GE
Digital Energy

PMCS

Instruction manual

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Power Management Control System (PMCS) software revision 7.00.

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PMCS

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PMCS

Glossary

Glossary

Baud rate	A measurement of a communication channel's signaling rate or information-carrying capacity. Communicating devices typically have configurable baud rates to provide compatibility with various speed communication networks. Higher baud rates generally provide faster data-refresh times.
CIMPLICITY HMI	An industry-standard supervisory control and data acquisition (SCADA) software package providing flexible, accurate, and easy-to-use graphics. CIMPLICITY® HMI is based on client-server architecture, consisting of Servers and Viewer workstations. Servers are responsible for the collection and distribution of data. Viewer workstations connect into Servers and have full access to the collected data for viewing and control actions. Servers and Viewer workstations can be easily networked together to share data without the need to replicate your database from node to node.
CIMPLICITY HMI Server Development	Allows you to create new projects and can also function as a runtime system
CIMPLICITY HMI Server Runtime	Can be used as runtime systems only. They do not support project configuration.
CIMPLICITY HMI Viewer Runtime	Connects to Servers for viewing data and control actions
Communication network	A physical standard for wiring and interconnection of communicating devices. A communication network standard usually includes specifications of voltages, maximum cable-run lengths, shielding, termination, and cable requirements. RS485 and Ethernet are examples of communication-network standards.
Communication protocol	A language or convention used for reliable transmission and reception of binary data. A communication protocol is often independent of the physical method or network used for transmission. Modbus and TCP/IP are examples of communication protocol standards.
DDE	Dynamic data exchange. A Microsoft Windows standard for efficient sharing of data between applications on the same computer

GLOSSARY

DDE/OPC Server	A software application that typically runs in the background, gathering information from the network and providing the information in dynamic data exchange (DDE) and object linking and embedding for process control (OPC) format for use by one or more applications. The PMCS DDE/OPC Server is included in the PMCS Network & Device Configurator and comes in versions optimized for Ethernet TCP/IP or RS485 Modbus networks.
Ethernet	An industry-standard communication network commonly used for local-area networks (LANs) of computers. Ethernet-based PMCS systems provide high-speed, reliable communications at 10 megabits per second.
Ethernet gateway	The gateway increases performance of a PMCS system through multiple Modbus networks and reduces overall wiring costs through reuse of existing Ethernet LAN wiring
Event logger	A standard PMCS application that efficiently analyzes, sorts, and logs unusual system behavior, such as circuit breaker trips, undervoltages, and overcurrents. Extensive data-logging capabilities make it a useful tool for analyzing and predicting system maintenance patterns.
Host computer	The computer running the PMCS DDE Server. All other computers running PMCS client programs are referred to as Remote Viewers, viewer workstations, or networked computers.
IED	Intelligent electronic device
Interface Toolkit	An optional PMCS tool used to quickly generate accurate and friendly graphical user interfaces. The Interface Toolkit provides dozens of wizards to efficiently create intelligent one-line diagrams and tabular displays.
Modbus RTU	An industry-standard, nonproprietary communications protocol typically used in medium-speed networks (up to 38.4 kpbs) on RS485
Multinet	An Ethernet communications module that allows connection for up to 32 Modbus devices, providing Modbus TCP/IP communications for these devices over Ethernet. This allows connection to fiberoptic LAN and WAN systems for remote access to data.
NetBEUI	A network protocol usually used in small, department-size local-area networks of 1 to 200 clients
NetDDE	A version of dynamic data exchange (DDE) that allows communications between applications running on different computers over network connections
ODBC	Open database connectivity. An inter-application communication protocol required for certain PMCS client applications to share data. Automatically installed and configured as part of the PMCS installation.
PMCS	Power Management Control System. GE's high-performance power-management system for Windows, including open network protocols, waveform capture and analysis, and event logging.
PLC	Programmable logic controller
RELT	Reduced energy let-through instantaneous protection. A measurement displayed in PMCS for GTU devices.
RS485	An industry-standard communication network supporting up to 32 networked devices. RS485 provides medium-speed, reliable communication transport through shielding, balanced transmission voltages, and termination.
RTD	Resistive temperature device. This function varies resistance based on temperature.

GLOSSARY

RTU	Remote terminal unit. A microprocessor based device, such as a relay.
SCADA	Supervisory control and data acquisition. A category of systems that primarily acquires data for logging and analysis, as well as providing supervisory control in applications without time-critical requirements. Power-management systems are a direct application of SCADA technology.
TCP/IP	Transmission control protocol / Internet protocol. An industry-standard protocol typically used on Ethernet or token-ring LANs.
Waveform capture	A standard PMCS application that provides a window into power-quality data in an electrical system. Waveform capture is used to view snapshots of voltage and current waveforms from various points in an electrical system to analyze harmonics and unusual system behavior.

GLOSSARY

PMCS

Chapter 1: Introduction

Overview

The Power Management Control System (PMCS) accesses GE Multilin™ and third-party devices in a substation and provides graphical representations of status and energy trends, remote control, and automated responses. By optimizing methods used to control both processes and equipment, energy efficiency is realized.

PMCS is intended for installation with CIMPLICITY® HMI. The wizards contained in the PMCS software allow you to quickly build accurate and friendly user interfaces with CIMPLICITY. Installation of PMCS adds PMCS and EnerVista™ Integrator™ functionality to CIMPLICITY, where EnerVista Integrator integrates the comprehensive line of POWER LEADER™ devices, as well as many new Modbus remote terminal unit (RTU) devices and systems.

PMCS supports Ethernet and baud rates of up to 38.4 kbps on a Modbus-based network and 10 Mbps on an Ethernet TCP/IP network. This results in near real-time screen viewing and immediate access to critical event and alarm data.

This document provides and introduction to PMCS and outlines how to configure CIMPLICITY for PMCS and how to view information for devices. For information on devices supported, installation, and starting the software, see the PMCS Quickstart Guide.

Features

PMCS includes the following features that make the system powerful and easy to use:

- Compatible with industry-standard third-party supervisory control and data acquisition (SCADA) platforms
- Built-in Modbus RTU network compatibility for an open network architecture and high-speed communications
- Built-in Ethernet TCP/IP network compatibility for high-speed communication and reduced wiring costs
- 3D virtual-device interaction with accurately reproduