

- Volts Decimal Placement
- Amps Decimal Placement
- WATT Decimal Placement
- VOLTS Full Scale
- AMPS Full Scale
- Lim. Threshold for Imb (%)

Reset

- WATT Hour
- VAR Hour
- VA Hour

If it is kilo volt inputs, the decimal placement is 2 (as shown in the screen); if kilo amp input the decimal placement is 3 and if mega watt input, it is 1.

Note: Configured is displayed in green, Enabled in red and Reset in Amber.

Setup Two Tab

| Setup Two | | | | | | | | | | |
|-----------------|---------|-------------|-------|--------------|---------|--------|----------|---------|-----------------|---------|
| | Limit 1 | Trigger | | Limit 2 | Trigger | | Exceeded | | Set Above/Below | |
| | | Rly.1 | Rly.2 | | Rly. 1 | Rly. 2 | Limit 1 | Limit 2 | Limit 1 | Limit 2 |
| Current | | | | | | | | | | |
| Ia(kAmp) | 100.000 | Amber | Gray | 80.000 | Gray | Amber | Green | Green | Red | Red |
| Ib(kAmp) | 100.000 | Amber | Gray | 80.000 | Gray | Amber | Green | Gray | Red | Gray |
| Ic(kAmp) | 100.000 | Amber | Gray | 80.000 | Gray | Amber | Gray | Green | Gray | Red |
| In(kAmp) | 50.000 | Amber | Gray | 40.000 | Gray | Amber | Green | Green | Gray | Gray |
| Voltage | | | | | | | | | | |
| Van(kV) | 100.000 | Amber | Gray | 80.000 | Gray | Amber | Green | Green | Red | Red |
| Vbn(kV) | 100.000 | Amber | Gray | 80.000 | Gray | Amber | Green | Gray | Red | Gray |
| Vcn(kV) | 100.000 | Amber | Gray | 80.000 | Gray | Amber | Gray | Green | Gray | Red |
| Vab(kV) | 170.000 | Amber | Gray | 150.000 | Gray | Amber | Gray | Gray | Gray | Gray |
| Vbc(kV) | 170.000 | Amber | Gray | 150.000 | Gray | Amber | Gray | Green | Gray | Red |
| Vca(kV) | 170.000 | Amber | Gray | 150.000 | Gray | Amber | Gray | Green | Gray | Red |
| Power | | | | | | | | | | |
| MVA | 10.000 | Amber | Gray | 5.000 | Gray | Amber | Green | Gray | Red | Gray |
| MVAR | 10.000 | Amber | Gray | 5.000 | Gray | Amber | Green | Gray | Red | Gray |
| MW | 10.000 | Amber | Gray | 5.000 | Gray | Amber | Green | Gray | Red | Gray |
| PF | 0.95 | Amber | Gray | 0.90 | Gray | Amber | Green | Gray | Red | Gray |
| Freq. | 55.0 | Amber | Gray | 50.0 | Gray | Amber | Green | Gray | Red | Gray |
| Legend : | | Not Trigger | | Not Exceeded | | Below | | | | |
| | | Trigger | | Exceeded | | Above | | | | |

Events Trend Help
Setup Wave Exit

Metering SetupOne SetupTwo

The screen explains various parameters related to Limits and Triggers:

Brief explanation of each of the columns is described below

| Column | Description |
|-------------------------|--|
| Limit 1 | Limit 1 value for the Associated quantity (For example: Phase A Amps) |
| Trigger - Relay 1 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 1. LED display in Gray color: Limit 1 of the associated value will not trigger Relay 1. |
| Trigger - Relay 2 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 2. LED display in Gray color: Limit 1 of the associated value will not trigger Relay 2. |
| Limit 2 | Limit 2 value for the Associated quantity (For example: Phase A Amps) |
| Trigger - Relay 1 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 1. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 1. |
| Trigger - Relay 2 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 2. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 2. |
| Set Above/Below Limit 1 | LED display in RED color : Limit 1 of the associated value is Set for Above. LED display in Gray color: Limit 1 of the associated value is Set for Below. |
| Set Above/Below Limit 2 | LED display in RED color : Limit 2 of the associated value is Set for Above. |

| | |
|------------------|--|
| | LED display in Gray color: Limit 2 of the associated value is Set for Below. |
| Exceeded Limit 1 | LED display in GREEN color : The associated quantity is exceeded the Limit 1 value. LED display in Gray color: The associated quantity is NOT exceeded the Limit 1 value. |
| Exceeded Limit 2 | LED display in GREEN color : The associated quantity is exceeded the Limit 2 value. LED display in Gray color: The associated quantity is NOT exceeded the Limit 2 value. |

| Example 1 | Example 2 |
|--|---|
| Limit1 is Set for Above | Limit 2 is Set for Below |
| Limit 1 is 100 Amps | Limit 2 is 80 Amps |
| The associated Quantity is Phase A Instantaneous value is 397 Amps | The associated Quantity is Phase A Instantaneous value is 50 Amps |
| Exceeded Limit 1 will show in GREEN color as $397 > 100$ | Exceeded Limit 1 will show in GREEN color as $50 < 80$ |

Current

- Phase A
- Phase B
- Phase C
- Neutral

Voltage

- AN
- BN
- CN
- AB
- BC
- CA

Power

- VA
- VAR
- WATT
- PF
- Frequency

EPM5200P

This device belongs to Electro Industries family, which is tightly integrated device in to PMCS product. This device contains the following tabs.

Metering Tab

The screenshot shows the 'Metering Tab' interface with the following data:

| Metering Tab | | | | | | | |
|---------------|-------------|---------|----------------|-------|---------------|--------------|--------------|
| Current(Amps) | | | Voltage(Volts) | | Phase | THD Current | THD Voltage |
| Phase | Inst. | Max. | Phase | Inst. | | Inst. (Amps) | Inst.(Volts) |
| A | 0.00 | 1465.00 | AN | 0.00 | A | N/A | N/A |
| B | 0.00 | 1328.00 | BN | 0.00 | B | N/A | N/A |
| C | 0.00 | 804.00 | CN | 0.00 | C | N/A | N/A |
| Neut. | 0.00 | 1141.00 | AB | 0.00 | Freq.(Hz) | | 0.00 |
| | | | BC | 0.00 | Ph. Imbalance | | 0.0 |
| | | | CA | 0.00 | Ph. Reversal | | A-B-C |
| Energy | | | | | | | |
| WATT Hour | | 0 | VA Hour | | N/A | VAR Hour | |
| | | | | | | | |
| Power | | | | | | | |
| Ph. | Real (Watt) | | Reactive (VAR) | | Apparent (VA) | | PF |
| | Inst. | Max. | Inst. | Max. | Inst. | Max. | Inst. |
| A | 0.00 | 1.00 | 0.00 | 5.00 | 0.00 | 110.00 | 0.00 |
| B | 0.00 | 1.00 | 0.00 | 4.00 | 0.00 | 101.00 | 0.00 |
| C | 0.00 | 1.00 | 0.00 | 4.00 | 0.00 | 81.00 | 0.00 |
| 3 Ph | 0.00 | 5.00 | 0.00 | 13.00 | 0.00 | 259.00 | 0.00 |

The screen explains various parameters of the device:

Current (Amps)

- Phase (A, B, C, Neutral)
- Inst
- Max

Voltage (Volts)

- Phase (AN, BN, CN, AB, BC, CA)
- Inst

THD Current/THD Voltage

- Displays Phase A, Phase B and Phase C THD Current and Voltage values.

Energy

- WATT Hour
- VA Hour
- VAR Hour

Power

- Real (WATT)
- Reactive (VAR)
- Apparent (VA)
- PF

Setup One Tab

| Configuration | | Relay 1 | Relay 2 |
|----------------------|-------------------------------------|-----------------|---------|
| Kilo Volt Inputs | <input checked="" type="checkbox"/> | Phase Reversal | N/A |
| Kilo Amp Input | <input checked="" type="checkbox"/> | Phase Imbalance | N/A |
| Mega Watt Input | <input type="checkbox"/> | Delay on(Sec) | N/A |
| Phase Reverse Limits | <input checked="" type="checkbox"/> | Delay Off(Sec) | N/A |
| Meter Setup | Non Open Delta | | |
| Limits Set By | Instantaneous | | |

| Decimal Placement | | Reset | |
|-------------------------|-------|-----------|--------------------------|
| Volts Decimal Placement | 1 | Watt Hour | <input type="checkbox"/> |
| Amps Decimal Placement | 2 | VAR Hour | <input type="checkbox"/> |
| Watt Decimal Placement | 0 | VA Hour | <input type="checkbox"/> |
| VOLTS Full Scale (kV) | 138.0 | | |
| AMPS Full Scale (kAmp) | 5.00 | | |

Legend :

| | | |
|--|---|---|
| <input type="checkbox"/> NOT Configured | <input type="checkbox"/> NOT Enabled | <input type="checkbox"/> NOT Reset |
| <input checked="" type="checkbox"/> Configured | <input checked="" type="checkbox"/> Enabled | <input checked="" type="checkbox"/> Reset |

The screen explains various parameters in relation with Relay 1 and Relay 2 such as:

Configuration

- Kilo Volt Inputs
- Kilo Amp Input
- Mega Watt Input
- Phase Reverse Limits
- Meter Setup
- Limits Set By

Relay 1 / Relay 2

- Phase Reversal
- Phase Imbalance
- Delay On
- Delay Off

Decimal Placement

- Volts Decimal Placement
This value decides the precision. User can change the values from 1 to 4.
- Amps Decimal Placement
This value decides the precision. User can change the values from 1 to 4.
- WATT Decimal Placement
- VOLTS Full Scale

If kilo volt inputs value is set then Voltage full-scale value is divided by 1000, showing the value in Kilo Volts.

- AMPS Full Scale

If kilo Amp inputs value is set then Amps full-scale value is divided by 1000, showing the value in Kilo Amps.

Reset

- WATT Hour
- VAR Hour
- VA Hour

Note: Configured is displayed in green, Enabled in red and Reset in Amber.

EPM5350P

Special Note: This device supports [GE32MTCP Server ONLY](#).

This device belongs to Electro Industries family, which is tightly integrated device in to PMCS product. This device contains the following tabs.

Metering Tab

EPM5300P Tabular Wizard

Device Name: DeviceNm
 Group Name: \$System
 Modbus Addr: 1
 Baud Rate: 9600

Metering Tab

| Current(Amps) | | | Voltage(Volts) | | Phase | THD Current | THD Voltage | |
|---------------|-------------|------------|----------------|----------|---------------------|--------------|--------------|---------|
| Phase | Inst. | Max. | Phase | Inst. | | Inst. (Amps) | Inst.(Volts) | |
| A | 0.40 | 0.00 | AN | 119.50 | A | 0.03 | 0.60 | |
| B | 0.40 | 0.00 | BN | 119.90 | B | 0.03 | 0.50 | |
| C | 0.40 | 0.00 | CN | 119.90 | C | 0.03 | 0.60 | |
| Neut. | 0.04 | 0.00 | AB | 206.40 | Frequency (Hz) | | 60.00 | |
| | | | BC | 207.10 | Phase Imbalance (%) | | 1.8 | |
| | | | CA | 207.40 | Phase Reversal | | A-B-C | |
| Energy | | | | | | | | |
| WATT Hour | | 1971189600 | VA Hour | | 2147483647 | VAR Hour | | 7260000 |
| Power | | | | | | | | |
| Ph. | Real (Watt) | | Reactive (VAR) | | Apparent (VA) | | PF | |
| | Inst. | Max. | Inst. | Max. | Inst. | Max. | Inst. | |
| A | -16286.00 | 16383.00 | -16252.00 | 0.00 | 16278.00 | 16383.00 | 0.58 | |
| B | 16169.00 | 16383.00 | -16130.00 | 0.00 | 16333.00 | 16383.00 | 0.87 | |
| C | 446.00 | 16383.00 | 16219.00 | 16383.00 | 16220.00 | 16383.00 | 0.87 | |
| 3 Ph | 584.00 | 16383.00 | 476.00 | 513.00 | 16320.00 | 16383.00 | 0.87 | |

Events Trend Help
 Setup Wave Exit

Metering1 SetupOne SetupTwo

The screen explains various parameters of the device:

Current (Amps)

- Phase (A, B, C and Neutral)
- Inst
- Max

Voltage (Volts)

- Phase (AN, BN, CN, AB, BC and CA)
- Inst

- THD Current
- THD Voltage

Energy

- WATT Hour
- VA Hour
- VAR Hour

Power

- Real (WATT)
- Reactive (VAR)
- Apparent (VA)
- PF

Setup One Tab

| Configuration | | Relay 1 | Relay 2 |
|----------------------|-------------------------------------|-----------------|--------------------------|
| Kilo Volt Inputs | <input type="checkbox"/> | Phase Reversal | <input type="checkbox"/> |
| Kilo Amp Input | <input type="checkbox"/> | Phase Imbalance | <input type="checkbox"/> |
| Mega Watt Input | <input type="checkbox"/> | Delay on(Sec) | 0 |
| Phase Reverse Limits | <input checked="" type="checkbox"/> | Delay Off(Sec) | 0 |
| Meter Setup | Non Open Delta | | |
| Limits Set By | Instantaneous | | |

| Decimal Placement | | Reset | |
|----------------------------|-------|-----------|--------------------------|
| Volts Decimal Placement | 1 | Watt Hour | <input type="checkbox"/> |
| Amps Decimal Placement | 4 | VAR Hour | <input type="checkbox"/> |
| Watt Decimal Placement | 0 | VA Hour | <input type="checkbox"/> |
| VOLTS Full Scale (Volts) | 120.0 | | |
| AMPS Full Scale (Amp) | 0.200 | | |
| Lim. Threshold for Imb.(%) | 100.0 | | |

Legend :

| | | |
|--|---|---|
| <input type="checkbox"/> NOT Configured | <input type="checkbox"/> NOT Enabled | <input type="checkbox"/> NOT Reset |
| <input checked="" type="checkbox"/> Configured | <input checked="" type="checkbox"/> Enabled | <input checked="" type="checkbox"/> Reset |

The screen explains various parameters in relation with Relay 1 and Relay 2 such as:

Configuration

- Kilo Volt Inputs
- Kilo Amp Input
- Mega Watt Input
- Phase Reverse Limits

- Meter Setup
- Limits Set By

Relay 1 / Relay 2

- Phase Reversal
- Phase Imbalance
- Delay On
- Delay Off

Decimal Placement

- Volts Decimal Placement
- Amps Decimal Placement
- WATT Decimal Placement
- VOLTS Full Scale
- AMPS Full Scale
- Lim. Threshold for lmb (%)

Reset

- WATT Hour
- VAR Hour
- VA Hour

If it is kilo volt inputs, the decimal placement is 2 (as shown in the screen); if kilo amp input the decimal placement is 3 and if mega watt input, it is 1.

Note: Configured is displayed in green, Enabled in red and Reset in Amber.

Setup Two Tab

| | Limit 1 | Trigger | | Limit 2 | Trigger | | Exceeded | | Set Above/Below | |
|----------------|---------|--------------------------|--------------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Rly.1 | Rly.2 | | Rly. 1 | Rly. 2 | Limit 1 | Limit 2 | Limit 1 | Limit 2 |
| Current | | | | | | | | | | |
| Ia(Amp) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Ib(Amp) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Ic(Amp) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| In(Amp) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Voltage | | | | | | | | | | |
| Van(Volt) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vbn(Volt) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vcn(Volt) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vab(Volt) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vbc(Volt) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vca(Volt) | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Power | | | | | | | | | | |
| kVA | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| kVAR | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| kW | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | 0.000 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PF | 0.00 | <input type="checkbox"/> | <input type="checkbox"/> | 0.00 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Freq. | 0.0 | <input type="checkbox"/> | <input type="checkbox"/> | 0.0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Legend : Not Trigger Not Exceeded Below
 Trigger Exceeded Above

Metering SetupOne SetupTwo

The screen explains various parameters related to Limits and Triggers:

Brief explanation of each of the columns is described below

| Column | Description |
|--------|-------------|
|--------|-------------|

| | |
|-------------------------|--|
| Limit 1 | Limit 1 value for the Associated quantity (For example: Phase A Amps) |
| Trigger - Relay 1 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 1. LED display in Gray color: Limit 1 of the associated value will not trigger Relay 1. |
| Trigger - Relay 2 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 2. LED display in Gray color: Limit 1 of the associated value will not trigger Relay 2. |
| Limit 2 | Limit 2 value for the Associated quantity (For example: Phase A Amps) |
| Trigger - Relay 1 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 1. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 1. |
| Trigger - Relay 2 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 2. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 2. |
| Set Above/Below Limit 1 | LED display in RED color : Limit 1 of the associated value is Set for Above. LED display in Gray color: Limit 1 of the associated value is Set for Below. |
| Set Above/Below Limit 2 | LED display in RED color : Limit 2 of the associated value is Set for Above. LED display in Gray color: Limit 2 of the associated value is Set for Below. |
| Exceeded Limit 1 | LED display in GREEN color : The associated quantity is exceeded the Limit 1 value. LED display in Gray color: The associated quantity is NOT exceeded the Limit 1 value. |
| Exceeded Limit 2 | LED display in GREEN color : The associated quantity is exceeded the Limit 2 value. LED display in Gray color: The associated quantity is NOT exceeded the Limit 2 value. |

| Example 1 | Example 2 |
|--|---|
| Limit1 is Set for Above | Limit 2 is Set for Below |
| Limit 1 is 100 Amps | Limit 2 is 80 Amps |
| The associated Quantity is Phase A Instantaneous value is 397 Amps | The associated Quantity is Phase A Instantaneous value is 50 Amps |
| Exceeded Limit 1 will show in GREEN color as 397>100 | Exceeded Limit 1 will show in GREEN color as 50<80 |

Current

- Phase A
- Phase B
- Phase C
- Neutral

Voltage

- AN
- BN
- CN
- AB
- BC
- CA

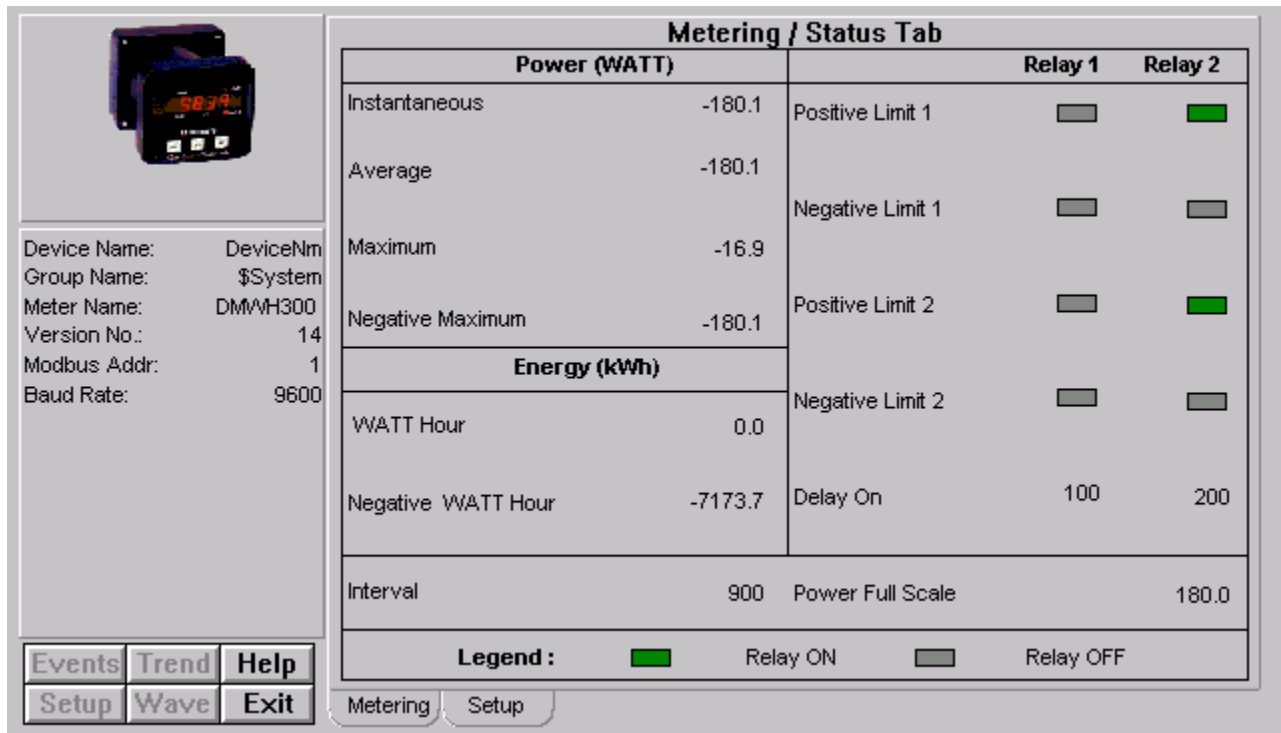
Power

- VA
- VAR
- WATT
- PF
- Frequency

EPM5000P

This device belongs to the Electro Industries family, which is a tightly integrated device in to the PMCS product. The device contains the following tabs:

Metering



Device Information:

- Device Name: DeviceNm
- Group Name: \$System
- Meter Name: DMVH300
- Version No.: 14
- Modbus Addr: 1
- Baud Rate: 9600

| Power (WATT) | | Relay 1 | Relay 2 |
|--------------------|---------|------------------|-------------------------------------|
| Instantaneous | -180.1 | Positive Limit 1 | <input checked="" type="checkbox"/> |
| Average | -180.1 | Negative Limit 1 | <input type="checkbox"/> |
| Maximum | -16.9 | Positive Limit 2 | <input checked="" type="checkbox"/> |
| Negative Maximum | -180.1 | Negative Limit 2 | <input type="checkbox"/> |
| Energy (kWh) | | | |
| WATT Hour | 0.0 | Delay On | 100 200 |
| Negative WATT Hour | -7173.7 | | |
| Interval | 900 | Power Full Scale | 180.0 |

Legend: Relay ON Relay OFF

Buttons: Events, Trend, Help, Setup, Wave, Exit

The screen explains various parameters related to metering and status.

Power (WATT): Instantaneous, Average, Maximum and Negative Maximum.

Relay 1/Relay 2: Positive Limit 1, Negative Limit 1, Positive Limit 2 and Negative Limit 2. Delay On is displayed too. If the relay is on, it is displayed in green. If the relay is off, it remains in gray.

Energy (kWh): WATT Hour and Negative WATT Hour. Interval is displayed.

Power Full Scale: This value internally depends on the Power Displacement Value. Based on this the value the number of decimals will be displayed. For example

If the Power Decimal Placement is set to 1, the value will have only one decimal place.

If the Power Decimal Placement is set to 2, the value will have two decimal places, and so on and so forth. The maximum value allowed is 4.

Setup

The screenshot shows the 'Setup Tab' interface. On the left, there is a small image of the meter and a list of device information: Device Name: DeviceNm, Group Name: \$System, Meter Name: DMVWH300, Version No.: 14, Modbus Addr: 1, and Baud Rate: 9600. Below this are buttons for 'Events', 'Trend', 'Help', 'Setup', 'Wave', and 'Exit'. The main area is titled 'Setup Tab' and contains a 'Configuration' section with parameters like Mega WATT, Leading Zero, Reset Protection, Open Delta, KYZ Output for positive WH, and KYZ Output for negative WH. A 'Protocol' section includes Relay 1, Relay 2, Communications, and DC Output. The 'Status' section has a table for 'Positive WATT' and 'Negative WATT' with 'Limit 1' and 'Limit 2' settings, each with a status dropdown and a value input field. At the bottom, there are 'Reset Power' and 'Reset Energy' buttons, and a legend indicating that red means 'Enabled' and gray means 'Disabled'.

| Configuration | |
|----------------------------|-------------------------------------|
| Mega WATT | <input type="checkbox"/> |
| Leading Zero | <input type="checkbox"/> |
| Reset Protection | <input type="checkbox"/> |
| Open Delta | <input type="checkbox"/> |
| KYZ Output for positive WH | <input checked="" type="checkbox"/> |
| KYZ Output for negative WH | <input checked="" type="checkbox"/> |
| Protocol | MODBUS |
| Relay 1 | <input type="checkbox"/> |
| Relay 2 | <input type="checkbox"/> |
| Communications | <input checked="" type="checkbox"/> |
| DC Output | <input type="checkbox"/> |

| Status | | Value |
|---------------|---------|---|
| Positive WATT | Limit 1 | Above <input type="button" value="↓"/> 256 <input type="button" value="Set"/> |
| | Limit 2 | Above <input type="button" value="↓"/> 1 <input type="button" value="Set"/> |
| Negative WATT | Limit 1 | Above <input type="button" value="↓"/> 0 <input type="button" value="Set"/> |
| | Limit 2 | Above <input type="button" value="↓"/> 20225 <input type="button" value="Set"/> |

Reset Power Reset Energy

Legend : Enabled Disabled

The screen explains various parameters related to configuration and setup.

Configuration: Mega WATT, Leading Zero, Reset Protection, Open Delta, KYZ Output for positive WH, KYZ Output for negative WH.

Protocol: Relay 1, Relay 2, Communications and DC Output.

Status/Value: The user can set the values in the Status and Value fields. Under Positive WATT and Negative WATT, the status is shown as Above/Below for Limit 1 and Limit 2. The user can directly set the status to the device by clicking on the arrow buttons on respective fields to change the value from Above to Below or from Below to Above. The user can enter the set values by clicking on the field that contains the rectangular box that filled with White color on respective fields by entering the desired set values. Once the user enters the set value, by clicking on the Set button of the respective field, will set the value in to the device. Against these settings the wizard will prompt user for the conformation.

Legend: The Legend is applicable for Configuration parameters. Enabled status is displayed in red, Otherwise the status is displayed in gray.

EPM9450Q

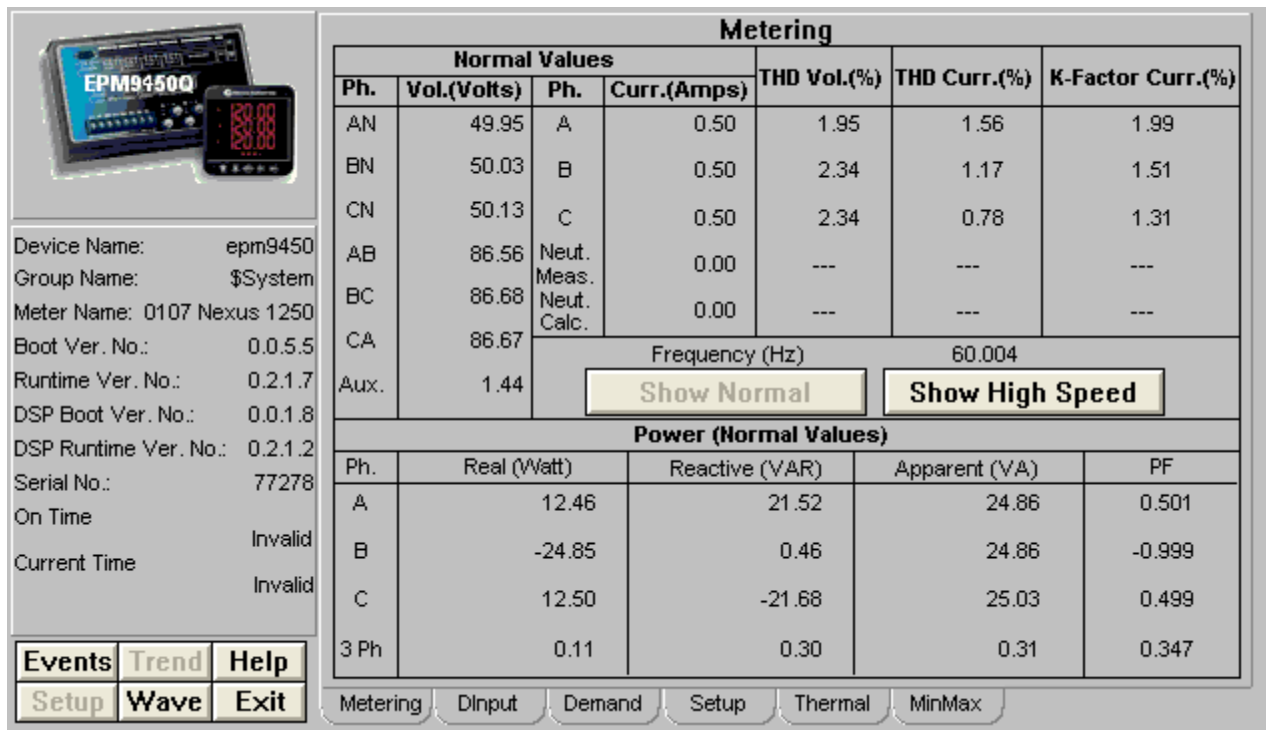
This device belongs to the Electro Industries family, which is a tightly integrated device in to the PMCS product.

The device offers the following features:

- **Max/Min integration:** Offers Maximum and Minimum values for every measured reading.
- **8 Built-in Digital High-Speed Status Inputs:** The device offers 8 High speed digital inputs.
- **Demand:** Measures Fixed window, Sliding window, Predictive and Thermal demands.
- **4 Communication Ports:** There are 4 ports – Port 1, Port 2, Port 3 and Port 4.

The device contains the following tabs:

Metering



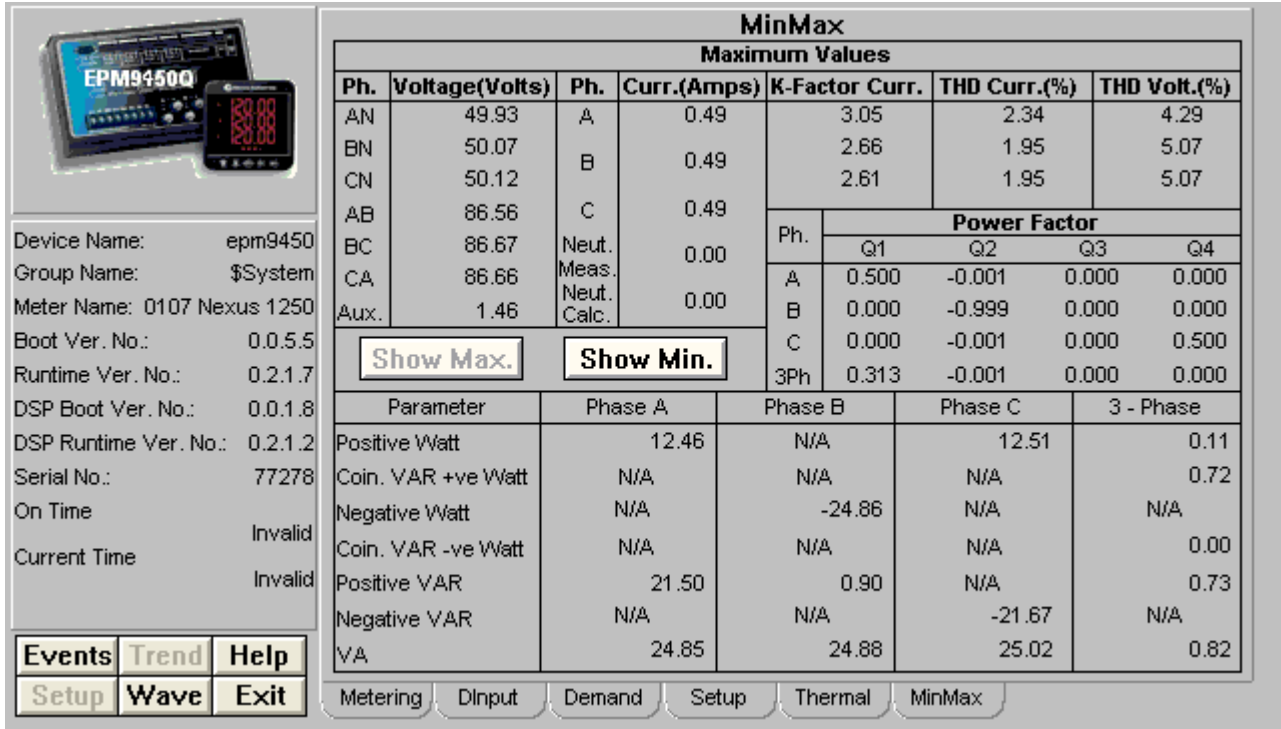
| Metering | | | | | | |
|-----------------------|-------------|-------------|----------------|---|---------------|-------------------|
| Normal Values | | | | THD Vol.(%) | THD Curr.(%) | K-Factor Curr.(%) |
| Ph. | Vol.(Volts) | Ph. | Curr.(Amps) | | | |
| AN | 49.95 | A | 0.50 | 1.95 | 1.56 | 1.99 |
| BN | 50.03 | B | 0.50 | 2.34 | 1.17 | 1.51 |
| CN | 50.13 | C | 0.50 | 2.34 | 0.78 | 1.31 |
| AB | 86.56 | Neut. Meas. | 0.00 | --- | --- | --- |
| BC | 86.68 | Neut. Calc. | 0.00 | --- | --- | --- |
| CA | 86.67 | | | Frequency (Hz) 60.004 | | |
| Aux. | 1.44 | | | <input type="button" value="Show Normal"/> <input type="button" value="Show High Speed"/> | | |
| Power (Normal Values) | | | | | | |
| Ph. | Real (Watt) | | Reactive (VAR) | | Apparent (VA) | PF |
| A | 12.46 | | 21.52 | | 24.86 | 0.501 |
| B | -24.85 | | 0.46 | | 24.86 | -0.999 |
| C | 12.50 | | -21.68 | | 25.03 | 0.499 |
| 3 Ph | 0.11 | | 0.30 | | 0.31 | 0.347 |

The Metering tab shows following various parameters:

- **Voltage Normal/ High Speed:** This tab displays the voltage values of AN, BN, CN, AB, BC, CA and Aux.
- **Current Normal/ High Speed:** Displays currents of Phase A, B, C, measured and calculated.
- **THD Normal/ High Speed:** Displays THD values of Phase A, B, C for Voltage and Current and K Factor.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Real (Watt), Reactive (VAR), Apparent (VA) and PF.

- **Frequency Normal/ High Speed:** Displays Frequency in Hz.

Min/Max



MinMax

Maximum Values

| Ph. | Voltage(Volts) | Ph. | Curr.(Amps) | K-Factor | Curr. | THD Curr.(%) | THD Volt.(%) |
|------|----------------|-------|-------------|----------|-------|--------------|--------------|
| AN | 49.93 | A | 0.49 | 3.05 | 2.34 | 4.29 | |
| BN | 50.07 | B | 0.49 | 2.66 | 1.95 | 5.07 | |
| CN | 50.12 | B | 0.49 | 2.61 | 1.95 | 5.07 | |
| AB | 86.56 | C | 0.49 | | | | |
| BC | 86.67 | Neut. | 0.00 | | | | |
| CA | 86.66 | Meas. | 0.00 | | | | |
| Aux. | 1.46 | Neut. | 0.00 | | | | |
| | | Calc. | | | | | |

Power Factor

| Ph. | Q1 | Q2 | Q3 | Q4 |
|-----|-------|--------|-------|-------|
| A | 0.500 | -0.001 | 0.000 | 0.000 |
| B | 0.000 | -0.999 | 0.000 | 0.000 |
| C | 0.000 | -0.001 | 0.000 | 0.500 |
| 3Ph | 0.313 | -0.001 | 0.000 | 0.000 |

Power

| Parameter | Phase A | Phase B | Phase C | 3 - Phase |
|--------------------|---------|---------|---------|-----------|
| Positive Watt | 12.46 | N/A | 12.51 | 0.11 |
| Coin. VAR +ve Watt | N/A | N/A | N/A | 0.72 |
| Negative Watt | N/A | -24.86 | N/A | N/A |
| Coin. VAR -ve Watt | N/A | N/A | N/A | 0.00 |
| Positive VAR | 21.50 | 0.90 | N/A | 0.73 |
| Negative VAR | N/A | N/A | -21.67 | N/A |
| VA | 24.85 | 24.88 | 25.02 | 0.82 |

Buttons: **Show Max.** **Show Min.** **Events** **Trend** **Help** **Setup** **Wave** **Exit** **Metering** **DInput** **Demand** **Setup** **Thermal** **MinMax**

The tab displays Maximum and Minimum values of various parameters. The user can get maximum and minimum values by clicking on respective buttons labeled Show Max and Show Min.

- **Voltage:** This tab displays the voltage values of AN, BN, CN, AB, BC, CA and Aux.
- **Current:** Displays currents of Phase A, B, C, measured and calculated.
- **THD :** Displays THD values of Phase A, B, C for Voltage and Current and K Factor.
- **Power Factor :** Displays PF of Phase A, B, C and 3 Phase of 4 Quadrants namely Q1, Q2, Q3 and Q4.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Positive Watt, Coincidence VAR for Positive Watt, Negative Watt, Coincidence VAR for Negative Watt, Positive VAR, Negative VAR and VA.

Demand

Device Information:

- Device Name: epm9450
- Group Name: \$System
- Meter Name: 0107 Nexus 1250
- Boot Ver. No.: 0.0.5.5
- Runtime Ver. No.: 0.2.1.7
- DSP Boot Ver. No.: 0.0.1.8
- DSP Runtime Ver. No.: 0.2.1.2
- Serial No.: 77278
- On Time: Invalid
- Current Time: Invalid

Demand Parameters:

| Demand | | |
|-----------------------------|---------------|---------|
| Sliding Window Power | | |
| | Instantaneous | Maximum |
| Positive Watt | 0.11 | 0.11 |
| Coin. VAR for Max. +ve Watt | N/A | 0.70 |
| Negative Watt | N/A | N/A |
| Coin. VAR for Max. -ve Watt | N/A | 0.00 |
| Positive VAR | 0.73 | 0.73 |
| Negative VAR | N/A | N/A |
| VA | 0.82 | 0.82 |

Buttons: Sliding Window, Fixed Window

| Energy | | Predictive Sliding Window | |
|----------------|------|---------------------------|------|
| Positive kWh | 0.00 | WATT | 0.11 |
| Negative kWh | 0.00 | VAR | 0.70 |
| Positive kVARh | 0.00 | VA | 0.79 |
| Negative kVARh | 0.00 | | |
| kVAh | 0.00 | | |

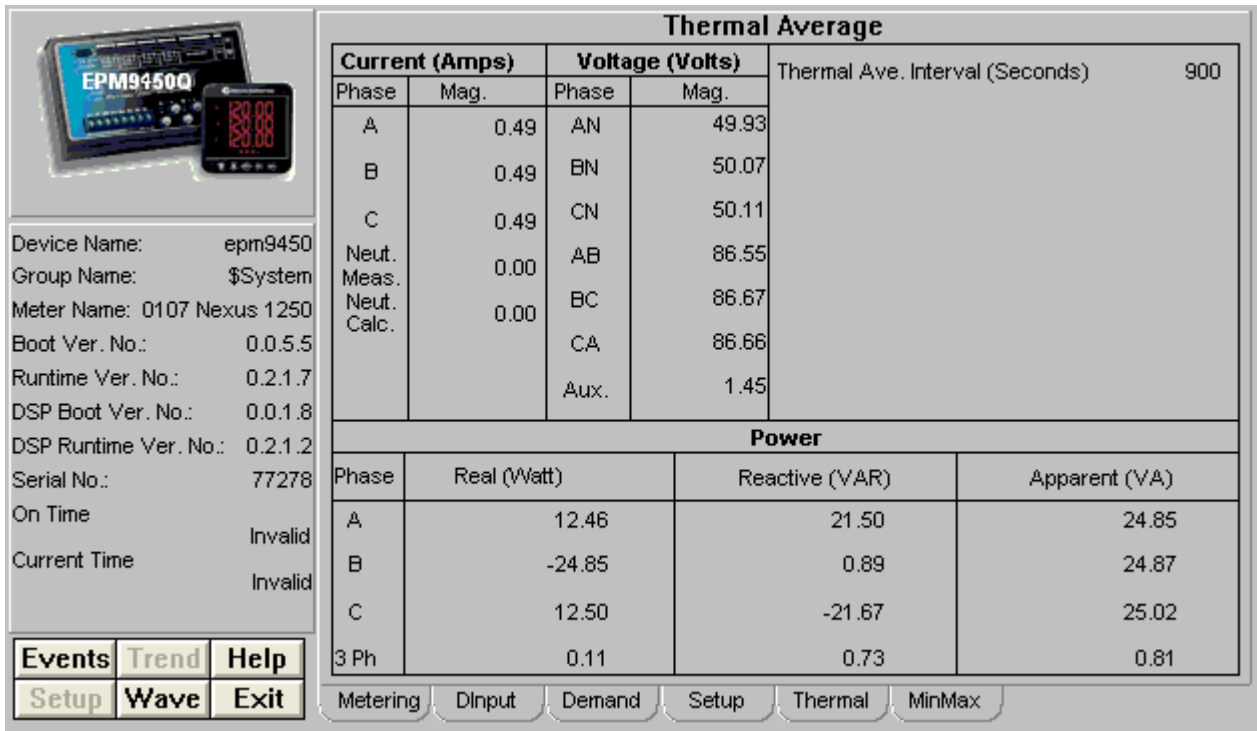
Navigation Bar: Metering, DInput, Demand, Setup, Thermal, MinMax

Bottom Menu: Events, Trend, Help, Setup, Wave, Exit

The screen explains various parameters related to demand values:

- **Sliding Window Demand:** Displays Average and Maximum Sliding window demand for Positive Watt, Coincidence VAR for Maximum Postive Watt, Negative Watt, Coincedance VAR for Maximum Negative Watt, Positive VAR, Negative VAR and VA. User can click on Sliding Window button to see the Sliding window Demand.
- **Fixed Window Demand:** Displays Average and Maximum Sliding window demand for Positive Watt, Coincidence VAR for Maximum Postive Watt, Negative Watt, Coincedance VAR for Maximum Negative Watt, Positive VAR, Negative VAR and VA. User can click on Fixed Window button to see the Fixed window Demand.
- **Predictive Sliding Window Demand:** Displays Predictive Sliding Window demand for WATT, VAR and VA.
- **Energy:** Displays Energy values for the parameters namely Positve kWh, Negative kWh, Positve kVARh, Negative kVARh and kVAh.

Thermal Average



Thermal Average

Thermal Ave. Interval (Seconds) 900

| Current (Amps) | | Voltage (Volts) | |
|----------------|------|-----------------|-------|
| Phase | Mag. | Phase | Mag. |
| A | 0.49 | AN | 49.93 |
| B | 0.49 | BN | 50.07 |
| C | 0.49 | CN | 50.11 |
| Neut. Meas. | 0.00 | AB | 86.55 |
| Neut. Calc. | 0.00 | BC | 86.67 |
| | | CA | 86.66 |
| | | Aux. | 1.45 |

Power

| Phase | Real (Watt) | Reactive (VAR) | Apparent (VA) |
|-------|-------------|----------------|---------------|
| A | 12.46 | 21.50 | 24.85 |
| B | -24.85 | 0.89 | 24.87 |
| C | 12.50 | -21.67 | 25.02 |
| 3 Ph | 0.11 | 0.73 | 0.81 |

Device Name: epm94500
 Group Name: \$System
 Meter Name: 0107 Nexus 1250
 Boot Ver. No.: 0.0.5.5
 Runtime Ver. No.: 0.2.1.7
 DSP Boot Ver. No.: 0.0.1.8
 DSP Runtime Ver. No.: 0.2.1.2
 Serial No.: 77278
 On Time: Invalid
 Current Time: Invalid

Events Trend Help
 Setup Wave Exit

Metering DInput Demand Setup Thermal MinMax

The screen explains about various parameters related to thermal average:

- **Current (Amps):** Displays the current readings for the phases A, B, C, Mea. (measured) and Cal. (calculated).
- **Voltage (Volts):** Displays the Voltage readings for the phases AN, BN, CN, AB, BC, CA and Aux.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Real (Watt), Reactive (VAR) and Apparent (VA).

Digital Inputs

| Digital Inputs Tab | | | | |
|--------------------|-------------|------------------|-------|---------------|
| I/P # | Name | Open/Close Label | State | Pulse Counter |
| 1 | HSI Input 1 | Open_1 | ■ | 0 |
| 2 | HSI Input 2 | Open_2 | ■ | 0 |
| 3 | HSI Input 3 | Open_3 | ■ | 0 |
| 4 | HSI Input 4 | Open_4 | ■ | 0 |
| 5 | HSI Input 5 | Open_5 | ■ | 0 |
| 6 | HSI Input 6 | Open_6 | ■ | 0 |
| 7 | HSI Input 7 | Open_7 | ■ | 0 |
| 8 | HSI Input 8 | Open_8 | ■ | 0 |

Legend : ■ Open ■ Closed

Events Trend Help
Setup Wave Exit

Metering DInput Demand Setup Thermal MinMax

The Digital Inputs tab displays the following parameters of 8 digital inputs. They are

Name: Displays the name of the Digital Input. The maximum allowed is 16 Character string.

Open/Close Label: Based on the Digital input status, the corresponding label will be displayed. For example if the digital input status is OPEN then label for Open condition is displayed or if the digital input status is CLOSED then label for Closed condition is displayed.

Status: The status is displayed Open/Closed. Open status showed in green and Closed status in gray.

Counter: Displays the corresponding digital input counter value.

Setup

Setup Tab

Device Name: epm9450
 Group Name: \$System
 Meter Name: 0107 Nexus 1250
 Boot Ver. No.: 0.0.5.5
 Runtime Ver. No.: 0.2.1.7
 DSP Boot Ver. No.: 0.0.1.8
 DSP Runtime Ver. No.: 0.2.1.2
 Serial No.: 77278
 On Time: Invalid
 Current Time: Invalid

| Phase | Current Setpoints(%) | | Phase | Voltage Setpoints(%) | |
|-------|----------------------|-------|-------|----------------------|-------|
| | Above | Below | | Above | Below |
| A | 120.00 | 0.00 | AN | 120.00 | 80.00 |
| B | 120.00 | 0.00 | BN | 120.00 | 80.00 |
| C | 120.00 | 0.00 | CN | 120.00 | 80.00 |
| Mea. | 10.00 | 0.00 | AB | 120.00 | 20.00 |
| Calc. | 0.00 | 0.00 | BC | 120.00 | 20.00 |
| | | | CA | 120.00 | 20.00 |
| | | | Aux. | 0.00 | 0.00 |

| | PT Ratio | | CT Ratio | | Comm. Parameters | | |
|-------------|----------|------|----------|-------|------------------|---------|--------|
| | Phase | Aux. | Phase | Neut. | Port # | Address | Baud |
| Numerator | 1.00 | 1.00 | 1.00 | 1.00 | 1 | 1 | 9600 |
| Denominator | 1.00 | 1.00 | 1.00 | 1.00 | 2 | 1 | 115200 |
| | | | | | 3 | 1 | 9600 |
| | | | | | 4 | 1 | 9600 |

Reset Minimum Reset Log

Reset Maximum Reset Energy

Volt. Phase Seq. A-B-C

Events Trend Help
 Setup Wave Exit

Metering DInput Demand Setup Thermal MinMax

The screen explains various parameters related to setup.

Current Set Points: Above and Below Current Setpoints are shown for Phase A, B, C, Measured and Calculated.

Voltage Set Points: Above and Below Voltage Setpoints are shown AN, BN, CN, AB, BC, CA and Aux.

PT Ratio: Displays Phase and Auxiliary values for Numerator and Denominator.

CT Ratio: Displays Phase and Neutral values for Numerator and Denominator.

Communication Parameters: Displays Port Addresses and Baudrate for each of the 4 Ports.

Reset: This wizard allows user to reset the following Parameters.

- Energy
- Log
- Maximum and
- Minimum

Voltage Phase Sequence: Displays Phase sequence as either C-B-A or A-B-C, based on the register value.

EPM9650Q

This device belongs to the Electro Industries family, which is a tightly integrated device in to the PMCS product. There is a Flicker option present in this device. The Customer who has opted for this option only will get the Flicker tab visible on the runtime wizards. This document still has the flicker tab description.

The device offers the following features:

- **Max/Min integration:** Offers Maximum and Minimum values for every measured reading.
- **8 Built-in Digital High-Speed Status Inputs:** The device offers 8 High speed digital inputs.
- **Demand:** Measures Fixed window, Sliding window, Predictive and Thermal demands.
- **4 Communication Ports:** There are 4 ports – Port 1, Port 2, Port 3 and Port 4.

The device contains the following tabs:

Metering

Device Information:

- Device Name: nexus
- Group Name: \$System
- Meter Name: 0107 Nexus 1252
- Boot Ver. No.: 0.6.0.1
- Runtime Ver. No.: 0.6.0.3
- DSP Boot Ver. No.: 0.6.0.0
- DSP Runtime Ver. No.: 0.6.0.2
- Serial No.: 79209
- On Time: Dec 31, 2003 13:44:58.10
- Current Time: Jan 05, 2004 18:11:57.90

Metering Data:

| Normal Values | | | | | | | |
|-----------------------|-------------|-------------|----------------|---|---------------|-------------------|--------|
| Ph. | Vol.(Volts) | Ph. | Curr.(Amps) | THD Vol.(%) | THD Curr.(%) | K-Factor Curr.(%) | |
| AN | 100.09 | A | 0.50 | 0.00 | 0.00 | 0.00 | |
| BN | 100.05 | B | 0.50 | 0.00 | 0.00 | 0.00 | |
| CN | 99.82 | C | 0.50 | 0.00 | 0.00 | 0.00 | |
| AB | 173.32 | Neut. Meas. | 0.00 | --- | --- | --- | |
| BC | 172.94 | Neut. Calc. | 1.49 | --- | --- | --- | |
| CA | 173.26 | | | | | | |
| Aux. | 1.03 | | | | | | |
| | | | | Frequency (Hz) 440.010 | | | |
| | | | | <input type="button" value="Show Normal"/> <input type="button" value="Show High Speed"/> | | | |
| Power (Normal Values) | | | | | | | |
| Ph. | Real (Watt) | | Reactive (VAR) | | Apparent (VA) | | PF |
| A | -24.89 | | 43.15 | | 49.81 | | -0.499 |
| B | -24.79 | | 43.00 | | 49.63 | | -0.499 |
| C | 49.82 | | 0.00 | | 49.80 | | 1.000 |
| 3 Ph | 0.15 | | 86.15 | | 86.15 | | 0.001 |

Navigation: Metering | DInput | Setup | Thermal | Demand | MinMax | Flickers

The Metering tab shows following various parameters:

- **Voltage Normal/ High Speed:** This tab displays the voltage values of AN, BN, CN, AB, BC, CA and Aux.
- **Current Normal/ High Speed:** Displays currents of Phase A, B, C, measured and calculated.
- **THD Normal/ High Speed:** Displays THD values of Phase A, B, C for Voltage and Current and K Factor.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Real (Watt), Reactive (VAR), Apparent (VA) and

PF.

- **Frequency Normal/ High Speed:** Displays Frequency in Hz.

Min/Max

The screenshot shows the EPM9650Q software interface. On the left, there is a device image and system information:

- Device Name: nexus
- Group Name: \$System
- Meter Name: 0107 Nexus 1252
- Boot Ver. No.: 0.6.0.1
- Runtime Ver. No.: 0.6.0.3
- DSP Boot Ver. No.: 0.6.0.0
- DSP Runtime Ver. No.: 0.6.0.2
- Serial No.: 79209
- On Time: Dec 31, 2003 13:44:58.10
- Current Time: Jan 05, 2004 18:13:39.22

The main display area is titled "MinMax" and contains a table with the following data:

| MinMax | | | | | | | | |
|--------------------|----------------|-------------|-------------|----------------|--------------|--------------|-------|-------|
| Maximum Values | | | | | | | | |
| Ph. | Voltage(Volts) | Ph. | Curr.(Amps) | K-Factor Curr. | THD Curr.(%) | THD Volt.(%) | | |
| AN | 100.11 | A | 0.50 | 327.68 | 327.68 | 327.68 | | |
| BN | 100.14 | B | 0.50 | 327.68 | 327.68 | 327.68 | | |
| CN | 99.93 | C | 0.50 | 327.68 | 327.68 | 327.68 | | |
| AB | 173.38 | Neut. | 0.00 | Ph. | Power Factor | | | |
| BC | 173.13 | | | | Q1 | Q2 | Q3 | Q4 |
| CA | 173.35 | Meas. | 1.49 | A | 0.000 | -0.506 | 0.000 | 0.000 |
| Aux. | 1.23 | Neut. Calc. | | B | 0.000 | -0.504 | 0.000 | 0.000 |
| | | | | C | 0.999 | -0.001 | 0.000 | 1.000 |
| | | | | 3Ph | 0.297 | -0.001 | 0.000 | 0.000 |
| Parameter | Phase A | Phase B | Phase C | 3 - Phase | | | | |
| Positive Watt | N/A | N/A | 49.89 | 0.16 | | | | |
| Coin. VAR +ve Watt | N/A | N/A | N/A | 85.41 | | | | |
| Negative Watt | -24.96 | -24.84 | N/A | N/A | | | | |
| Coin. VAR -ve Watt | N/A | N/A | N/A | 0.00 | | | | |
| Positive VAR | 43.19 | 43.09 | N/A | 85.74 | | | | |
| Negative VAR | N/A | N/A | -1.05 | N/A | | | | |
| VA | 49.88 | 49.73 | 49.89 | 85.74 | | | | |

Below the table are two buttons: "Show Max." and "Show Min.". At the bottom of the interface are navigation buttons: "Events", "Trend", "Help", "Setup", "Wave", "Exit", "Metering", "DInput", "Setup", "Thermal", "Demand", "MinMax", and "Flickers".

The tab displays Maximum and Minimum values of various parameters. The user can get maximum and minimum values by clicking on respective buttons labeled Show Max and Show Min.

- **Voltage:** This tab displays the voltage values of AN, BN, CN, AB, BC, CA and Aux.
- **Current:** Displays currents of Phase A, B, C, measured and calculated.
- **THD :** Displays THD values of Phase A, B, C for Voltage and Current and K Factor.
- **Power Factor :** Displays PF of Phase A, B, C and 3 Phase of 4 Quadrants namely Q1, Q2, Q3 and Q4.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Positive Watt, Coincidence VAR for Positive Watt, Negative Watt, Coincidence VAR for Negative Watt, Positive VAR, Negative VAR and VA.

Demand

Device Name: nexus
 Group Name: \$System
 Meter Name: 0107 Nexus 1252
 Boot Ver. No.: 0.6.0.1
 Runtime Ver. No.: 0.6.0.3
 DSP Boot Ver. No.: 0.6.0.0
 DSP Runtime Ver. No.: 0.6.0.2
 Serial No.: 79209
 On Time
 Dec 31, 2003 13:44:58.10
 Current Time
 Jan 05, 2004 18:13:24.72


| Demand | | |
|-----------------------------|---------------|---------|
| Sliding Window Power | | |
| | Instantaneous | Maximum |
| Positive Watt | 0.15 | 1.49 |
| Coin. VAR for Max. +ve Watt | N/A | 57.67 |
| Negative Watt | N/A | N/A |
| Coin. VAR for Max. -ve Watt | N/A | 0.00 |
| Positive VAR | 85.54 | 85.68 |
| Negative VAR | N/A | N/A |
| VA | 85.54 | 85.68 |

| Energy | | Predictive Sliding Window | |
|----------------|-------|---------------------------|-------|
| Positive kWh | 0.02 | WATT | 0.14 |
| Negative kWh | 0.00 | VAR | 85.60 |
| Positive kVARh | 10.51 | VA | 85.60 |
| Negative kVARh | 0.00 | | |
| kVAh | 10.51 | | |

The screen explains various parameters related to demand values:

- **Sliding Window Demand:** Displays Average and Maximum Sliding window demand for Positive Watt, Coincidence VAR for Maximum Postive Watt, Negative Watt, Coincedance VAR for Maximum Negative Watt, Positive VAR, Negative VAR and VA. User can click on Sliding Window button to see the Sliding window Demand.
- **Fixed Window Demand:** Displays Average and Maximum Sliding window demand for Positive Watt, Coincidence VAR for Maximum Postive Watt, Negative Watt, Coincedance VAR for Maximum Negative Watt, Positive VAR, Negative VAR and VA. User can click on Fixed Window button to see the Fixed window Demand.
- **Predictive Sliding Window Demand:** Displays Predictive Sliding Window demand for WATT, VAR and VA.
- **Energy:** Displays Energy values for the parameters namely Positive kWh, Negative kWh, Positive kVARh, Negative kVARh and kVAh.

Thermal Average



Device Name: nexus
 Group Name: \$System
 Meter Name: 0107 Nexus 1252
 Boot Ver. No.: 0.6.0.1
 Runtime Ver. No.: 0.6.0.3
 DSP Boot Ver. No.: 0.6.0.0
 DSP Runtime Ver. No.: 0.6.0.2
 Serial No.: 79209
 On Time
 Dec 31, 2003 13:44:58.10
 Current Time
 Jan 05, 2004 18:13:04.82

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |


| Thermal Average | | | | | |
|-----------------|-------------|-----------------|----------------|-------------------------------------|---------------|
| Current (Amps) | | Voltage (Volts) | | Thermal Ave. Interval (Seconds) 300 | |
| Phase | Mag. | Phase | Mag. | | |
| A | 0.50 | AN | 100.04 | | |
| B | 0.50 | BN | 100.07 | | |
| C | 0.50 | CN | 99.87 | | |
| Neut. Meas. | 0.00 | AB | 173.27 | | |
| Neut. Calc. | 1.49 | BC | 173.03 | | |
| | | CA | 173.24 | | |
| | | Aux. | 1.02 | | |
| Power | | | | | |
| Phase | Real (Watt) | | Reactive (VAR) | | Apparent (VA) |
| A | -24.90 | | 43.11 | | 49.78 |
| B | -24.79 | | 43.02 | | 49.65 |
| C | 49.83 | | -0.53 | | 49.81 |
| 3 Ph | 0.15 | | 85.60 | | 85.60 |

Metering
Dinput
Setup
Thermal
Demand
MinMax
Flickers

The screen explains about various parameters related to thermal average:

- **Current (Amps):** Displays the current readings for the phases A, B, C, Mea. (measured) and Cal. (calculated).
- **Voltage (Volts):** Displays the Voltage readings for the phases AN, BN, CN, AB, BC, CA and Aux.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Real (Watt), Reactive (VAR) and Apparent (VA).

Digital Inputs



Device Name: nexus
 Group Name: \$System
 Meter Name: 0107 Nexus 1252
 Boot Ver. No.: 0.6.0.1
 Runtime Ver. No.: 0.6.0.3
 DSP Boot Ver. No.: 0.6.0.0
 DSP Runtime Ver. No.: 0.6.0.2
 Serial No.: 79209
 On Time
 Dec 31, 2003 13:44:58.10
 Current Time
 Jan 05, 2004 18:12:35.79

| Digital Inputs Tab | | | | |
|--------------------|------|------------------|-------|---------------|
| IP # | Name | Open/Close Label | State | Pulse Counter |
| 1 | | Closed_1 | █ | 0 |
| 2 | | Open_2 | █ | 0 |
| 3 | | Open_3 | █ | 0 |
| 4 | | Open_4 | █ | 0 |
| 5 | | Open_5 | █ | 0 |
| 6 | | Open_6 | █ | 1.00 |
| 7 | | Open_7 | █ | 0 |
| 8 | | Open_8 | █ | 0 |

Legend : █ Open █ Closed

Events

Trend

Help

Setup

Wave

Exit

Metering

Dinput

Setup

Thermal

Demand

MinMax

Flickers

The Digital Inputs tab displays the following parameters of 8 digital inputs. They are

Name: Displays the name of the Digital Input. The maximum allowed is 16 Character string.

Open/Close Label: Based on the Digital input status, the corresponding label will be displayed. For example if the digital input status is OPEN then label for Open condition is displayed or if the digital input status is CLOSED then label for Closed condition is displayed.

Status: The status is displayed Open/Closed. Open status showed in green and Closed status in gray.

Counter: Displays the corresponding digital input counter value.

Setup

Setup Tab

| Phase | Current Setpoints(%) | | Phase | Voltage Setpoints(%) | |
|-------|----------------------|-------|-------|----------------------|-------|
| | Above | Below | | Above | Below |
| A | 120.00 | 0.00 | AN | 120.00 | 80.00 |
| B | 120.00 | 0.00 | BN | 120.00 | 80.00 |
| C | 120.00 | 0.00 | CN | 120.00 | 80.00 |
| Mea. | 10.00 | 0.00 | AB | 120.00 | 20.00 |
| Calc. | 0.00 | 0.00 | BC | 120.00 | 20.00 |
| | | | CA | 120.00 | 20.00 |
| | | | Aux. | 0.00 | 0.00 |

| | PT Ratio | | CT Ratio | | Comm. Parameters | | |
|-------------|----------|------|----------|-------|------------------|---------|--------|
| | Phase | Aux. | Phase | Neut. | Port # | Address | Baud |
| Numerator | 1.00 | 1.00 | 1.00 | 5.00 | 1 | 1 | 9600 |
| Denominator | 1.00 | 1.00 | 1.00 | 5.00 | 2 | 1 | 115200 |
| | | | | | 3 | 1 | 9600 |
| | | | | | 4 | 1 | 19200 |

Volt. Phase Seq. C-B-A

The screen explains various parameters related to setup.

Current Set Points: Above and Below Current Setpoints are shown for Phase A, B, C, Measured and Calculated.

Voltage Set Points: Above and Below Voltage Setpoints are shown AN, BN, CN, AB, BC, CA and Aux.

PT Ratio: Displays Phase and Auxiliary values for Numerator and Denominator.

CT Ratio: Displays Phase and Neutral values for Numerator and Denominator.

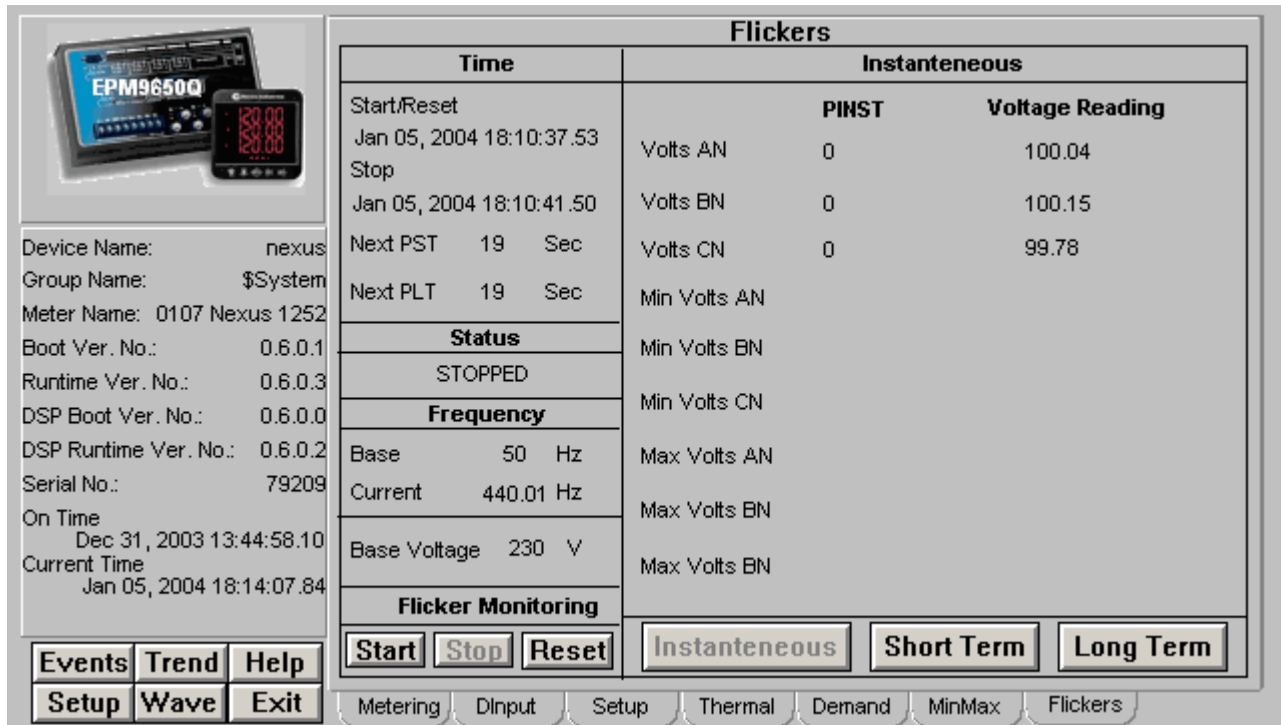
Communication Parameters: Displays Port Addresses and Baudrate for each of the 4 Ports.

Reset: This wizard allows user to reset the following Parameters.

- Energy
- Log
- Maximum and
- Minimum

Voltage Phase Sequence: Displays Phase sequence as either C-B-A or A-B-C, based on the register value.

Flicker



| Time | | Instantaneous | |
|---------------------------|-----------|----------------------|------------------------|
| Start/Reset | | PINST | Voltage Reading |
| Jan 05, 2004 18:10:37.53 | | Volts AN | 0 |
| Stop | | | |
| Jan 05, 2004 18:10:41.50 | | Volts BN | 0 |
| Next PST 19 Sec | | Volts CN | 0 |
| Next PLT 19 Sec | | Min Volts AN | 99.78 |
| Status | | Min Volts BN | |
| STOPPED | | Min Volts CN | |
| Frequency | | Max Volts AN | |
| Base | 50 Hz | Max Volts BN | |
| Current | 440.01 Hz | Max Volts CN | |
| Base Voltage | 230 V | | |
| Flicker Monitoring | | | |
| Start | | Instantaneous | Short Term |
| Stop | | | Long Term |
| Reset | | | |

Device Name: nexus
 Group Name: \$System
 Meter Name: 0107 Nexus 1252
 Boot Ver. No.: 0.6.0.1
 Runtime Ver. No.: 0.6.0.3
 DSP Boot Ver. No.: 0.6.0.0
 DSP Runtime Ver. No.: 0.6.0.2
 Serial No.: 79209
 On Time
 Dec 31, 2003 13:44:58.10
 Current Time
 Jan 05, 2004 18:14:07.84

Events Trend Help
 Setup Wave Exit

Metering DInput Setup Thermal Demand MinMax Flickers

The screen explains various parameters related to setup.

Current Date Time: Current Date Time in the device

Start/Reset/Stop: The start and stop time stamp of flicker. Start and Reset timestamps are displayed at the same place.

Next PST: When is the next short-term flicker in seconds.

Next PLT: When is the next long-term flicker in seconds.

Status: Whether Flicker is running/active or stopped.

Frequency: This has information about base frequency, current frequency. And base voltage is displayed.

Instantaneous: Displays the P instantaneous and Voltage AN, BN and CN readings. No Min Volts AN, BN, CN present.

Short Term: Shows short term voltage for AN, BN, CN, Min and Max voltages along with their time stamps.

Long Term: Shows long term voltage for AN, BN, CN, Min and Max voltages along with their time stamps.

Flicker Monitoring: There are 3 buttons under this to enable the following:

Start: Start the flicker

Stop: Stop the Flicker


Reset: Stops and starts the flicker.

EPM7430D/EPM7450D

These devices belong to the Electro Industries family, which is a tightly integrated device in to the PMCS product. These devices communicate through EI Protocol (Electro Industries Protocol). The server used for these devices is **GE32EIND**.

The device comes with 2 versions – EPM7430D and EPM7450D. Both the devices does not support Waveform and events features. So these two buttons will be disabled.

Metering



Device Name: FUTURA
Group Name: \$System
Baud Rate: 9600
Modbus Addr: 51

| Metering Tab | | | | | |
|---------------|----------------|-----------------|----------------|--------------------------|-----------------|
| Ph. | Voltage(Volts) | Ph. | Current(Amps) | THD Current (%) | THD Voltage (%) |
| AN | 9.70 | A | 0.00 | 0.00 | 2.40 |
| BN | 9.60 | B | 0.00 | 0.00 | 3.70 |
| CN | 9.80 | C | 0.00 | 0.00 | 4.00 |
| AB | 0.00 | Neut. | 0.00 | Frequency (Hz) 59.99 | |
| BC | 0.00 | | | Phase Imbalance (%) 0.00 | |
| CA | 0.00 | | | Phase Reversal A-B-C | |
| Energy | | | | | |
| Positive kWh | | 3998.30 | | Positive kVARh 1454.91 | |
| Negative kWh | | 16948.49 | | Negative kVARh 326.88 | |
| kVAh | | 59687.53 | | | |
| Power | | | | | |
| Ph. | Real (kW) | Reactive (kVAR) | Apparent (kVA) | PF | |
| A | 0.00 | 0.00 | 0.00 | 1.00 | |
| B | 0.00 | 0.00 | 0.00 | 1.00 | |
| C | 0.00 | 0.00 | 0.00 | 1.00 | |
| 3 Ph | 0.00 | 0.00 | 0.00 | 1.00 | |

Events Trend Help

Setup Wave Exit


Metering MinMax Setup Limits

The Metering tab shows following various parameters:

- **Voltage:** This tab displays the voltage values of AN, BN, CN, AB, BC and CA.
- **Current:** Displays currents of Phase A, B, C and neutral.
- **THD Current/THD Voltage:** Displays THD values of Phase A, B and C for current and voltage.
- **Energy:** Displays values for Positive kWh, Negative kWh, Positive kVARh, Negative kVARh and kVAh,.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Real (kW), Reactive (kVAR), Apparent (kVA) and PF.

The wizard also displays the parameters Frequency (Hz), Phase Imbalance (%) and Phase Reversal. If Phase Reversal is ON, the wizard shows CBA, if not then shows ABC.

Min/Max



Device Name: FUTURA
Group Name: \$System
Baud Rate: 9600
Modbus Addr: 51

MinMax Tab

| Maximum Values | | | | | |
|----------------|----------------|-------|---------------|-----------------|-----------------|
| Ph. | Voltage(Volts) | Ph. | Current(Amps) | THD Current (%) | THD Voltage (%) |
| AN | 149.70 | A | 398.00 | 5.80 | 20.90 |
| BN | 111.10 | B | 398.00 | 6.10 | 20.30 |
| CN | 150.30 | C | 398.00 | 15.00 | 15.00 |
| AB | 94.70 | Neut. | 1197.00 | Frequency (Hz) | |
| BC | 95.20 | | | 60.00 | |
| CA | 94.70 | | | | |
| | | | | | |

| Power | | | | | | | |
|-------|---------|---------|-----------|-----------|--------|---------|---------|
| Ph. | Pos. kW | Neg. kW | Pos. kVAR | Neg. kVAR | kVA | Pos. PF | Neg. PF |
| A | 0.00 | -59.00 | 0.00 | 0.00 | 59.00 | 1.00 | -0.00 |
| B | 0.00 | -30.00 | 0.00 | 0.00 | 30.00 | 0.00 | -0.00 |
| C | 0.00 | -59.00 | 0.00 | 0.00 | 59.00 | 1.00 | -0.00 |
| 3 Ph | 0.00 | -141.00 | 1.00 | 0.00 | 141.00 | 0.00 | -0.00 |

Show Min. Values

Show Max. Values

| | | |
|--------|-------|------|
| Events | Trend | Help |
| Setup | Wave | Exit |

| | | | |
|----------|--------|-------|--------|
| Metering | MinMax | Setup | Limits |
|----------|--------|-------|--------|

The tab displays Maximum and Minimum values of various parameters. The user can get maximum and minimum values by clicking on respective buttons labeled Show Max. Values and Show Min. Values.

- **Voltage:** This tab displays the voltage values of AN, BN, CN, AB, BC and CA.
- **Current:** Displays currents of Phase A, B, C and Neutral.
- **THD :** Displays THD values of Phase A, B, C for Current and Voltage.
- **Power:** Displays Phase A, B, C and 3 Phase Power Values for Positive kW, Negative kW, Positive kVAR, Negative kVAR, kVA, Positive PF and Negative PF.
- **Frequency:** Displays frequency in Hz.

Limits

| | Limit 1 | Limit 1 Trigger | | | Limit 2 | Limit 2 Trigger | | | Set Above/Below | |
|----------------|---------|-----------------|--------|--------|---------|-----------------|--------|--------|-----------------|-------|
| | | Rly. 1 | Rly. 2 | Rly. 3 | | Rly. 1 | Rly. 2 | Rly. 3 | Lim.1 | Lim.2 |
| | | | | | | | | | | |
| Current | | | | | | | | | | |
| Ia(Amp) | 760.000 | Gray | Amber | Gray | 625.000 | Gray | Gray | Amber | Red | Gray |
| Ib(Amp) | 760.000 | Gray | Amber | Gray | 25.000 | Gray | Gray | Amber | Red | Gray |
| Ic(Amp) | 760.000 | Gray | Amber | Gray | 25.000 | Gray | Gray | Amber | Red | Gray |
| In(Amp) | 10.000 | Gray | Amber | Gray | 5.000 | Gray | Gray | Amber | Red | Gray |
| Voltage | | | | | | | | | | |
| Van(Volt) | 999.900 | Amber | Gray | Gray | 30.000 | Gray | Gray | Amber | Red | Gray |
| Vbn(Volt) | 100.000 | Amber | Gray | Gray | 300.000 | Gray | Gray | Amber | Red | Gray |
| Vcn(Volt) | 100.000 | Amber | Gray | Gray | 30.000 | Gray | Gray | Amber | Red | Gray |
| Vab(Volt) | 150.000 | Amber | Gray | Gray | 50.000 | Gray | Gray | Amber | Red | Gray |
| Vbc(Volt) | 150.000 | Amber | Gray | Gray | 50.000 | Gray | Gray | Amber | Red | Gray |
| Vca(Volt) | 150.000 | Amber | Gray | Gray | 50.000 | Gray | Gray | Amber | Red | Gray |
| Power | | | | | | | | | | |
| kVA | 10.000 | Gray | Amber | Gray | 5.000 | Gray | Amber | Gray | Red | Gray |
| kVAR | 20.000 | Gray | Amber | Gray | 5.000 | Gray | Amber | Gray | Red | Gray |
| kW | 20.000 | Gray | Amber | Gray | 5.000 | Gray | Amber | Gray | Red | Gray |
| Freq. | 60.1 | Gray | Amber | Gray | 60.1 | Gray | Amber | Gray | Red | Gray |

Legend : ■ Trigger ■ Not Trigger ■ Below ■ Above

The screen explains various parameters related to Limits and Triggers:

Limit 1 Trigger/Limit 2 Trigger (Relay 1, Relay 2 and Relay 3)

Relay 1, Relay 2 and Relay 3 are triggered depending upon the Limit 1 and Limit 2 values. The screen also displays whether the Limit 1 and Limit 2 are set above or set below.

Relay 1, Relay 2 and Relay 3 of Limit 1 and Limit 2 are displayed either as Not Triggered or Triggered. If the relay is triggered, the LED fills with amber, if not then gray.

If Limit 1 or Limit 2 are set above, then the status is displayed in red, if not gray, meaning the Limits are set below,

The Limit 1 and Limit 2 Parameters that are shown on the tab are

Current: Phase A, Phase B, Phase C and Neutral.

Voltage: AN, BN, CN, AB, BC, CA


Power: VA, VAR, WATT, PF and Frequency

Brief explanation of each of the columns is described below

| Column | Description |
|-------------------|--|
| Limit 1 | Limit 1 value for the Associated quantity (For example: Phase A Amps) |
| Trigger - Relay 1 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 1. LED display in Gray color: Limit 1 of the associated value will not trigger Relay 1. |
| Trigger - Relay 2 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 2. LED display in Gray color: Limit 1 of the associated value will not trigger Relay 2. |
| Trigger - Relay 3 | LED display in Amber color : Limit 1 of the associated value will trigger Relay 3. |

| | |
|-------------------------|--|
| | LED display in Gray color: Limit 1 of the associated value will not trigger Relay 3. |
| Limit 2 | Limit 2 value for the Associated quantity (For example: Phase A Amps) |
| Trigger - Relay 1 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 1. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 1. |
| Trigger - Relay 2 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 2. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 2. |
| Trigger - Relay 3 | LED display in Amber color : Limit 2 of the associated value will trigger Relay 3. LED display in Gray color: Limit 2 of the associated value will not trigger Relay 3. |
| Set Above/Below Limit 1 | LED display in RED color : Limit 1 of the associated value is Set for Above. LED display in Gray color: Limit 1 of the associated value is Set for Below. |
| Set Above/Below Limit 2 | LED display in RED color : Limit 2 of the associated value is Set for Above. LED display in Gray color: Limit 2 of the associated value is Set for Below. |

Setup



Device Name: FUTURA
Group Name: \$System
Baud Rate: 9600
Modbus Addr: 17

Setup

| Configuration | | | | Relay 1 | Relay 2 | Relay 3 |
|---|-------------------------------------|----------------|--------------------------|--|--------------------------|---------|
| Kilo Volt Inputs | <input type="checkbox"/> | Ph. Imbalance | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Kilo Amp Input | <input type="checkbox"/> | Delay on(Sec) | 1 | 2 | 3 | |
| Mega Watt Input | <input type="checkbox"/> | Delay Off(Sec) | 3 | 2 | 1 | |
| Phase Reverse Limits | <input checked="" type="checkbox"/> | Interval (Sec) | 900 | | | |
| Meter Setup | Non Open Delta | | | | | |
| Limits Set By | Instantaneous | | | | | |
| Full Scale Values | | | | Reset | | |
| Phase | Voltage (Volt) | Phase | Current (Amps) | <div style="margin-bottom: 20px; text-align: center; border: 1px solid gray; padding: 5px; width: 100%;">Watt Hour</div> <div style="margin-bottom: 20px; text-align: center; border: 1px solid gray; padding: 5px; width: 100%;">VAR Hour</div> <div style="text-align: center; border: 1px solid gray; padding: 5px; width: 100%;">VA Hour</div> | | |
| AN | 100.0 | A | 100.0 | | | |
| BN | 100.0 | B | 100.0 | | | |
| CN | 100.0 | C | 100.0 | | | |
| Volts Decimal Placement | | | 1 | | | |
| Amps Decimal Placement | | | 1 | | | |
| Power Decimal Placement | | | 0 | | | |
| Legend : <input type="checkbox"/> NOT Configured <input checked="" type="checkbox"/> Configured <input type="checkbox"/> NOT Enabled <input checked="" type="checkbox"/> Enabled | | | | | | |

Metering
MinMax
Setup
Limits

Events
Trend
Help

Setup
Wave
Exit

The screen shows the following parameters in relation with Relay 1, Relay 2 and Relay 3 such as:

Configuration: The Parameters under configuration are Kilo Volt Inputs, Kilo Amp Input, Mega Watt Input, Phase Reverse Limits. If any of the above parameters are configured the LED shows Green otherwise LED shows Gray in color.

Meter Setup: If this parameter is set then text displayed as Open Delta, if not then shows Non Open Delta.

Limits Set By: If this parameter is set then text displayed as Average, if not then shows Instantaneous.

Relay 1 / Relay 2/ Relay 3: This section shows the parameters Phase Imbalance, Delay On and Delay Off of Realy 1, Relay 2 and Relay 3.

The Legend applicable Phase Imbalance is if any of the above parameters are Enabled the LED shows RED otherwise LED shows Gray in color.

Full Scale Values: Displays Full Scale Voltage values for phases AN, B and CN; and Full Scale current values for phases A, B and C. Also shows Decimal Placement values of Volts, Amps and Power.

Reset of Min and Max: Resets Minimum and Maximum values.

For example:

To reset Minimum values, when the button is clicked, a dialog box will appear asking “Reset minimum values?”. The dialog box contains Ok and Cancel buttons. If the Ok button is clicked, all the minimum values of parameters are reset. If the Cancel button is clicked, no Reset will occur.

Reset of WATT Hour, VAR Hour and VA Hour:

In resetting the above parameters 2 dialog boxes will prompt user to implement the functionality.

For example:

Dialog box 1: To reset Watt Hour, when the button is clicked, a dialog box will appear asking “Do you want to reset Watt Hour?”. The dialog box contains Ok and Cancel buttons. If the Ok button is clicked, then another dialog box prompts the user. If Cancel button is clicked the Dialog box 2 will not appear and no Reset will occur.

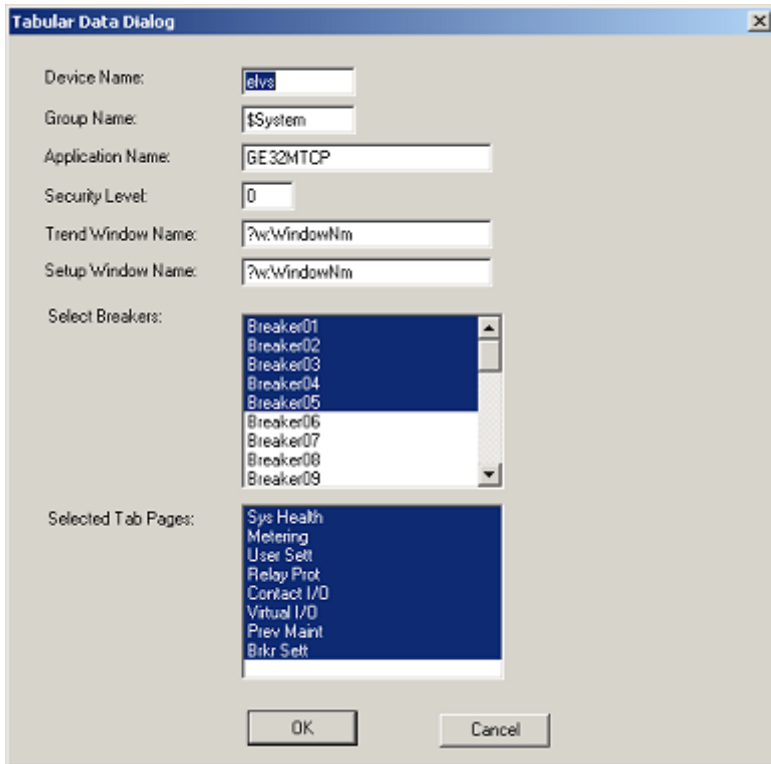
Dialog box 2: Asking “Confirm the reset within 10 seconds”. If the Ok button is clicked the parameter is reset. If Cancel button is clicked no Reset will occur.

Entellisys LVS

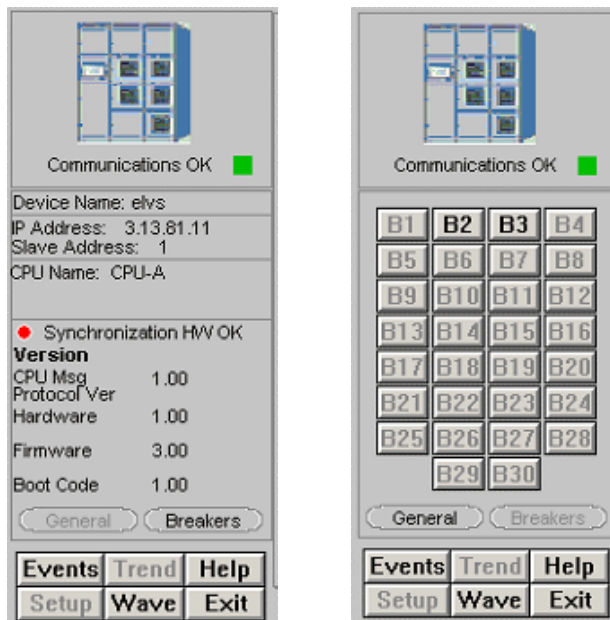
EntellisysLVS is an integrated switchgear control system using a single central processing unit (C/CPU) to perform all switchgear functions. It replaces all devices and the point-to-point wiring used today to perform protection, monitoring, metering, discrete I/O and control functions in GE low voltage distribution switchgear. The basic FBW system consists of a C/CPU (Power PC), a digital communications network, and device electronics (Nodes) at the breaker - all are located in the gear. Raw voltage/current samples and status are digitized by the Node and communicated via the digital network to the C/CPU. The C/CPU runs the software to perform all of the switchgear functions. When it is determined that a breaker operation is required, the C/CPU sends a command to the Node. The Node decodes the commands and controls the power to actuate the breaker. Additionally, the EntellisysLVS system performs discrete I/O and communicates externally to SCADA systems, web interfaces, and through email. The EntellisysLVS system is redundant to achieve higher reliability than current day systems. Local maximum breaker protection is provided at the Node.

Configuration

After dropping the Entellisys wizard, when user double click you see the following dialog box. User need to select the breakers and tabs which he need to configure in the project. Depending upon the selection of Breakers and Tabs, tags are imported into the project.



There are two buttons provided in Framework Wizard –General and Breaker. General button shows CPU health information while Breaker button displays set of all the 30 breaker buttons. By default General button is clicked.



Depending upon the configured breakers respective Breaker buttons become enabled. Remaining all other breakers are disabled. When the user opens the tabular wizard by clicking small face plate, by default the first breaker out of configured breakers is selected.

System Health

The System Health window displays diagnostic and statistic information for up to 30 nodes and for both CPUs.

Operators can quickly be alerted to any system maintenance or repairs that require attention, as well as troubleshoot startup issues.

Metering

Breaker Status

Breaker Status screen displays detailed information about the status of this breaker.

Demand Metering

Demand Metering window displays breaker load information about the selected breaker

Metering - Demand - Breaker 01

| DEMAND | | | |
|-------------------|---------------------|---------------------|---------------------|
| | Real | Reactive | Apparent |
| Previous Interval | 0.00 W | 0.00 VAR | 0.00 VA |
| Maximum | 0.00 W | 0.00 VAR | 0.00 VA |
| Date of Max | 01/01/1970 00:00:00 | 01/01/1970 00:00:00 | 01/01/1970 00:00:00 |

| | |
|---------------------------|---------------------|
| Date of Last Demand Reset | 04/26/2005 14:10:44 |
| Quantity of 'Last Resets' | 21 |

| | |
|--------------------------------|---------------------|
| Date of Last Reset - All Brkrs | 04/09/2005 15:01:32 |
| Quantity of 'Last Resets All' | 9 |

| | |
|--------------------------|---------------------|
| Date of Last Log Clear | 04/26/2005 14:10:22 |
| Records Since Last Clear | 26966 |
| Records Available | 5697 |

| | |
|------------------------------|---------------------|
| Date of Last Clear All Brkrs | 04/09/2005 15:02:00 |
|------------------------------|---------------------|

General Breakers

Events Trend Help
Setup Wave Exit

Breaker Status Demand Detailed Harmonics

Sys Health Metering User Sett Relay Prot Contact I/O Virtual I/O Prev Maint Brkr Sett

Detailed Metering

Detailed Metering window displays current, voltage, energy, and power data for the selected breaker.

Metering - Detailed - Breaker 01

| POWER | | | | |
|----------|----------|-----------|-----------|-----------|
| | 3 Phase | Phase - A | Phase - B | Phase - C |
| Real | 0.00 W | 0.00 W | 0.00 W | 0.00 W |
| Reactive | 0.00 VAR | 0.00 VAR | 0.00 VAR | 0.00 VAR |
| Apparent | 0.00 VA | 0.00 VA | 0.00 VA | 0.00 VA |

| POWER FACTOR | | | | |
|--------------|------------------|------------------|------------------|------------------|
| Present | 0.000 | 0.000 | 0.000 | 0.000 |
| Minimum | 0.000 | 0.000 | 0.000 | 0.000 |
| Date of Min | 01/01/1970 00:00 | 01/01/1970 00:00 | 01/01/1970 00:00 | 01/01/1970 00:00 |
| Maximum | 0.000 | 0.000 | 0.000 | 0.000 |
| Date of Max | 01/01/1970 00:00 | 01/01/1970 00:00 | 01/01/1970 00:00 | 01/01/1970 00:00 |

| ENERGY | | | | |
|---------------|-----------|-----------|-----------|-----------|
| Positive Wh | 0.00 Wh | 0.00 Wh | 0.00 Wh | 0.00 Wh |
| Negative Wh | 0.00 Wh | 0.00 Wh | 0.00 Wh | 0.00 Wh |
| Positive VARh | 0.00 VARh | 0.00 VARh | 0.00 VARh | 0.00 VARh |
| Negative VARh | 0.00 VARh | 0.00 VARh | 0.00 VARh | 0.00 VARh |
| VAh | 0.00 VAh | 0.00 VAh | 0.00 VAh | 0.00 VAh |

| | |
|-------------------------------------|---------------------|
| Date of Last Energy Clear | 01/01/1970 00:00:00 |
| Date of Last Energy Clear All Brkrs | 01/01/1970 00:00:00 |

General Breakers

Events Trend Help
Setup Wave Exit

Breaker Status Demand Detailed Harmonics

Sys Health Metering User Sett Relay Prot Contact I/O Virtual I/O Prev Maint Brkr Sett

Harmonics Metering

Harmonics Metering window displays K factor and harmonic distortion information about the selected breaker.

Metering - Harmonics - Breaker 01

Communications OK ■

Harmonics

| K - FACTOR | |
|------------|------|
| A | 1.0 |
| B | 1.0 |
| C | 66.6 |
| N | 1.0 |

| TOTAL HARMONIC DISTORTION | |
|---------------------------|-------------|
| PHASE | Current THD |
| A | 0.000 |
| B | 0.000 |
| C | 10.421 |
| N | 0.000 |

| PHASE | Voltage THD |
|-----------------|-------------|
| V _{an} | 0.000 |
| V _{bn} | 0.000 |
| V _{cn} | 0.000 |

Breaker Control Status

| | |
|---------------|------------|
| Breaker Name | Breaker 01 |
| Current State | Error |

General Breakers

Events Trend Help
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Breaker Status Demand Detailed Harmonics

Sys Health Metering User Sett Relay Prot Contact I/O Virtual I/O Prev Maint Brkr Sett

User Settings

Entellisis provides different kinds of protections: Long Time (LT), Short Time (ST), Instantaneous Overcurrent (IOC), and Ground Fault (GF). The system provides overcurrent protection for each breaker by monitoring the phase currents at each breaker. When an overcurrent condition is detected, the system opens the breaker.

Here User setting screen shows data related to Overcurrent Protection . This screen lets you see present Over current Protection, IOC/Short Time, Long Time, and Ground Fault settings .

User Settings - Breaker 01

Communications OK ■

Rating

Frame

Sensor

Instantaneous

Instantaneous : Enabled

IOC Pickup

Short Time

Short Time : Enabled

Pickup Setting

Curve I²T

Delay Band

Long Time Protection

Delay Band

Rating

Setting

Current Setting

Ground Fault

Ground Fault : Enabled

Pickup Setting

Curve I²T

Delay Band

Ground Fault Protec/Alarm

General Breakers

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Setup Wave Exit

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Relay Protection

Entellisis provides single-point protection relay functions in three optioned packages. The Voltage Relay package has the following functions:

- Undervoltage Protection Relay
- Overvoltage Protection Relay
- Phase Loss Protection Relay

The Frequency and Reverse Power Relay package has the following functions:

- Under Frequency Protection Relay
- Over Frequency Protection Relay
- Reverse Power Protection Relay

High Current Relay Package has the following function:

- High Current Protection Relay

Page 1

Relay Protection - Breaker 01

Trip

Over Voltage

Pickup Setting: 123.0
Time Delay: 263.0
Phase Require: 1 phase violates threshold
Open Trip: Trip, Activate lockout

Under Voltage

Curve Type: Constant Time Curve
Pickup Setting: 51.0
Time Delay: 30.5
Phase Require: 2 phases violates threshold
Blocking Voltage: 6.0
Open Trip: Open, Don't activate lockout

Reverse Power

Pickup Setting: 10.0
Time Delay: 30.5
Open Trip: Open, Don't activate lockout

Alarm

Over Voltage

Pickup Threshold: 123.0
Time Delay: 263.0
Phase Require: 1 phase violates threshold

Under Voltage

Curve Type: Constant Time Curve
Pickup Setting: 52.0
Time Delay: 31.0
Phase Require: 3 phases violates threshold
Blocking Voltage: 6.0

Reverse Power

Pickup Threshold: 10.0
Time Delay: 16.0

High Current

Pickup Setting: 200.0
Time Delay: 15.0

General Breakers

Events Trend Help
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Sys Health Metering User Sett **Relay Prot** Contact I/O Virtual I/O Prev Maint Brkr Sett

Page 2

Relay Protection - Breaker 01

Trip

Phase Loss

Pickup Setting: 11.0
Time Delay: 31.0
Blocking Voltage: 5.0
Open Trip: Trip, Activate lockout

Over Frequency

Pickup Setting: 50.1
Time Delay: 30.1
Blocking Voltage: 10
Open Trip: Open, Don't activate lockout

Under Frequency

Pickup Setting: 45.1
Time Delay: 30.1
Blocking Voltage: 10
Open Trip: Open, Don't activate lockout

High Resistance GF (Alarm)

Pickup Setting: 9.9
Time Delay: 4.9
Ground Resistance: 6
Ground CT Rating: 10

Alarm

Phase Loss

Pickup Setting: 13.0
Time Delay: 12.0
Blocking Voltage: 5.0

Over Frequency

Pickup Setting: 50.2
Time Delay: 30.2
Blocking Voltage: 10

Under Frequency

Pickup Setting: 45.2
Time Delay: 30.2
Blocking Voltage: 10


General Breakers

Events Trend Help
Setup Wave Exit

Sys Health Metering User Sett **Relay Prot** Contact I/O Virtual I/O Prev Maint Brkr Sett

Preventive Maintenance

Entellisys provides data to manage preventative maintenance items. Breaker transition counters, life calculations, run hours of operations, and last operation date stamping are all values that can aid in maintaining and servicing the Entellisys system. Transition counters can trigger alarms after a certain number of transitions have occurred. The *Preventative Maintenance* screen lets you specify general setup and alarm setup maintenance settings.



Maintenance

Preventive Maintenance - **Breaker 01**

| | Actual Value |
|---|---------------------|
| No. of operations As per ANSMIEEE C37.13 and C37.16 | 60 |
| No. of No-Load operations As per ANSMIEEE C37.13 and C37.16 | 11 |
| No. of Load operations As per ANSMIEEE C37.13 and C37.16 | 2 |
| No. of Fault operations As per ANSMIEEE C37.13 and C37.16 | 8 |
| Percentage of Total Load Life As per ANSI C37.50 | 25.12 |
| Percentage of Mechanical Life As per ANSI C37.50 | 0.48 |
| Date of Initial Energization | 06/30/2005 00:00:00 |
| Hours of Operations | 1191950 |
| Date of Last Operation | 05/14/2005 16:28:04 |

Line Up Options

- Synch Check Relay
- Bus Differential Relay
- Multi Source Ground Fault
- ZSI
- High Resistance Ground Fault
- Waveform Capture

Per Breaker Options

| | |
|--------------------------------------|----|
| Expanded Metering Count | 30 |
| Demand Metering Count | 30 |
| Advanced Metering Count | 30 |
| Voltage Relay Count | 30 |
| High Current Relay Count | 30 |
| Frequency and High Power Relay Count | 30 |

General Breakers


Events Trend Help

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Sys Health
Metering
User Sett
Relay Prot
Contact I/O
Virtual I/O
Prev Maint
Brkr Sett

Breaker Settings

This is part of factory configuration settings. It lets the user to see Breaker settings.



Factory Settings - Breaker Settings - Breaker 01

Communications OK ■

| | | | |
|-----|-----|-----|-----|
| B1 | B2 | B3 | B4 |
| B5 | B6 | B7 | B8 |
| B9 | B10 | B11 | B12 |
| B13 | B14 | B15 | B16 |
| B17 | B18 | B19 | B20 |
| B21 | B22 | B23 | B24 |
| B25 | B26 | B27 | B28 |
| B29 | B30 | | |

General Breakers

Events Trend Help

Setup Wave Exit

| | |
|---|--|
| <input checked="" type="checkbox"/> Installed | PT Rating <input style="width: 100px;" type="text" value="600V_WYE"/> |
| <input type="checkbox"/> Commissioned | |
| Breaker Type <input style="width: 100px;" type="text" value="UL"/> | Hardware Version <input style="width: 100px;" type="text" value="0"/> |
| Frame Rating <input style="width: 100px;" type="text" value="0"/> | Firmware Version <input style="width: 100px;" type="text" value="0.00"/> |
| Sensor Rating <input style="width: 100px;" type="text" value="0"/> | Message Protocol Version <input style="width: 100px;" type="text" value="0.00"/> |
| Long Time Rating <input style="width: 100px;" type="text" value="0"/> | |
| Long Time Setting <input style="width: 100px;" type="text" value="0.00"/> | |
| Long Time Current Setting <input style="width: 100px;" type="text" value="0.00"/> | |

Sys Health Metering User Sett Relay Prot Contact I/O Virtual I/O Prev Maint Brkr Sett

Contact Input/Output

Contact Input

CI screen displays a list of all the contact inputs configured along with the input name and state – On or Off

The screenshot shows the 'Discrete I/O - Contact I/O States' window with the 'Contact Inputs' tab selected. The window title is 'Discrete I/O - Contact I/O States' and the 'Contact Input Count' is 120. The left sidebar contains a 'Communications OK' indicator, a grid of buttons labeled B1 through B30, and navigation buttons for 'General', 'Breakers', 'Events', 'Trend', 'Help', 'Setup', 'Wave', and 'Exit'. The main table lists 16 contact inputs, all of which are currently 'Off' (indicated by a red square in the State column).

| CI No | Name | State |
|-------|------------------|-------|
| 17 | Contact Input 17 | Off |
| 18 | Contact Input 18 | Off |
| 19 | Contact Input 19 | Off |
| 20 | Contact Input 20 | Off |
| 21 | Contact Input 21 | Off |
| 22 | Contact Input 22 | Off |
| 23 | Contact Input 23 | Off |
| 24 | Contact Input 24 | Off |
| 25 | Contact Input 25 | Off |
| 26 | Contact Input 26 | Off |
| 27 | Contact Input 27 | Off |
| 28 | Contact Input 28 | Off |
| 29 | Contact Input 29 | Off |
| 30 | Contact Input 30 | Off |
| 31 | Contact Input 31 | Off |
| 32 | Contact Input 32 | Off |

At the bottom of the window, there are buttons for 'Contact Inputs' and 'Contact Outputs', a legend showing 'On' (green square) and 'Off' (red square), and a row of navigation buttons: 'Sys Health', 'Metering', 'User Sett', 'Relay Prot', 'Contact I/O', 'Virtual I/O', 'Prev Maint', and 'Brkr Sett'.

Contact Output

CO screen displays a list of all the contact outputs you configured in the *Discrete I/O* window along with the input name and state – On or Off.

The screenshot shows the 'Discrete I/O - Contact I/O States' window with the 'Contact Outputs' tab selected. The window title is 'Discrete I/O - Contact I/O States' and the 'Contact Output Count' is 8. The left sidebar is identical to the previous screenshot. The main table lists 8 contact outputs, all of which are currently 'Off' (indicated by a red square in the State column).

| CO No | Name | State |
|-------|------------------|-------|
| 1 | Contact Output 1 | Off |
| 2 | Contact Output 2 | Off |
| 3 | Contact Output 3 | Off |
| 4 | Contact Output 4 | Off |
| 5 | Contact Output 5 | Off |
| 6 | Contact Output 6 | Off |
| 7 | Contact Output 7 | Off |
| 8 | Contact Output 8 | Off |

The bottom of the window features the same navigation buttons as the previous screenshot, with 'Contact I/O' and 'Virtual I/O' buttons highlighted.

Virtual Input / Output

Virtual Input

This screen lets you view the state of Virtual Inputs . For each virtual input, Entellisys displays its name and current

state.

The screenshot shows the 'Virtual I/O States' interface with the 'Virtual Inputs' tab selected. On the left, there is a 'Communications OK' indicator with a green light and a grid of buttons labeled B1 through B30. Below the grid are 'General' and 'Breakers' buttons. At the bottom left are 'Events', 'Trend', 'Help', 'Setup', 'Wave', and 'Exit' buttons. The main table lists 16 virtual inputs, all with green state indicators. At the bottom, there are navigation buttons for 'Virtual Inputs', 'Virtual Outputs', and a 'Legend' showing 'On' as a green square and 'Off' as a red square. A row of system navigation buttons is at the very bottom.

| VI No | Name | State |
|-------|------------------|-------|
| 1 | Virtual Input 1 | On |
| 2 | Virtual Input 2 | On |
| 3 | Virtual Input 3 | On |
| 4 | Virtual Input 4 | On |
| 5 | Virtual Input 5 | On |
| 6 | Virtual Input 6 | On |
| 7 | Virtual Input 7 | On |
| 8 | Virtual Input 8 | On |
| 9 | Virtual Input 9 | On |
| 10 | Virtual Input 10 | On |
| 11 | Virtual Input 11 | On |
| 12 | Virtual Input 12 | On |
| 13 | Virtual Input 13 | On |
| 14 | Virtual Input 14 | On |
| 15 | Virtual Input 15 | On |
| 16 | Virtual Input 16 | On |

Virtual Output

It lets the user to view the state of Virtual Inputs . For each virtual input, Entellisys displays its name and current state.

The screenshot shows the 'Virtual I/O States' interface with the 'Virtual Outputs' tab selected. The layout is similar to the previous screenshot, but the main table lists 16 virtual outputs, all with red state indicators. The 'Legend' at the bottom right shows 'On' as a green square and 'Off' as a red square. The 'Contact I/O' button in the bottom navigation bar is highlighted with a red box.

| VO No | Name | State |
|-------|-------------------|-------|
| 17 | Virtual Output 17 | Off |
| 18 | Virtual Output 18 | Off |
| 19 | Virtual Output 19 | Off |
| 20 | Virtual Output 20 | Off |
| 21 | Virtual Output 21 | Off |
| 22 | Virtual Output 22 | Off |
| 23 | Virtual Output 23 | Off |
| 24 | Virtual Output 24 | Off |
| 25 | Virtual Output 25 | Off |
| 26 | Virtual Output 26 | Off |
| 27 | Virtual Output 27 | Off |
| 28 | Virtual Output 28 | Off |
| 29 | Virtual Output 29 | Off |
| 30 | Virtual Output 30 | Off |
| 31 | Virtual Output 31 | Off |
| 32 | Virtual Output 32 | Off |

Troubleshooting

Assertion Error

Q: While switching between InTouch's Runtime and Development modes, the program crashed with an Assertion Error.

A: This is a problem with InTouch Wonderware, not the GE PMCS Wizards. It occurs rarely during the development phase, and is not seen once a stable application has been developed and put into use. Reboot the computer and restart the application.

EPM 3710/EPM 3720 – no data or incorrect data displayed

Q: The values on the EPM 3710/3720 wizards come up showing zeros or incorrect data.

A: The EPM 3710/3720 wizards require you to click the Refresh button on the wizard before the display is updated. Also, the first time the wizard is displayed, it may take a few moments for the DDE conversation to be established and data to be displayed.

EPM 3720 – KVAH import values incorrect

Q: On the EPM 3720 Tabular data screen, the KVAH import value does not equal the value of KVAH total or KVAH net when KVAH export equals zero.

A: Some rapidly changing values and/or values requiring extensive calculations cannot be updated on the wizards quickly enough to reflect the data displayed on the device in real time. Be patient while the software catches up with the device.

Long update when changing setpoints

Q: I attempted to change a device setpoint (such as changing the VT connection type from WYE to DELTA). It took a long time to update the Wizards setpoint tab to reflect the changes.

A: When changing setpoints, which are polled very slowly, the display may take a long time (a minute or more) to update. This means the metering data will be postponed while the display updates. Setpoint changes are a relatively rare change to make - please be patient during the delay.

PLEPM – Wrong Metering tab displayed

Q: When I double-click the display on the PLEPM's Large Faceplate wizard to go to the Tabular data screen, the DELTA metering tab is displayed, even though the PLEPM is configured as WYE.

A: Click another tab and then click back to the Metering tab. The correct configuration will now be displayed.

InTouch applications – Windows not displayed properly

Q: When an InTouch application containing PMCS Wizards has its resolution changed, the fonts in the wizard are not sized correctly. For instance, if I develop an

application in 600 x 480 resolution and then convert it to 800 x 600 resolution, the screens look terrible, things extend off the screen, text formatting is changed, etc.

A: First, make sure that the TrueType fonts option is turned on in Windows 2000 SP2. If this option is off, it can cause font display problems even if windows have not been resized. Next, any time you change the resolution of an InTouch application containing PMCS Wizards, you'll need to delete the wizards from any converted Windows, and then add the wizards back in. When you add the wizard back in, it will display correctly.

Appendix A: EPM 3720 Sliding Window Demand Keys

Downloading Sliding Demand Window Keys to the EPM 3720

The EPM 3720 supports up to 10 sliding demand measurements that are user-programmable via the Tabular Data screen wizard. The Sliding Demand tab offers a set of adjustable fields, into which a user can enter a key (a unique string of values) which, when downloaded to the EPM 3720, will trigger a measurement.

For explanations of what the EPM 3720's various parameters mean, refer to the EPM 3720 Users Guide, in the section titled *Sliding Window Demand*.

To set the EPM 3720's sliding demand keys, follow the procedure below:

Locate the key code for the parameter you wish to measure in the table below.

1. Open the EPM 3720 Tabular Data screen wizard and select the Sliding Demand tab.
2. Enter the appropriate sliding demand window key by clicking the on-screen thumbwheels up or down until the key code from the table below is displayed.
3. Press the Download button to send the key to the device.
4. Allow several seconds for transmission time, then press the Refresh button to verify that the device has accepted the setup parameter. The values displayed should be those downloaded. When it receives the downloaded key, the meter will perform a sliding demand measurement for the parameter selected by the key.

| #1 | #2 | #3 & #4 | Sliding Window Key Thumbwheel Settings | |
|-------|-----------|----------|--|---------------------|
| Class | Sub-class | Instance | Measurement | Supported Modes |
| 4 | 3 | 00 | Volts LN Average | HS STD TD SD PD |
| 4 | 3 | 01 | Volts LN Phase A | HS STD TD SD PD |
| 4 | 3 | 02 | Volts LN Phase B | HS STD TD SD PD |
| 4 | 3 | 03 | Volts LN Phase C | HS STD TD SD PD |
| 4 | 3 | 04 | Volts LL Average | HS STD TD SD PD |
| 4 | 3 | 05 | Volts LL Phase AB | HS STD TD SD PD |
| 4 | 3 | 06 | Volts LL Phase BC | HS STD TD SD PD |
| 4 | 3 | 07 | Volts LL Phase CA | HS STD TD SD PD |
| 4 | 3 | 08 | Amps Average | HS STD TD SD PD |
| 4 | 3 | 09 | Amps Phase A | HS STD TD SD PD |
| 4 | 3 | 0A | Amps Phase B | HS STD TD SD PD |
| 4 | 3 | 0B | Amps Phase C | HS STD TD SD PD |
| 4 | 3 | 0C | Amps Neutral | HS STD TD SD PD |
| 4 | 3 | 0D | Reserved | |
| 4 | 3 | 0E | Volts Imbalance (0-100) | HS STD TD SD PD |
| 4 | 3 | 0F | Amps Imbalance (0-100) | STD TD SD PD |
| 4 | 3 | 10 | kW Total | HS STD TD SD PD HRS |
| 4 | 3 | 11 | kW Phase A | HS STD TD SD PD |
| 4 | 3 | 12 | kW Phase B | HS STD TD SD PD |
| 4 | 3 | 13 | kW Phase C | HS STD TD SD PD |
| 4 | 3 | 14 | kVAR Total | STD TD SD PD HRS |
| 4 | 3 | 15 | kVAR Phase A | STD TD SD PD |
| 4 | 3 | 16 | kVAR Phase B | STD TD SD PD |
| 4 | 3 | 17 | kVAR Phase C | STD TD SD PD |
| 4 | 3 | 18 | kVA Total | HS STD TD SD PD HRS |
| 4 | 3 | 19 | kVA Phase A | HS STD TD SD PD |
| 4 | 3 | 1A | kVA Phase B | HS STD TD SD PD |
| 4 | 3 | 1B | kVA Phase C | HS STD TD SD PD |
| 4 | 3 | 1C | PF Total | STD TD SD PD |
| 4 | 3 | 1D | PF Phase A | STD TD SD PD |
| 4 | 3 | 1E | PF Phase B | STD TD SD PD |
| 4 | 3 | 1F | PF Phase C | STD TD SD PD |
| 4 | 3 | 20 | Frequency | HS STD TD SD PD |
| 4 | 3 | 21-23 | Reserved | |
| 4 | 3 | 24 | Phase Reversal (0 or 1) | HS STD |
| 4 | 3 | 25-27 | Reserved | |
| 4 | 3 | 28 | VAUX | STD TD SD PD |

| #1 | #2 | #3 & #4 | Sliding Window Key Thumbwheel Settings | |
|-------|-----------|----------|--|-----------------|
| Class | Sub-class | Instance | Measurement | Supported Modes |
| 4 | 3 | 29-2F | Reserved | |
| 4 | 3 | 30 | I2T Avg. (0 = Off, 1= On) | HS |
| 4 | 3 | 31 | I2T Phase A (0=Off, 1=On) | HS |
| 4 | 3 | 32 | I2T Phase B (0=Off, 1=On) | HS |
| 4 | 3 | 33 | I2T Phase C (0=Off, 1=On) | HS |
| 4 | 3 | 34-67 | Reserved | |
| 4 | 3 | 68 | V1 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 69 | V2 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 6A | V3 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 6B | VAUX HD - K-Factor | STD TD SD PD |
| 4 | 3 | 6C | I1 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 6D | I2 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 6E | I3 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 6F | I4 HD - K-Factor | STD TD SD PD |
| 4 | 3 | 70 | V1 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 71 | V2 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 72 | V3 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 73 | VAUX HD - Total Odd | STD TD SD PD |
| 4 | 3 | 74 | I1 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 75 | I2 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 76 | I3 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 77 | I4 HD - Total Odd | STD TD SD PD |
| 4 | 3 | 78 | V1 HD - Total Even | STD TD SD PD |
| 4 | 3 | 79 | V2 HD - Total Even | STD TD SD PD |
| 4 | 3 | 7A | V3 HD - Total Even | STD TD SD PD |
| 4 | 3 | 7B | VAUX HD - Total Even | STD TD SD PD |
| 4 | 3 | 7C | I1 HD - Total Even | STD TD SD PD |
| 4 | 3 | 7D | I2 HD - Total Even | STD TD SD PD |
| 4 | 3 | 7E | I3 HD - Total Even | STD TD SD PD |
| 4 | 3 | 7F | I4 HD - Total Even | STD TD SD PD |
| 4 | 3 | 80 | V1 HD - Total | STD TD SD PD |
| 4 | 3 | 81 | V2 HD - Total | STD TD SD PD |
| 4 | 3 | 82 | V3 HD - Total | STD TD SD PD |
| 4 | 3 | 83 | VAUX HD - Total | STD TD SD PD |
| 4 | 3 | 84 | I1 HD - Total | STD TD SD PD |
| 4 | 3 | 85 | I2 HD - Total | STD TD SD PD |
| 4 | 3 | 86 | I3 HD - Total | STD TD SD PD |
| 4 | 3 | 87 | I4 HD - Total | STD TD SD PD |

| #1 | #2 | #3 & #4 | Sliding Window Key Thumbwheel Settings | |
|-------|-----------|----------|--|-----------------|
| Class | Sub-class | Instance | Measurement | Supported Modes |
| 4 | 3 | 88 | V1 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 89 | V2 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 8A | V3 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 8B | VAUX HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 8C | I1 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 8D | I2 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 8E | I3 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 8F | I4 HD - Harmonic #1 | STD TD SD PD |
| 4 | 3 | 90 | V1 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 91 | V2 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 92 | V3 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 93 | VAUX HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 94 | I1 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 95 | I2 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 96 | I3 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 97 | I4 HD - Harmonic #2 | STD TD SD PD |
| 4 | 3 | 98 | V1 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 99 | V2 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 9A | V3 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 9B | VAUX HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 9C | I1 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 9D | I2 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 9E | I3 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | 9F | I4 HD - Harmonic #3 | STD TD SD PD |
| 4 | 3 | A0 | V1 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A1 | V2 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A2 | V3 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A3 | VAUX HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A4 | I1 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A5 | I2 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A6 | I3 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A7 | I4 HD - Harmonic #4 | STD TD SD PD |
| 4 | 3 | A8 | V1 HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | A9 | V2 HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | AA | V3 HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | AB | VAUX HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | AC | I1 HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | AD | I2 HD - Harmonic #5 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Sliding Window Key Thumbwheel Settings | |
|-------|-----------|----------|--|-----------------|
| Class | Sub-class | Instance | Measurement | Supported Modes |
| 4 | 3 | AE | I3 HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | AF | I4 HD - Harmonic #5 | STD TD SD PD |
| 4 | 3 | B0 | V1 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B1 | V2 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B2 | V3 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B3 | VAUX HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B4 | I1 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B5 | I2 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B6 | I3 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B7 | I4 HD - Harmonic #6 | STD TD SD PD |
| 4 | 3 | B8 | V1 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | B9 | V2 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | BA | V3 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | BB | VAUX HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | BC | I1 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | BD | I2 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | BE | I3 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | BF | I4 HD - Harmonic #7 | STD TD SD PD |
| 4 | 3 | C0 | V1 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C1 | V2 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C2 | V3 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C3 | VAUX HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C4 | I1 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C5 | I2 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C6 | I3 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C7 | I4 HD - Harmonic #8 | STD TD SD PD |
| 4 | 3 | C8 | V1 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | C9 | V2 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | CA | V3 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | CB | VAUX HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | CC | I1 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | CD | I2 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | CE | I3 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | CF | I4 HD - Harmonic #9 | STD TD SD PD |
| 4 | 3 | D0 | V1 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D1 | V2 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D2 | V3 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D3 | VAUX HD - Harmonic #10 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Sliding Window Key Thumbwheel Settings | |
|-------|-----------|----------|--|-----------------|
| Class | Sub-class | Instance | Measurement | Supported Modes |
| 4 | 3 | D4 | I1 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D5 | I2 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D6 | I3 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D7 | I4 HD - Harmonic #10 | STD TD SD PD |
| 4 | 3 | D8 | V1 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | D9 | V2 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | DA | V3 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | DB | VAUX HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | DC | I1 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | DD | I2 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | DE | I3 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | DF | I4 HD - Harmonic #11 | STD TD SD PD |
| 4 | 3 | E0 | V1 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E1 | V2 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E2 | V3 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E3 | VAUX HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E4 | I1 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E5 | I2 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E6 | I3 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E7 | I4 HD - Harmonic #12 | STD TD SD PD |
| 4 | 3 | E8 | V1 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | E9 | V2 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | EA | V3 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | EB | VAUX HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | EC | I1 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | ED | I2 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | EE | I3 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | EF | I4 HD - Harmonic #13 | STD TD SD PD |
| 4 | 3 | F0 | V1 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F1 | V2 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F2 | V3 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F3 | VAUX HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F4 | I1 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F5 | I2 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F6 | I3 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F7 | I4 HD - Harmonic #14 | STD TD SD PD |
| 4 | 3 | F8 | V1 HD - Harmonic #15 | STD TD SD PD |
| 4 | 3 | F9 | V2 HD - Harmonic #15 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Sliding Window Key Thumbwheel Settings | |
|-------|-----------|----------|--|-----------------|
| Class | Sub-class | Instance | Measurement | Supported Modes |
| 4 | 3 | FA | V3 HD - Harmonic #15 | STD TD SD PD |
| 4 | 3 | FB | VAUX HD - Harmonic #15 | STD TD SD PD |
| 4 | 3 | FC | I1 HD - Harmonic #15 | STD TD SD PD |
| 4 | 3 | FD | I2 HD - Harmonic #15 | STD TD SD PD |
| 4 | 3 | FE | I3 HD - Harmonic #15 | STD TD SD PD |

Table A-1. EPM 3720 Sliding Window Demand Keys.

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Appendix B:

Automatic Waveform Capture and Waveform Retrieval on EPM3720

Using a setpoint to trigger waveform capture or record on the EPM 3720

When a Setpoint is programmed from the MMI, the EPM3720 has the ability to automatically capture or record waveforms based on the value of a specified parameter. In order to display a Waveform Capture, the meter takes 128 samples from a full cycle of any single selected channel. For a Waveform Record, the meter takes 16 samples per cycle from multiple cycles on all 8 inputs simultaneously. The device will store 36 cycles of 1 event, 18 cycles of 2 events, or 12 cycles of 3 events, depending on the Record Depth programmed by the user. Please follow the instructions below to use a Setpoint to trigger a waveform capture or record on the EPM3720.

For explanations of what the EPM 3720's various parameters mean, refer to the EPM 3720 Users Guide, in the section titled *Sliding Window Demand*.

1. In the EPM3720 MMI tabular screen, click on the Setpoints tab.
2. Choose an unassigned setpoint number. Either Standard or High Speed may be used, but High Speed is recommended for quicker response. (See Section 6 of the 3720 ACM Installation & Operation Manual for more details on configuring Setpoints.)
3. Based on the parameter that will be set in the Trigger Key, select the Setpoint Type.
4. Set the Trigger Key. The Trigger Key is a code for the parameter that, when its value passes a set limit, triggers an Action. Refer to the table in this section for a list of Trigger Key codes.
5. Enter the High and Low Limits as well as any Time Delays to operate and release.
6. Select the required Action. To record a waveform, choose **Waveform Recorder**. For Waveform Capture, remember that the waveform of only one input may be automatically captured. Choose **Waveform**

Capture Channel X where X represents an integer between 1 and 8. Following are the Channel assignments for Wye and Delta systems.

7. Press the **Download** key. This will transmit the values entered into the Setpoints tabular screen for the selected setpoint number to the device. After several seconds press the **Refresh** button and scroll to the selected setpoint to verify that the device has accepted the setpoint entered parameters.
8. For waveform record, open the Waveform Capture program from within the MMI. On the main screen, select the appropriate Topic or device name and click on the **Record** radio button. Then, under the menu Waveform>Configure>Record Depth, select a depth of either 1 event x 36 cycles, 2 events x 18 cycles, or 3 events x 12 cycles. Press OK. The Trigger, Arm, and Retrieve buttons will become inactive as the depth is downloaded to the meter. For waveform capture proceed directly to step 9.
9. Once the **Trigger, Arm, & Retrieve** buttons become active, press the **Arm** button. The **Trigger, Arm, & Retrieve** buttons will momentarily become inactive. When the buttons become active, the meter is now ready to record/capture a waveform when the setpoint conditions are reached.
10. Once the waveform has been automatically captured or recorded and the event has been logged, choose the appropriate Topic and function; i.e., in the main screen of the Waveform Capture program, press **Retrieve**.
11. View and save waveforms as desired.
12. To rearm the meter and clear the waveform data out of the device's memory, press **Arm** on the main screen of the Waveform Capture program.

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting |
|-------|-----------|---------------------------|--|
| Class | Sub-class | Instance | Meaning |
| 0 | 0 | 00 | Null Object Identifier |
| 1 | 0 | 00-05 | Digital Inputs (Status Inputs) |
| 1 | 1 | 00-02 | Digital Outputs (Relays) |
| 1 | 2 | 00-07 | Analog Inputs (Voltage & Current Inputs) |
| 1 | 3 | 00 | Analog Outputs (IOUT) |
| 1 | 4 | 00-05 | Digital Inputs (Status Inputs) -- Status |
| 1 | 5 | 00-02 | Digital Outputs (Relays) -- Status |
| 1 | 8 | 00-05 | Digital Inputs (Status Inputs) -- Counter |
| 1 | 9 | 00-02 | Digital Outputs (Relays) -- Counter |
| 1 | C | 00-05 | Digital Inputs (Status Inputs) -- Preset/Reset |
| 1 | D | 00-02 | Digital Outputs (Relays) -- Reset |
| 1 | E | 00-03 | Digital Inputs (Status Inputs) -- Scale |
| 1 | F | 00-03 | Digital Inputs (Status Inputs) -- Rollover |
| 4 | 0 | see valid instances below | High-speed Present |
| 4 | 1 | see valid instances below | Standard Present |
| 4 | 2 | see valid instances below | Thermal Demand Present |
| 4 | 3 | see valid instances below | Sliding Window Demand Present |
| 4 | 4 | see valid instances below | High-speed Minimum |
| 4 | 5 | see valid instances below | Standard Minimum |
| 4 | 6 | see valid instances below | Thermal Demand Minimum |
| 4 | 7 | see valid instances below | Sliding Window Demand Minimum |
| 4 | 8 | see valid instances below | High-speed Maximum |
| 4 | 9 | see valid instances below | Standard Maximum |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|---------------------------|---------------------------------|---------------------|
| Class | Sub-class | Instance | Meaning | |
| 4 | A | see valid instances below | Thermal Demand Maximum | |
| 4 | B | see valid instances below | Sliding Window Demand Maximum | |
| 4 | C | see valid instances below | Hours - Net (Import - Export) | |
| 4 | D | see valid instances below | Hours - Import | |
| 4 | E | see valid instances below | Hours - Export | |
| 4 | F | see valid instances below | Hours - Total (Import + Export) | |
| | | ↓ | | |
| | | Instance | Measurement | Supported Modes |
| | | 00 | Volts LN Average | HS STD TD SD PD |
| | | 01 | Volts LN Phase A | HS STD TD SD PD |
| | | 02 | Volts LN Phase B | HS STD TD SD PD |
| | | 03 | Volts LN Phase C | HS STD TD SD PD |
| | | 04 | Volts LL Average | HS STD TD SD PD |
| | | 05 | Volts LL Phase AB | HS STD TD SD PD |
| | | 06 | Volts LL Phase BC | HS STD TD SD PD |
| | | 07 | Volts LL Phase CA | HS STD TD SD PD |
| | | 08 | Amps Average | HS STD TD SD PD |
| | | 09 | Amps Phase A | HS STD TD SD PD |
| | | 0A | Amps Phase B | HS STD TD SD PD |
| | | 0B | Amps Phase C | HS STD TD SD PD |
| | | 0C | Amps Neutral | HS STD TD SD PD |
| | | 0D | Reserved | |
| | | 0E | Volts Imbalance (0-100) | HS STD TD SD PD |
| | | 0F | Amps Imbalance (0-100) | STD TD SD PD |
| | | 10 | kW Total | HS STD TD SD PD HRS |
| | | 11 | kW Phase A | HS STD TD SD PD |
| | | 12 | kW Phase B | HS STD TD SD PD |
| | | 13 | kW Phase C | HS STD TD SD PD |
| | | 14 | kVAR Total | STD TD SD PD HRS |
| | | 15 | kVAR Phase A | STD TD SD PD |
| | | 16 | kVAR Phase B | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|---------------------|
| Class | Sub-class | Instance | Meaning | |
| | | 17 | kVAR Phase C | STD TD SD PD |
| | | 18 | kVA Total | HS STD TD SD PD HRS |
| | | 19 | kVA Phase A | HS STD TD SD PD |
| | | 1A | kVA Phase B | HS STD TD SD PD |
| | | 1B | kVA Phase C | HS STD TD SD PD |
| | | 1C | PF Total | STD TD SD PD |
| | | 1D | PF Phase A | STD TD SD PD |
| | | 1E | PF Phase B | STD TD SD PD |
| | | 1F | PF Phase C | STD TD SD PD |
| | | 20 | Frequency | HS STD TD SD PD |
| | | 21-23 | Reserved | |
| | | 24 | Phase Reversal (0 or 1) | HS STD |
| | | 25-27 | Reserved | |
| | | 28 | VAUX | STD TD SD PD |
| | | 29-2F | Reserved | |
| | | 30 | I2T Avg. (0 = Off, 1= On) | HS |
| | | 31 | I2T Phase A (0=Off, 1=On) | HS |
| | | 32 | I2T Phase B (0=Off, 1=On) | HS |
| | | 33 | I2T Phase C (0=Off, 1=On) | HS |
| | | 34-67 | Reserved | |
| | | 68 | V1 HD - K-Factor | STD TD SD PD |
| | | 69 | V2 HD - K-Factor | STD TD SD PD |
| | | 6A | V3 HD - K-Factor | STD TD SD PD |
| | | 6B | VAUX HD - K-Factor | STD TD SD PD |
| | | 6C | I1 HD - K-Factor | STD TD SD PD |
| | | 6D | I2 HD - K-Factor | STD TD SD PD |
| | | 6E | I3 HD - K-Factor | STD TD SD PD |
| | | 6F | I4 HD - K-Factor | STD TD SD PD |
| | | 70 | V1 HD - Total Odd | STD TD SD PD |
| | | 71 | V2 HD - Total Odd | STD TD SD PD |
| | | 72 | V3 HD - Total Odd | STD TD SD PD |
| | | 73 | VAUX HD - Total Odd | STD TD SD PD |
| | | 74 | I1 HD - Total Odd | STD TD SD PD |
| | | 75 | I2 HD - Total Odd | STD TD SD PD |
| | | 76 | I3 HD - Total Odd | STD TD SD PD |
| | | 77 | I4 HD - Total Odd | STD TD SD PD |
| | | 78 | V1 HD - Total Even | STD TD SD PD |
| | | 79 | V2 HD - Total Even | STD TD SD PD |
| | | 7A | V3 HD - Total Even | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | 7B | VAUX HD - Total Even | STD TD SD PD |
| | | 7C | I1 HD - Total Even | STD TD SD PD |
| | | 7D | I2 HD - Total Even | STD TD SD PD |
| | | 7E | I3 HD - Total Even | STD TD SD PD |
| | | 7F | I4 HD - Total Even | STD TD SD PD |
| | | 80 | V1 HD - Total | STD TD SD PD |
| | | 81 | V2 HD - Total | STD TD SD PD |
| | | 82 | V3 HD - Total | STD TD SD PD |
| | | 83 | VAUX HD - Total | STD TD SD PD |
| | | 84 | I1 HD - Total | STD TD SD PD |
| | | 85 | I2 HD - Total | STD TD SD PD |
| | | 86 | I3 HD - Total | STD TD SD PD |
| | | 87 | I4 HD - Total | STD TD SD PD |
| | | 88 | V1 HD - Harmonic #1 | STD TD SD PD |
| | | 89 | V2 HD - Harmonic #1 | STD TD SD PD |
| | | 8A | V3 HD - Harmonic #1 | STD TD SD PD |
| | | 8B | VAUX HD - Harmonic #1 | STD TD SD PD |
| | | 8C | I1 HD - Harmonic #1 | STD TD SD PD |
| | | 8D | I2 HD - Harmonic #1 | STD TD SD PD |
| | | 8E | I3 HD - Harmonic #1 | STD TD SD PD |
| | | 8F | I4 HD - Harmonic #1 | STD TD SD PD |
| | | 90 | V1 HD - Harmonic #2 | STD TD SD PD |
| | | 91 | V2 HD - Harmonic #2 | STD TD SD PD |
| | | 92 | V3 HD - Harmonic #2 | STD TD SD PD |
| | | 93 | VAUX HD - Harmonic #2 | STD TD SD PD |
| | | 94 | I1 HD - Harmonic #2 | STD TD SD PD |
| | | 95 | I2 HD - Harmonic #2 | STD TD SD PD |
| | | 96 | I3 HD - Harmonic #2 | STD TD SD PD |
| | | 97 | I4 HD - Harmonic #2 | STD TD SD PD |
| | | 98 | V1 HD - Harmonic #3 | STD TD SD PD |
| | | 99 | V2 HD - Harmonic #3 | STD TD SD PD |
| | | 9A | V3 HD - Harmonic #3 | STD TD SD PD |
| | | 9B | VAUX HD - Harmonic #3 | STD TD SD PD |
| | | 9C | I1 HD - Harmonic #3 | STD TD SD PD |
| | | 9D | I2 HD - Harmonic #3 | STD TD SD PD |
| | | 9E | I3 HD - Harmonic #3 | STD TD SD PD |
| | | 9F | I4 HD - Harmonic #3 | STD TD SD PD |
| | | A0 | V1 HD - Harmonic #4 | STD TD SD PD |
| | | A1 | V2 HD - Harmonic #4 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | A2 | V3 HD - Harmonic #4 | STD TD SD PD |
| | | A3 | VAUX HD - Harmonic #4 | STD TD SD PD |
| | | A4 | I1 HD - Harmonic #4 | STD TD SD PD |
| | | A5 | I2 HD - Harmonic #4 | STD TD SD PD |
| | | A6 | I3 HD - Harmonic #4 | STD TD SD PD |
| | | A7 | I4 HD - Harmonic #4 | STD TD SD PD |
| | | A8 | V1 HD - Harmonic #5 | STD TD SD PD |
| | | A9 | V2 HD - Harmonic #5 | STD TD SD PD |
| | | AA | V3 HD - Harmonic #5 | STD TD SD PD |
| | | AB | VAUX HD - Harmonic #5 | STD TD SD PD |
| | | AC | I1 HD - Harmonic #5 | STD TD SD PD |
| | | AD | I2 HD - Harmonic #5 | STD TD SD PD |
| | | AE | I3 HD - Harmonic #5 | STD TD SD PD |
| | | AF | I4 HD - Harmonic #5 | STD TD SD PD |
| | | B0 | V1 HD - Harmonic #6 | STD TD SD PD |
| | | B1 | V2 HD - Harmonic #6 | STD TD SD PD |
| | | B2 | V3 HD - Harmonic #6 | STD TD SD PD |
| | | B3 | VAUX HD - Harmonic #6 | STD TD SD PD |
| | | B4 | I1 HD - Harmonic #6 | STD TD SD PD |
| | | B5 | I2 HD - Harmonic #6 | STD TD SD PD |
| | | B6 | I3 HD - Harmonic #6 | STD TD SD PD |
| | | B7 | I4 HD - Harmonic #6 | STD TD SD PD |
| | | B8 | V1 HD - Harmonic #7 | STD TD SD PD |
| | | B9 | V2 HD - Harmonic #7 | STD TD SD PD |
| | | BA | V3 HD - Harmonic #7 | STD TD SD PD |
| | | BB | VAUX HD - Harmonic #7 | STD TD SD PD |
| | | BC | I1 HD - Harmonic #7 | STD TD SD PD |
| | | BD | I2 HD - Harmonic #7 | STD TD SD PD |
| | | BE | I3 HD - Harmonic #7 | STD TD SD PD |
| | | BF | I4 HD - Harmonic #7 | STD TD SD PD |
| | | C0 | V1 HD - Harmonic #8 | STD TD SD PD |
| | | C1 | V2 HD - Harmonic #8 | STD TD SD PD |
| | | C2 | V3 HD - Harmonic #8 | STD TD SD PD |
| | | C3 | VAUX HD - Harmonic #8 | STD TD SD PD |
| | | C4 | I1 HD - Harmonic #8 | STD TD SD PD |
| | | C5 | I2 HD - Harmonic #8 | STD TD SD PD |
| | | C6 | I3 HD - Harmonic #8 | STD TD SD PD |
| | | C7 | I4 HD - Harmonic #8 | STD TD SD PD |
| | | C8 | V1 HD - Harmonic #9 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | C9 | V2 HD - Harmonic #9 | STD TD SD PD |
| | | CA | V3 HD - Harmonic #9 | STD TD SD PD |
| | | CB | VAUX HD - Harmonic #9 | STD TD SD PD |
| | | CC | I1 HD - Harmonic #9 | STD TD SD PD |
| | | CD | I2 HD - Harmonic #9 | STD TD SD PD |
| | | CE | I3 HD - Harmonic #9 | STD TD SD PD |
| | | CF | I4 HD - Harmonic #9 | STD TD SD PD |
| | | D0 | V1 HD - Harmonic #10 | STD TD SD PD |
| | | D1 | V2 HD - Harmonic #10 | STD TD SD PD |
| | | D2 | V3 HD - Harmonic #10 | STD TD SD PD |
| | | D3 | VAUX HD - Harmonic #10 | STD TD SD PD |
| | | D4 | I1 HD - Harmonic #10 | STD TD SD PD |
| | | D5 | I2 HD - Harmonic #10 | STD TD SD PD |
| | | D6 | I3 HD - Harmonic #10 | STD TD SD PD |
| | | D7 | I4 HD - Harmonic #10 | STD TD SD PD |
| | | D8 | V1 HD - Harmonic #11 | STD TD SD PD |
| | | D9 | V2 HD - Harmonic #11 | STD TD SD PD |
| | | DA | V3 HD - Harmonic #11 | STD TD SD PD |
| | | DB | VAUX HD - Harmonic #11 | STD TD SD PD |
| | | DC | I1 HD - Harmonic #11 | STD TD SD PD |
| | | DD | I2 HD - Harmonic #11 | STD TD SD PD |
| | | DE | I3 HD - Harmonic #11 | STD TD SD PD |
| | | DF | I4 HD - Harmonic #11 | STD TD SD PD |
| | | E0 | V1 HD - Harmonic #12 | STD TD SD PD |
| | | E1 | V2 HD - Harmonic #12 | STD TD SD PD |
| | | E2 | V3 HD - Harmonic #12 | STD TD SD PD |
| | | E3 | VAUX HD - Harmonic #12 | STD TD SD PD |
| | | E4 | I1 HD - Harmonic #12 | STD TD SD PD |
| | | E5 | I2 HD - Harmonic #12 | STD TD SD PD |
| | | E6 | I3 HD - Harmonic #12 | STD TD SD PD |
| | | E7 | I4 HD - Harmonic #12 | STD TD SD PD |
| | | E8 | V1 HD - Harmonic #13 | STD TD SD PD |
| | | E9 | V2 HD - Harmonic #13 | STD TD SD PD |
| | | EA | V3 HD - Harmonic #13 | STD TD SD PD |
| | | EB | VAUX HD - Harmonic #13 | STD TD SD PD |
| | | EC | I1 HD - Harmonic #13 | STD TD SD PD |
| | | ED | I2 HD - Harmonic #13 | STD TD SD PD |
| | | EE | I3 HD - Harmonic #13 | STD TD SD PD |
| | | EF | I4 HD - Harmonic #13 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|---------------------------|---|-----------------|
| Class | Sub-class | Instance | Meaning | |
| | | F0 | V1 HD - Harmonic #14 | STD TD SD PD |
| | | F1 | V2 HD - Harmonic #14 | STD TD SD PD |
| | | F2 | V3 HD - Harmonic #14 | STD TD SD PD |
| | | F3 | VAUX HD - Harmonic #14 | STD TD SD PD |
| | | F4 | I1 HD - Harmonic #14 | STD TD SD PD |
| | | F5 | I2 HD - Harmonic #14 | STD TD SD PD |
| | | F6 | I3 HD - Harmonic #14 | STD TD SD PD |
| | | F7 | I4 HD - Harmonic #14 | STD TD SD PD |
| | | F8 | V1 HD - Harmonic #15 | STD TD SD PD |
| | | F9 | V2 HD - Harmonic #15 | STD TD SD PD |
| | | FA | V3 HD - Harmonic #15 | STD TD SD PD |
| | | FB | VAUX HD - Harmonic #15 | STD TD SD PD |
| | | FC | I1 HD - Harmonic #15 | STD TD SD PD |
| | | FD | I2 HD - Harmonic #15 | STD TD SD PD |
| | | FE | I3 HD - Harmonic #15 | STD TD SD PD |
| | | FF | I4 HD - Harmonic #15 | STD TD SD PD |
| 6 | 0-2 | Reserved | Reserved | |
| 6 | 3 | see valid instances below | Predicted Sliding Window Demand Present | |
| 6 | 4-6 | Reserved | Reserved | |
| 6 | 7 | see valid instances below | Predicted Sliding Window Demand Minimum | |
| 6 | 8-A | Reserved | Reserved | |
| 6 | B | see valid instances below | Predicted Sliding Window Demand Maximum | |
| 6 | C-F | Reserved | Reserved | |
| | | ↓ | | |
| | | Instance | Measurement | Supported Modes |
| | | 00 | Volts LN Average | HS STD TD SD PD |
| | | 01 | Volts LN Phase A | HS STD TD SD PD |
| | | 02 | Volts LN Phase B | HS STD TD SD PD |
| | | 03 | Volts LN Phase C | HS STD TD SD PD |
| | | 04 | Volts LL Average | HS STD TD SD PD |
| | | 05 | Volts LL Phase AB | HS STD TD SD PD |
| | | 06 | Volts LL Phase BC | HS STD TD SD PD |
| | | 07 | Volts LL Phase CA | HS STD TD SD PD |
| | | 08 | Amps Average | HS STD TD SD PD |
| | | 09 | Amps Phase A | HS STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|---------------------|
| Class | Sub-class | Instance | Meaning | |
| | | 0A | Amps Phase B | HS STD TD SD PD |
| | | 0B | Amps Phase C | HS STD TD SD PD |
| | | 0C | Amps Neutral | HS STD TD SD PD |
| | | 0D | Reserved | |
| | | 0E | Volts Imbalance (0-100) | HS STD TD SD PD |
| | | 0F | Amps Imbalance (0-100) | STD TD SD PD |
| | | 10 | kW Total | HS STD TD SD PD HRS |
| | | 11 | kW Phase A | HS STD TD SD PD |
| | | 12 | kW Phase B | HS STD TD SD PD |
| | | 13 | kW Phase C | HS STD TD SD PD |
| | | 14 | kVAR Total | STD TD SD PD HRS |
| | | 15 | kVAR Phase A | STD TD SD PD |
| | | 16 | kVAR Phase B | STD TD SD PD |
| | | 17 | kVAR Phase C | STD TD SD PD |
| | | 18 | kVA Total | HS STD TD SD PD HRS |
| | | 19 | kVA Phase A | HS STD TD SD PD |
| | | 1A | kVA Phase B | HS STD TD SD PD |
| | | 1B | kVA Phase C | HS STD TD SD PD |
| | | 1C | PF Total | STD TD SD PD |
| | | 1D | PF Phase A | STD TD SD PD |
| | | 1E | PF Phase B | STD TD SD PD |
| | | 1F | PF Phase C | STD TD SD PD |
| | | 20 | Frequency | HS STD TD SD PD |
| | | 21-23 | Reserved | |
| | | 24 | Phase Reversal (0 or 1) | HS STD |
| | | 25-27 | Reserved | |
| | | 28 | VAUX | STD TD SD PD |
| | | 29-2F | Reserved | |
| | | 30 | I2T Avg. (0 = Off, 1= On) | HS |
| | | 31 | I2T Phase A (0=Off, 1=On) | HS |
| | | 32 | I2T Phase B (0=Off, 1=On) | HS |
| | | 33 | I2T Phase C (0=Off, 1=On) | HS |
| | | 34-67 | Reserved | |
| | | 68 | V1 HD - K-Factor | STD TD SD PD |
| | | 69 | V2 HD - K-Factor | STD TD SD PD |
| | | 6A | V3 HD - K-Factor | STD TD SD PD |
| | | 6B | VAUX HD - K-Factor | STD TD SD PD |
| | | 6C | I1 HD - K-Factor | STD TD SD PD |
| | | 6D | I2 HD - K-Factor | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | 6E | I3 HD - K-Factor | STD TD SD PD |
| | | 6F | I4 HD - K-Factor | STD TD SD PD |
| | | 70 | V1 HD - Total Odd | STD TD SD PD |
| | | 71 | V2 HD - Total Odd | STD TD SD PD |
| | | 72 | V3 HD - Total Odd | STD TD SD PD |
| | | 73 | VAUX HD - Total Odd | STD TD SD PD |
| | | 74 | I1 HD - Total Odd | STD TD SD PD |
| | | 75 | I2 HD - Total Odd | STD TD SD PD |
| | | 76 | I3 HD - Total Odd | STD TD SD PD |
| | | 77 | I4 HD - Total Odd | STD TD SD PD |
| | | 78 | V1 HD - Total Even | STD TD SD PD |
| | | 79 | V2 HD - Total Even | STD TD SD PD |
| | | 7A | V3 HD - Total Even | STD TD SD PD |
| | | 7B | VAUX HD - Total Even | STD TD SD PD |
| | | 7C | I1 HD - Total Even | STD TD SD PD |
| | | 7D | I2 HD - Total Even | STD TD SD PD |
| | | 7E | I3 HD - Total Even | STD TD SD PD |
| | | 7F | I4 HD - Total Even | STD TD SD PD |
| | | 80 | V1 HD - Total | STD TD SD PD |
| | | 81 | V2 HD - Total | STD TD SD PD |
| | | 82 | V3 HD - Total | STD TD SD PD |
| | | 83 | VAUX HD - Total | STD TD SD PD |
| | | 84 | I1 HD - Total | STD TD SD PD |
| | | 85 | I2 HD - Total | STD TD SD PD |
| | | 86 | I3 HD - Total | STD TD SD PD |
| | | 87 | I4 HD - Total | STD TD SD PD |
| | | 88 | V1 HD - Harmonic #1 | STD TD SD PD |
| | | 89 | V2 HD - Harmonic #1 | STD TD SD PD |
| | | 8A | V3 HD - Harmonic #1 | STD TD SD PD |
| | | 8B | VAUX HD - Harmonic #1 | STD TD SD PD |
| | | 8C | I1 HD - Harmonic #1 | STD TD SD PD |
| | | 8D | I2 HD - Harmonic #1 | STD TD SD PD |
| | | 8E | I3 HD - Harmonic #1 | STD TD SD PD |
| | | 8F | I4 HD - Harmonic #1 | STD TD SD PD |
| | | 90 | V1 HD - Harmonic #2 | STD TD SD PD |
| | | 91 | V2 HD - Harmonic #2 | STD TD SD PD |
| | | 92 | V3 HD - Harmonic #2 | STD TD SD PD |
| | | 93 | VAUX HD - Harmonic #2 | STD TD SD PD |
| | | 94 | I1 HD - Harmonic #2 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | 95 | I2 HD - Harmonic #2 | STD TD SD PD |
| | | 96 | I3 HD - Harmonic #2 | STD TD SD PD |
| | | 97 | I4 HD - Harmonic #2 | STD TD SD PD |
| | | 98 | V1 HD - Harmonic #3 | STD TD SD PD |
| | | 99 | V2 HD - Harmonic #3 | STD TD SD PD |
| | | 9A | V3 HD - Harmonic #3 | STD TD SD PD |
| | | 9B | VAUX HD - Harmonic #3 | STD TD SD PD |
| | | 9C | I1 HD - Harmonic #3 | STD TD SD PD |
| | | 9D | I2 HD - Harmonic #3 | STD TD SD PD |
| | | 9E | I3 HD - Harmonic #3 | STD TD SD PD |
| | | 9F | I4 HD - Harmonic #3 | STD TD SD PD |
| | | A0 | V1 HD - Harmonic #4 | STD TD SD PD |
| | | A1 | V2 HD - Harmonic #4 | STD TD SD PD |
| | | A2 | V3 HD - Harmonic #4 | STD TD SD PD |
| | | A3 | VAUX HD - Harmonic #4 | STD TD SD PD |
| | | A4 | I1 HD - Harmonic #4 | STD TD SD PD |
| | | A5 | I2 HD - Harmonic #4 | STD TD SD PD |
| | | A6 | I3 HD - Harmonic #4 | STD TD SD PD |
| | | A7 | I4 HD - Harmonic #4 | STD TD SD PD |
| | | A8 | V1 HD - Harmonic #5 | STD TD SD PD |
| | | A9 | V2 HD - Harmonic #5 | STD TD SD PD |
| | | AA | V3 HD - Harmonic #5 | STD TD SD PD |
| | | AB | VAUX HD - Harmonic #5 | STD TD SD PD |
| | | AC | I1 HD - Harmonic #5 | STD TD SD PD |
| | | AD | I2 HD - Harmonic #5 | STD TD SD PD |
| | | AE | I3 HD - Harmonic #5 | STD TD SD PD |
| | | AF | I4 HD - Harmonic #5 | STD TD SD PD |
| | | B0 | V1 HD - Harmonic #6 | STD TD SD PD |
| | | B1 | V2 HD - Harmonic #6 | STD TD SD PD |
| | | B2 | V3 HD - Harmonic #6 | STD TD SD PD |
| | | B3 | VAUX HD - Harmonic #6 | STD TD SD PD |
| | | B4 | I1 HD - Harmonic #6 | STD TD SD PD |
| | | B5 | I2 HD - Harmonic #6 | STD TD SD PD |
| | | B6 | I3 HD - Harmonic #6 | STD TD SD PD |
| | | B7 | I4 HD - Harmonic #6 | STD TD SD PD |
| | | B8 | V1 HD - Harmonic #7 | STD TD SD PD |
| | | B9 | V2 HD - Harmonic #7 | STD TD SD PD |
| | | BA | V3 HD - Harmonic #7 | STD TD SD PD |
| | | BB | VAUX HD - Harmonic #7 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | BC | I1 HD - Harmonic #7 | STD TD SD PD |
| | | BD | I2 HD - Harmonic #7 | STD TD SD PD |
| | | BE | I3 HD - Harmonic #7 | STD TD SD PD |
| | | BF | I4 HD - Harmonic #7 | STD TD SD PD |
| | | C0 | V1 HD - Harmonic #8 | STD TD SD PD |
| | | C1 | V2 HD - Harmonic #8 | STD TD SD PD |
| | | C2 | V3 HD - Harmonic #8 | STD TD SD PD |
| | | C3 | VAUX HD - Harmonic #8 | STD TD SD PD |
| | | C4 | I1 HD - Harmonic #8 | STD TD SD PD |
| | | C5 | I2 HD - Harmonic #8 | STD TD SD PD |
| | | C6 | I3 HD - Harmonic #8 | STD TD SD PD |
| | | C7 | I4 HD - Harmonic #8 | STD TD SD PD |
| | | C8 | V1 HD - Harmonic #9 | STD TD SD PD |
| | | C9 | V2 HD - Harmonic #9 | STD TD SD PD |
| | | CA | V3 HD - Harmonic #9 | STD TD SD PD |
| | | CB | VAUX HD - Harmonic #9 | STD TD SD PD |
| | | CC | I1 HD - Harmonic #9 | STD TD SD PD |
| | | CD | I2 HD - Harmonic #9 | STD TD SD PD |
| | | CE | I3 HD - Harmonic #9 | STD TD SD PD |
| | | CF | I4 HD - Harmonic #9 | STD TD SD PD |
| | | D0 | V1 HD - Harmonic #10 | STD TD SD PD |
| | | D1 | V2 HD - Harmonic #10 | STD TD SD PD |
| | | D2 | V3 HD - Harmonic #10 | STD TD SD PD |
| | | D3 | VAUX HD - Harmonic #10 | STD TD SD PD |
| | | D4 | I1 HD - Harmonic #10 | STD TD SD PD |
| | | D5 | I2 HD - Harmonic #10 | STD TD SD PD |
| | | D6 | I3 HD - Harmonic #10 | STD TD SD PD |
| | | D7 | I4 HD - Harmonic #10 | STD TD SD PD |
| | | D8 | V1 HD - Harmonic #11 | STD TD SD PD |
| | | D9 | V2 HD - Harmonic #11 | STD TD SD PD |
| | | DA | V3 HD - Harmonic #11 | STD TD SD PD |
| | | DB | VAUX HD - Harmonic #11 | STD TD SD PD |
| | | DC | I1 HD - Harmonic #11 | STD TD SD PD |
| | | DD | I2 HD - Harmonic #11 | STD TD SD PD |
| | | DE | I3 HD - Harmonic #11 | STD TD SD PD |
| | | DF | I4 HD - Harmonic #11 | STD TD SD PD |
| | | E0 | V1 HD - Harmonic #12 | STD TD SD PD |
| | | E1 | V2 HD - Harmonic #12 | STD TD SD PD |
| | | E2 | V3 HD - Harmonic #12 | STD TD SD PD |

| #1 | #2 | #3 & #4 | Trigger Key Thumbwheel Setting | |
|-------|-----------|----------|--------------------------------|--------------|
| Class | Sub-class | Instance | Meaning | |
| | | E3 | VAUX HD - Harmonic #12 | STD TD SD PD |
| | | E4 | I1 HD - Harmonic #12 | STD TD SD PD |
| | | E5 | I2 HD - Harmonic #12 | STD TD SD PD |
| | | E6 | I3 HD - Harmonic #12 | STD TD SD PD |
| | | E7 | I4 HD - Harmonic #12 | STD TD SD PD |
| | | E8 | V1 HD - Harmonic #13 | STD TD SD PD |
| | | E9 | V2 HD - Harmonic #13 | STD TD SD PD |
| | | EA | V3 HD - Harmonic #13 | STD TD SD PD |
| | | EB | VAUX HD - Harmonic #13 | STD TD SD PD |
| | | EC | I1 HD - Harmonic #13 | STD TD SD PD |
| | | ED | I2 HD - Harmonic #13 | STD TD SD PD |
| | | EE | I3 HD - Harmonic #13 | STD TD SD PD |
| | | EF | I4 HD - Harmonic #13 | STD TD SD PD |
| | | F0 | V1 HD - Harmonic #14 | STD TD SD PD |
| | | F1 | V2 HD - Harmonic #14 | STD TD SD PD |
| | | F2 | V3 HD - Harmonic #14 | STD TD SD PD |
| | | F3 | VAUX HD - Harmonic #14 | STD TD SD PD |
| | | F4 | I1 HD - Harmonic #14 | STD TD SD PD |
| | | F5 | I2 HD - Harmonic #14 | STD TD SD PD |
| | | F6 | I3 HD - Harmonic #14 | STD TD SD PD |
| | | F7 | I4 HD - Harmonic #14 | STD TD SD PD |
| | | F8 | V1 HD - Harmonic #15 | STD TD SD PD |
| | | F9 | V2 HD - Harmonic #15 | STD TD SD PD |
| | | FA | V3 HD - Harmonic #15 | STD TD SD PD |
| | | FB | VAUX HD - Harmonic #15 | STD TD SD PD |
| | | FC | I1 HD - Harmonic #15 | STD TD SD PD |
| | | FD | I2 HD - Harmonic #15 | STD TD SD PD |
| | | FE | I3 HD - Harmonic #15 | STD TD SD PD |
| | | FF | I4 HD - Harmonic #15 | STD TD SD PD |

Table B-1. EPM 3720 Trigger Keys.

The action keys specify the instance number for an object to perform an action on.
The following action keys are possible:

| Action Key | Setpoint Supported | Meaning |
|------------|--------------------|---|
| 0 | - | No action |
| 1000-1004 | STD HS | Clear digital input counter 0-3 (Status input counter 1-4), 4=ALL |
| 1100-1102 | STD HS | Operate Relay #1 to 3 |
| 1C00-1C04 | STD HS | same as 1000-1004 |
| A400-A407 | STD HS | Waveform Capture channels #1 to 8 |
| A500 | STD HS | Waveform Recorder |

Action keys marked with STD are supported by Standard Setpoints (1–11), action keys marked with HS are supported by High Speed Setpoints (1–6).

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Appendix C: EPM 7700 - Special Considerations

EPM 7700 Tags Subject to Deactivation by Tabular Data Screen Wizard

This appendix lists the EPM 7700 tags which may be activated or deactivated by the EPM 7700 Tabular Data Screen wizard. This information is of use for developers creating their own wizards to access the EPM 7700's data. If you wish to use a tag in a custom wizard you are developing, check this table to see if it is subject to deactivation by the Tabular Data Screen wizard. If it is, you may wish to create a duplicate tag with a unique name to access the same register. Otherwise, it is possible that the tag may be deactivated by the Tabular Data Screen wizard, and the data will be unavailable for use by your custom wizard.

NOTE: It is important to keep in mind that tags which may be deactivated by the Tabular Data Screen Wizard will not work properly with InTouch's trending features.

NOTE: `_Anlg` or `_Msg` indicate Internal Tags for display use; `_GWY` indicates I/O Tags which talk to GE77GTWY. All others tags talk to ION_LINK

| Memory Discrete | Comment | Subject to deactivation? |
|-----------------|--|--------------------------|
| DeviceNm_Min | Tag to indicate whether to show min or max on min/max page | N |

| Memory Discrete | Comment | Subject to deactivation? |
|------------------------|---|---------------------------------|
| DeviceNm_CommFail | Comm Fail Indicator for Pegasys DDE Server - ION_LINK | N |
| I/O Discrete | Comment | |
| DeviceNm_24576 | PHASE_REVERSAL | Y |
| DeviceNm_24577 | DIO1 | Y |
| DeviceNm_24578 | DIO2 | Y |
| DeviceNm_24579 | DIO3 | Y |
| DeviceNm_24580 | DIO4 | Y |
| DeviceNm_24581 | DIO5 | Y |
| DeviceNm_24582 | DIO6 | Y |
| DeviceNm_24583 | DIO7 | Y |
| DeviceNm_24584 | DIO8 | Y |
| DeviceNm_24721_GWY | Enable_SagSwell | N |
| DeviceNm_24721 | External Boolean 3 - Enable Sag Swell | Y |
| DeviceNm_24722_GWY | Enable_Transient | N |
| DeviceNm_24722 | External Boolean 4 - Enable Transient | Y |
| DeviceNm_24723_GWY | Enable_OverKW | N |
| DeviceNm_24723 | External Boolean 5 - Enable Over SWD KW | Y |
| DeviceNm_24724_GWY | Enable_OverAmp | N |
| DeviceNm_24724 | External Boolean 6 - Enable Over Current | Y |
| DeviceNm_24725_GWY | Enable_OverVunb | N |
| DeviceNm_24725 | External Boolean 7 - Enable Over Vunbal | Y |
| DeviceNm_25053 | OVER_KW | Y |
| DeviceNm_25054 | OVER_IA_STATUS | Y |
| DeviceNm_25055 | OVER_IB_STATUS | Y |
| DeviceNm_25056 | OVER_IC_STATUS | Y |
| DeviceNm_25057 | OVER_VUN_STATUS | Y |
| DeviceNm_25064 | OVER_IA_OVER | Y |
| DeviceNm_25065 | OVER_IB_OVER | Y |
| DeviceNm_25066 | OVER_IC_OVER | Y |
| DeviceNm_25067 | OVER_VUN_OVER | Y |
| DeviceNm_25074 | OVER_IA_UNDER | Y |
| DeviceNm_25075 | OVER_IB_UNDER | Y |
| DeviceNm_25076 | OVER_IC_UNDER | Y |
| DeviceNm_25077 | OVER_VUN_UNDER | Y |
| DeviceNm_26798_GWY | Reset_MinMax | N |
| DeviceNm_26799_GWY | Reset_SWD | N |
| DeviceNm_26800_GWY | Reset_Thermal | N |
| DeviceNm_26802_GWY | Reset_SCounter | N |
| DeviceNm_26803_GWY | Reset_Energy | N |
| DeviceNm_26804_GWY | Reset_Dist_Cnt | N |

| Memory Integer | Comment | |
|-------------------------|----------------------------------|---|
| DeviceNm_28672_Anlg | PT Primary | N |
| DeviceNm_28673_Anlg | PT Secondary | N |
| DeviceNm_28674_Anlg | Ct Primary | N |
| DeviceNm_28675_Anlg | Ct Secondary | N |
| DeviceNm_28676_Anlg | I4 CT Primary | N |
| DeviceNm_28677_Anlg | I4 CT Secondary | N |
| DeviceNm_Display_Screen | Display Screen for Lrg Faceplate | N |
| DeviceNm_ResetButton | Reset Command Code | N |
| DeviceNm_Tab | Tag to indicate tab on tabular | N |
| DeviceNm_Result | | N |

| I/O Integer | Comment | |
|------------------------|---------------------|---|
| DeviceNm_23420 | Universal Clock | N |
| DeviceNm_28673 | PT_SECONDARY | Y |
| DeviceNm_28672 | PT_PRIMARY | Y |
| DeviceNm_28672_GWY | PT Primary | N |
| DeviceNm_28673_GWY | PT Secondary | N |
| DeviceNm_28674 | CT_Primary | Y |
| DeviceNm_28674_GWY | Ct Primary | N |
| DeviceNm_28675 | CT_Secondary | Y |
| DeviceNm_28675_GWY | Ct Secondary | N |
| DeviceNm_28676 | I4_CT_Primary | Y |
| DeviceNm_28676_GWY | I4 CT Primary | N |
| DeviceNm_28677 | I4_CT_Secondary | Y |
| DeviceNm_28677_GWY | I4 CT Secondary | N |
| DeviceNm_DEVICE_STATUS | GE77GTWY Comm Check | N |

| Memory Real | Comment | |
|---------------------|--|---|
| DeviceNm_23260_Anlg | External Numeric 1 - Over Kw Nominal | N |
| DeviceNm_23261_Anlg | External Numeric 2 - Over Ia Nominal | N |
| DeviceNm_23262_Anlg | External Numeric 3 - Over Ib Nominal | N |
| DeviceNm_23263_Anlg | External Numeric 4 - Over Ic Nominal | N |
| DeviceNm_23264_Anlg | External Numeric 5 - Over Vunbal Nominal | N |
| DeviceNm_24023_Anlg | Transient Nominal | N |
| DeviceNm_28852_Anlg | KW SWD Sub Interval | N |
| DeviceNm_28853_Anlg | KVAR SWD SUB INTERVAL | N |
| DeviceNm_28854_Anlg | KVA SWD SUBINTERVAL | N |
| DeviceNm_28855_Anlg | IAVG SWD SUB INTERVAL | N |
| DeviceNm_28868_Anlg | KW SWD #SUB INTERVALS | N |

| Memory Real | Comment | |
|---------------------|-----------------------------|---|
| DeviceNm_28869_Anlg | KVAR SWD #SUB INTERVALS | N |
| DeviceNm_28870_Anlg | KVA SWD #SUB INTERVALS | N |
| DeviceNm_28871_Anlg | IAVG SWD #SUB INTERVALS | N |
| DeviceNm_28884_Anlg | KW SWD PREDICTED RESPONSE | N |
| DeviceNm_28885_Anlg | KVAR SWD PREDICTED RESPONSE | N |
| DeviceNm_28886_Anlg | KVA SWD PREDICTED RESPONSE | N |
| DeviceNm_28887_Anlg | IAVG SWD PREDICTED RESPONSE | N |
| DeviceNm_29204_Anlg | Swell Limit | N |
| DeviceNm_29206_Anlg | Sag Limit | N |
| DeviceNm_29208_Anlg | Change Criteria | N |
| DeviceNm_29210_Anlg | SAG SWELL NOMINAL | N |
| DeviceNm_29508_Anlg | Transient Threshold | N |
| DeviceNm_29686_Anlg | Over KW Over Pickup | N |
| DeviceNm_29687_Anlg | Over Ia Over Pickup | N |
| DeviceNm_29688_Anlg | Over Ib Over Pickup | N |
| DeviceNm_29689_Anlg | Over Ic Over Pickup | N |
| DeviceNm_29690_Anlg | Over Vunbal Over Pickup | N |
| DeviceNm_29696_Anlg | Over KW Over Dropout | N |
| DeviceNm_29697_Anlg | Over Ia Over Dropout | N |
| DeviceNm_29698_Anlg | Over Ib Over Dropout | N |
| DeviceNm_29699_Anlg | Over Ic Over Dropout | N |
| DeviceNm_29700_Anlg | Over Vunbal Over Dropout | N |
| DeviceNm_29706_Anlg | Over KW Under Pickup | N |
| DeviceNm_29707_Anlg | Over Ia Under Pickup | N |
| DeviceNm_29708_Anlg | Over Ib Under Pickup | N |
| DeviceNm_29709_Anlg | Over Ic Under Pickup | N |
| DeviceNm_29710_Anlg | Over Vunbal Under Pickup | N |
| DeviceNm_29716_Anlg | Over KW Under Dropout | N |
| DeviceNm_29717_Anlg | Over Ia Under Dropout | N |
| DeviceNm_29718_Anlg | Over Ib Under Pickup | N |
| DeviceNm_29719_Anlg | Over Ic Under Dropout | N |
| DeviceNm_29720_Anlg | Over Vunbal Under Dropout | N |
| DeviceNm_29726_Anlg | Over KW Time On | N |
| DeviceNm_29727_Anlg | Over Ia Time On | N |
| DeviceNm_29728_Anlg | Over Ib Time On | N |
| DeviceNm_29729_Anlg | Over Ic Time On | N |
| DeviceNm_29730_Anlg | Over Vunbal Time On | N |
| DeviceNm_29736_Anlg | Over KW Time Off | N |
| DeviceNm_29737_Anlg | Over Ia Time Off | N |
| DeviceNm_29738_Anlg | Over Ib Time Off | N |
| DeviceNm_29739_Anlg | Over Ic Time Off | N |

| Memory Real | Comment | |
|-------------------------|----------------------|---|
| DeviceNm_29740_Anlg | Over Vunbal Time Off | N |
| DeviceNm_UniversalClock | Universal Clock Time | N |

| I/O Real | Comment | |
|----------------|----------------|---|
| DeviceNm_22528 | VLN_A | N |
| DeviceNm_22529 | VLN_B | N |
| DeviceNm_22530 | VLN_C | N |
| DeviceNm_22531 | VLN_AVG | N |
| DeviceNm_22532 | VLL_AB | N |
| DeviceNm_22533 | VLL_BC | N |
| DeviceNm_22534 | VLL_CA | N |
| DeviceNm_22535 | VLL_AVG | N |
| DeviceNm_22536 | I_A | N |
| DeviceNm_22537 | I_B | N |
| DeviceNm_22538 | I_C | N |
| DeviceNm_22539 | I_AVG | N |
| DeviceNm_22540 | KWA | N |
| DeviceNm_22541 | KWB | N |
| DeviceNm_22542 | KWC | N |
| DeviceNm_22543 | KWTOTAL | N |
| DeviceNm_22544 | KVARA | N |
| DeviceNm_22545 | KVARB | N |
| DeviceNm_22546 | KVARC | N |
| DeviceNm_22547 | KVARTOTAL | N |
| DeviceNm_22548 | KVAA | N |
| DeviceNm_22549 | KVAB | N |
| DeviceNm_22550 | KVAC | N |
| DeviceNm_22551 | KVATOTAL | N |
| DeviceNm_22552 | PFSIGNED_A | Y |
| DeviceNm_22553 | PFSIGNED_B | Y |
| DeviceNm_22554 | PFSIGNED_C | Y |
| DeviceNm_22555 | PFSIGNED_TOTAL | N |
| DeviceNm_22556 | PFLEAD_A | Y |
| DeviceNm_22557 | PFLEAD_B | Y |
| DeviceNm_22558 | PFLEAD_C | Y |
| DeviceNm_22559 | PFLEAD_TOTAL | N |
| DeviceNm_22560 | PFLAG_A | Y |
| DeviceNm_22561 | PFLAG_B | Y |
| DeviceNm_22562 | PFLAG_C | Y |
| DeviceNm_22563 | PFLAG_TOTAL | N |

| I/O Real | Comment | |
|----------------|-----------------|---|
| DeviceNm_22564 | V_UNBAL | Y |
| DeviceNm_22565 | I_UNBAL | Y |
| DeviceNm_22566 | I_4 | Y |
| DeviceNm_22567 | LINE_FREQUENCY | Y |
| DeviceNm_22656 | KW_SWD | N |
| DeviceNm_22657 | KVAR_SWD | N |
| DeviceNm_22658 | KVA_SWD | N |
| DeviceNm_22659 | I AVG_SWD | N |
| DeviceNm_22672 | KW_PD | Y |
| DeviceNm_22673 | KVAR_PD | Y |
| DeviceNm_22674 | KVA_PD | Y |
| DeviceNm_22675 | I AVG_PD | Y |
| DeviceNm_22688 | KW_TD | Y |
| DeviceNm_22689 | KVAR_TD | Y |
| DeviceNm_22690 | KVA_TD | Y |
| DeviceNm_22691 | I AVG_TD | Y |
| DeviceNm_22720 | VLN_A_MIN | Y |
| DeviceNm_22721 | VLN_B_MIN | Y |
| DeviceNm_22722 | VLN_C_MIN | Y |
| DeviceNm_22723 | VLNAV_MIN | Y |
| DeviceNm_22724 | VLL_AB_MIN | Y |
| DeviceNm_22725 | VLL_BC_MIN | Y |
| DeviceNm_22726 | VLL_CA_MIN | Y |
| DeviceNm_22727 | VLLAVE_MIN | Y |
| DeviceNm_22728 | V_UNBAL_MIN | Y |
| DeviceNm_22729 | IA_MIN | Y |
| DeviceNm_22730 | IB_MIN | Y |
| DeviceNm_22731 | IC_MIN | Y |
| DeviceNm_22732 | I AVE_MIN | Y |
| DeviceNm_22733 | KWTOTAL_MIN | Y |
| DeviceNm_22734 | KVARTOTAL_MIN | Y |
| DeviceNm_22735 | KVATOTAL_MIN | Y |
| DeviceNm_22736 | KW_SWD_MIN | Y |
| DeviceNm_22737 | KVAR_SWD_MIN | Y |
| DeviceNm_22738 | KVA_SWD_MIN | Y |
| DeviceNm_22739 | KW_TD_MIN | Y |
| DeviceNm_22740 | FREQ_MIN | Y |
| DeviceNm_22741 | PF_LEAD_MIN | Y |
| DeviceNm_22742 | PFLAG_TOTAL_MIN | Y |
| DeviceNm_22743 | V1_THD_MIN | Y |
| DeviceNm_22744 | V2_THD_MIN | Y |

| I/O Real | Comment | |
|----------------|-----------------|---|
| DeviceNm_22745 | V3_THD_MIN | Y |
| DeviceNm_22746 | IA_THD_MIN | Y |
| DeviceNm_22747 | IB_THD_MIN | Y |
| DeviceNm_22748 | IC_THD_MIN | Y |
| DeviceNm_22749 | I4_MIN | Y |
| DeviceNm_22750 | IA_KFACTOR_MIN | Y |
| DeviceNm_22751 | IB_KFACTOR_MIN | Y |
| DeviceNm_22752 | VLN_A_MAX | Y |
| DeviceNm_22753 | VLN_B_MAX | Y |
| DeviceNm_22754 | VLN_C_MAX | Y |
| DeviceNm_22755 | VLNAV_MAX | Y |
| DeviceNm_22756 | VLL_AB_MAX | Y |
| DeviceNm_22757 | VLL_BC_MAX | Y |
| DeviceNm_22758 | VLL_CA_MAX | Y |
| DeviceNm_22759 | VLLAVE_MAX | Y |
| DeviceNm_22760 | V_UNBAL_MAX | Y |
| DeviceNm_22761 | IA_MAX | Y |
| DeviceNm_22762 | IB_MAX | Y |
| DeviceNm_22763 | IC_MAX | Y |
| DeviceNm_22764 | IAVE_MAX | Y |
| DeviceNm_22765 | KWTOTAL_MAX | Y |
| DeviceNm_22766 | KVARTOTAL_MAX | Y |
| DeviceNm_22767 | KVATOTAL_MAX | Y |
| DeviceNm_22768 | KWTOT_SWD_MAX | Y |
| DeviceNm_22769 | KVARTOT_SWD_MAX | Y |
| DeviceNm_22770 | KVATOT_SWD_MAX | Y |
| DeviceNm_22771 | KWTOT_TD_MAX | Y |
| DeviceNm_22772 | FREQ_MAX | Y |
| DeviceNm_22773 | PF_LEAD_MAX | Y |
| DeviceNm_22774 | PFLAG_TOTAL_MAX | Y |
| DeviceNm_22775 | V1_THD_MAX | Y |
| DeviceNm_22776 | V2_THD_MAX | Y |
| DeviceNm_22777 | V3_THD_MAX | Y |
| DeviceNm_22778 | IA_THD_MAX | Y |
| DeviceNm_22779 | IB_THD_MAX | Y |
| DeviceNm_22780 | IC_THD_MAX | Y |
| DeviceNm_22781 | KVAR_TD_MAX | Y |
| DeviceNm_22782 | KVA_TD_MAX | Y |
| DeviceNm_22783 | I4_MAX | Y |
| DeviceNm_22847 | V1_THD | N |
| DeviceNm_22913 | V2_THD | N |

| I/O Real | Comment | |
|--------------------|--|---|
| DeviceNm_22979 | V3_THD | N |
| DeviceNm_23045 | I1_TOTAL_HD | N |
| DeviceNm_23048 | I1_KFACTOR | N |
| DeviceNm_23112 | I2_TOTAL_HD | N |
| DeviceNm_23115 | I2_KFACTOR | N |
| DeviceNm_23179 | I3_TOTAL_HD | N |
| DeviceNm_23182 | I3_KFACTOR | N |
| DeviceNm_23246 | I4_TOTAL_HD | N |
| DeviceNm_23249 | I4_KFACTOR | N |
| DeviceNm_23250 | STATUS1_CNT | Y |
| DeviceNm_23251 | STATUS2_CNT | Y |
| DeviceNm_23252 | STATUS3_CNT | Y |
| DeviceNm_23253 | STATUS4_CNT | Y |
| DeviceNm_23254 | STATUS5_CNT | Y |
| DeviceNm_23255 | STATUS6_CNT | Y |
| DeviceNm_23256 | STATUS7_CNT | Y |
| DeviceNm_23257 | STATUS8_CNT | Y |
| DeviceNm_23258 | SAGSWELL_COUNT | Y |
| DeviceNm_23259 | TRANSIENT_COUNT | Y |
| DeviceNm_23260 | Over SWD KW Nominal | Y |
| DeviceNm_23260_GWY | External Numeric 1 - Over Kw Nominal | N |
| DeviceNm_23261 | Over Ia Nominal | Y |
| DeviceNm_23261_GWY | External Numeric 2 - Over Ia Nominal | N |
| DeviceNm_23262 | Over Ib Nominal | Y |
| DeviceNm_23262_GWY | External Numeric 3 - Over Ib Nominal | N |
| DeviceNm_23263 | Over Ic Nominal | Y |
| DeviceNm_23263_GWY | External Numeric 4 - Over Ic Nominal | N |
| DeviceNm_23264 | Over Vunbal Nominal | Y |
| DeviceNm_23264_GWY | External Numeric 5 - Over Vunbal Nominal | N |
| DeviceNm_23281 | VZERO_SEQ_MAG | Y |
| DeviceNm_23282 | VZERO_SEQ_PHS | Y |
| DeviceNm_23283 | VPOS_SEQ_MAG | Y |
| DeviceNm_23284 | VPOS_SEQ_PHS | Y |
| DeviceNm_23285 | VNEG_SEQ_MAG | Y |
| DeviceNm_23286 | VNEG_SEQ_PHS | Y |
| DeviceNm_23287 | IZERO_SEQ_MAG | Y |
| DeviceNm_23288 | IZERO_SEQ_PHS | Y |
| DeviceNm_23289 | IPOS_SEQ_MAG | Y |
| DeviceNm_23290 | IPOS_SEQ_PHS | Y |
| DeviceNm_23291 | INEG_SEQ_MAG | Y |
| DeviceNm_23292 | INEG_SEQ_PHS | Y |

| I/O Real | Comment | |
|--------------------|-----------------------------|---|
| DeviceNm_24023 | TRANSIENT_NOM | Y |
| DeviceNm_24023_GWY | TRANSIENT_NOM | N |
| DeviceNm_24074 | IC_KFACTOR_MIN | Y |
| DeviceNm_24075 | I4_KFACTOR_MIN | Y |
| DeviceNm_24076 | I4_THD_MIN | Y |
| DeviceNm_24077 | KVAR_TD_MIN | Y |
| DeviceNm_24078 | KVA_TD_MIN | Y |
| DeviceNm_24102 | IA_KFACTOR_MAX | Y |
| DeviceNm_24103 | IB_KFACTOR_MAX | Y |
| DeviceNm_24104 | IC_KFACTOR_MAX | Y |
| DeviceNm_24105 | I4_KFACTOR_MAX | Y |
| DeviceNm_24106 | I4_THD_Max | Y |
| DeviceNm_25063 | OVER_KW_OVER | Y |
| DeviceNm_25073 | OVER_KW_UNDER | Y |
| DeviceNm_28678 | Analog1_ZeroScale | Y |
| DeviceNm_28679 | Analog2_ZeroScale | Y |
| DeviceNm_28680 | Analog3_ZeroScale | Y |
| DeviceNm_28681 | Analog4_ZeroScale | Y |
| DeviceNm_28696 | Analog1_FullScale | Y |
| DeviceNm_28697 | Analog2_FullScale | Y |
| DeviceNm_28698 | Analog3_FullScale | Y |
| DeviceNm_28699 | Analog4_FullScale | Y |
| DeviceNm_28852 | KW SWD Sub Interval | Y |
| DeviceNm_28852_GWY | KW SWD Sub Interval | N |
| DeviceNm_28853 | KVAR SWD SUB INTERVAL | Y |
| DeviceNm_28853_GWY | KVAR SWD SUB INTERVAL | N |
| DeviceNm_28854 | KVA SWD SUBINTERVAL | Y |
| DeviceNm_28854_GWY | KVA SWD SUBINTERVAL | N |
| DeviceNm_28855 | I AVG SWD SUB INTERVAL | Y |
| DeviceNm_28855_GWY | I AVG SWD SUB INTERVAL | N |
| DeviceNm_28868 | KW SWD #SUB INTERVALS | Y |
| DeviceNm_28868_GWY | KW SWD #SUB INTERVALS | N |
| DeviceNm_28869 | KVAR SWD #SUB INTERVALS | Y |
| DeviceNm_28869_GWY | KVAR SWD #SUB INTERVALS | N |
| DeviceNm_28870 | KVA SWD #SUB INTERVALS | Y |
| DeviceNm_28870_GWY | KVA SWD #SUB INTERVALS | N |
| DeviceNm_28871 | I AVG SWD #SUB INTERVALS | Y |
| DeviceNm_28871_GWY | I AVG SWD #SUB INTERVALS | N |
| DeviceNm_28884 | KW SWD PREDICTED RESPONSE | Y |
| DeviceNm_28884_GWY | KW SWD PREDICTED RESPONSE | N |
| DeviceNm_28885 | KVAR SWD PREDICTED RESPONSE | Y |

| I/O Real | Comment | |
|--------------------|------------------------------|---|
| DeviceNm_28885_GWY | KVAR SWD PREDICTED RESPONSE | N |
| DeviceNm_28886 | KVA SWD PREDICTED RESPONSE | Y |
| DeviceNm_28886_GWY | KVA SWD PREDICTED RESPONSE | N |
| DeviceNm_28887 | I AVG SWD PREDICTED RESPONSE | Y |
| DeviceNm_28887_GWY | I AVG SWD PREDICTED RESPONSE | N |
| DeviceNm_29204 | SAGSWELL_LIMIT_MAX | Y |
| DeviceNm_29204_GWY | Swell Limit | N |
| DeviceNm_29206 | Sag Limit | Y |
| DeviceNm_29206_GWY | Sag Limit | N |
| DeviceNm_29208 | Change Criteria | Y |
| DeviceNm_29208_GWY | Change Criteria | N |
| DeviceNm_29210 | SAG SWELL NOMINAL | Y |
| DeviceNm_29210_GWY | SAG SWELL NOMINAL | N |
| DeviceNm_29508 | Transient Threshold | Y |
| DeviceNm_29508_GWY | Transient Threshold | N |
| DeviceNm_29686 | OVER_KW_PUOVER | Y |
| DeviceNm_29686_GWY | Over KW Over Pickup | N |
| DeviceNm_29687 | OVER_IA_PUOVER | Y |
| DeviceNm_29687_GWY | Over Ia Over Pickup | N |
| DeviceNm_29688 | OVER_IB_PUOVER | Y |
| DeviceNm_29688_GWY | Over Ib Over Pickup | N |
| DeviceNm_29689 | OVER_IC_PUOVER | Y |
| DeviceNm_29689_GWY | Over Ic Over Pickup | N |
| DeviceNm_29690 | OVER_VUN_PUOVER | Y |
| DeviceNm_29690_GWY | Over Vunbal Over Pickup | N |
| DeviceNm_29696 | OVER_KW_DOOVER | Y |
| DeviceNm_29696_GWY | Over KW Over Dropout | N |
| DeviceNm_29697 | OVER_IA_DOOVER | Y |
| DeviceNm_29697_GWY | Over Ia Over Dropout | N |
| DeviceNm_29698 | OVER_IB_DOOVER | Y |
| DeviceNm_29698_GWY | Over Ib Over Dropout | N |
| DeviceNm_29699 | OVER_IC_DOOVER | Y |
| DeviceNm_29699_GWY | Over Ic Over Dropout | N |
| DeviceNm_29700 | OVER_VUN_DOOVER | Y |
| DeviceNm_29700_GWY | Over Vunbal Over Dropout | N |
| DeviceNm_29706 | OVER_KW_PUUNDER | Y |
| DeviceNm_29706_GWY | Over KW Under Pickup | N |
| DeviceNm_29707 | OVER_IA_PUUNDER | Y |
| DeviceNm_29707_GWY | Over Ia Under Pickup | N |
| DeviceNm_29708 | OVER_IB_PUUNDER | Y |
| DeviceNm_29708_GWY | Over Ib Under Pickup | N |

| I/O Real | Comment | |
|--------------------|---------------------------|---|
| DeviceNm_29709 | OVER_IC_PUUNDER | Y |
| DeviceNm_29709_GWY | Over Ic Under Pickup | N |
| DeviceNm_29710 | OVER_VUN_PUUNDER | Y |
| DeviceNm_29710_GWY | Over Vunbal Under Pickup | N |
| DeviceNm_29716 | OVER_KW_DOUNDER | Y |
| DeviceNm_29716_GWY | Over KW Under Dropout | N |
| DeviceNm_29717 | OVER_IA_DOUNDER | Y |
| DeviceNm_29717_GWY | Over Ia Under Dropout | N |
| DeviceNm_29718 | OVER_IB_DOUnder | Y |
| DeviceNm_29718_GWY | Over Ib Under Pickup | N |
| DeviceNm_29719 | OVER_IC_DOUNDER | Y |
| DeviceNm_29719_GWY | Over Ic Under Dropout | N |
| DeviceNm_29720 | OVER_VUN_DOUNDER | Y |
| DeviceNm_29720_GWY | Over Vunbal Under Dropout | N |
| DeviceNm_29726 | OVER_KW_ON | Y |
| DeviceNm_29726_GWY | Over KW Time On | N |
| DeviceNm_29727 | OVER_IA_ON | Y |
| DeviceNm_29727_GWY | Over Ia Time On | N |
| DeviceNm_29728 | OVER_IB_ON | Y |
| DeviceNm_29728_GWY | Over Ib Time On | N |
| DeviceNm_29729 | OVER_IC_ON | Y |
| DeviceNm_29729_GWY | Over Ic Time On | N |
| DeviceNm_29730 | OVER_VUN_ON | Y |
| DeviceNm_29730_GWY | Over Vunbal Time On | N |
| DeviceNm_29736 | OVER_KW_OFF | Y |
| DeviceNm_29736_GWY | Over KW Time Off | N |
| DeviceNm_29737 | OVER_IA_OFF | Y |
| DeviceNm_29737_GWY | Over Ia Time Off | N |
| DeviceNm_29738 | OVER_IB_OFF | Y |
| DeviceNm_29738_GWY | Over Ib Time Off | N |
| DeviceNm_29739 | OVER_IC_OFF | Y |
| DeviceNm_29739_GWY | Over Ic Time Off | N |
| DeviceNm_29740 | OVER_VUN_OFF | Y |
| DeviceNm_29740_GWY | Over Vunbal Time Off | N |

| Memory Message | Comment | |
|-----------------------|----------------------|---|
| DeviceNm_30720_Msg | Voltage Mode Message | N |
| DeviceNm_30721_Msg | Ia Polarity | N |
| DeviceNm_30722_Msg | Ib Polarity | N |
| DeviceNm_30723_Msg | Ic Polarity | N |

| Memory Message | Comment | |
|-----------------------------|--------------------------|---|
| DeviceNm_30724_Msg | Phase Order | N |
| DeviceNm_31032_Msg | Waveform Recorder Format | N |
| DeviceNm_31305_Msg | I4 Polarity | N |
| DeviceNm_31306_Msg | Va Polarity | N |
| DeviceNm_31307_Msg | Vb Polarity | N |
| DeviceNm_31308_Msg | Vc Polarity | N |
| DeviceNm_Status_Input1_Name | | N |
| DeviceNm_Status_Input2_Name | | N |
| DeviceNm_Status_Input3_Name | | N |
| DeviceNm_Status_Input4_Name | | N |
| DeviceNm_Status_Input5_Name | | N |
| DeviceNm_Status_Input6_Name | | N |
| DeviceNm_Status_Input7_Name | | N |
| DeviceNm_Status_Input8_Name | | N |
| DeviceNm_Analog1_Name | | N |
| DeviceNm_Analog2_Name | | N |
| DeviceNm_Analog3_Name | | N |
| DeviceNm_Analog4_Name | | N |
| DeviceNm_DownloadMessage | Download Message | N |
| DeviceNm_ResetMessage | Reset Message | N |
| DEVICENM_ErrorMessage | Error Message | N |
| DeviceNm_RefreshMessage | Refresh Message | N |
| DeviceNm_Path | | N |

| I/O Message | Comment | |
|----------------|---------------------|---|
| DeviceNm_4864 | Device_Type | N |
| DeviceNm_4867 | Hardware_Rev | N |
| DeviceNm_4868 | SERIAL_NUMBER | N |
| DeviceNm_4936 | Ethernet_IP_Address | Y |
| DeviceNm_4937 | Ethernet_Subnet | Y |
| DeviceNm_4938 | Ethernet_DGateway | Y |
| DeviceNm_22608 | Analog1_Value | Y |
| DeviceNm_22609 | Analog2_Value | Y |
| DeviceNm_22610 | Analog3_Value | Y |
| DeviceNm_22611 | Analog 4_Value | Y |
| DeviceNm_22704 | KWH_IMPRT | N |
| DeviceNm_22705 | KWH_EXPRT | N |
| DeviceNm_22706 | KWH_TOT | N |
| DeviceNm_22707 | KWH_NT | N |
| DeviceNm_22708 | KVARH_IMPRT | N |

| I/O Message | Comment | |
|--------------------|--------------------------|---|
| DeviceNm_22709 | KVARH_EXPRT | N |
| DeviceNm_22710 | KVARH_TOT | N |
| DeviceNm_22711 | KVARH_NT | N |
| DeviceNm_22712 | KVAH_TOT | N |
| DeviceNm_29161 | Comm1_UID | Y |
| DeviceNm_29236 | Comm2_UID | Y |
| DeviceNm_29237 | Comm3_UID | Y |
| DeviceNm_30720 | VOLT_INPUT_MODE_MSG | N |
| DeviceNm_30720_GWY | VOLT_INPUT_MODE_MSG | N |
| DeviceNm_30721 | IA_POLARITY_INPUT_MS | Y |
| DeviceNm_30721_GWY | IA_POLARITY_INPUT_MS | N |
| DeviceNm_30722 | IB_POLARITY_INPUT_MS | Y |
| DeviceNm_30722_GWY | IB_POLARITY_INPUT_MS | N |
| DeviceNm_30723 | IC_POLARITY_INPUT_MS | Y |
| DeviceNm_30723_GWY | IC_POLARITY_INPUT_MS | N |
| DeviceNm_30724 | PHASE_ORDER_INPUR_MS | Y |
| DeviceNm_30724_GWY | PHASE_ORDER_INPUR_MS | N |
| DeviceNm_31032 | Waveform Recorder Format | Y |
| DeviceNm_31032_GWY | Waveform Recorder Format | N |
| DeviceNm_31110 | Comm1_Mode | Y |
| DeviceNm_31111 | Comm1_Baud | Y |
| DeviceNm_31305 | I4_Polarity_Input_Ms | Y |
| DeviceNm_31305_GWY | I4_Polarity_Input_Ms | N |
| DeviceNm_31306 | Va_POLARITY_INPUT_MS | Y |
| DeviceNm_31306_GWY | Va_POLARITY_INPUT_MS | N |
| DeviceNm_31307 | VB_POLARITY_INPUT_MS | Y |
| DeviceNm_31307_GWY | VB_POLARITY_INPUT_MS | N |
| DeviceNm_31308 | VC_POLARITY_INPUT_MS | Y |
| DeviceNm_31308_GWY | VC_POLARITY_INPUT_MS | N |
| DeviceNm_31309 | Comm2_Baud | Y |
| DeviceNm_31310 | Comm3_Baud | Y |
| DeviceNm_31311 | Comm1_Protocol | Y |
| DeviceNm_31312 | Comm2_Protocol | Y |
| DeviceNm_31313 | Comm3_Protocol | Y |
| DeviceNm_31314 | Ethernet_Protocol | Y |

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GE Industrial Systems

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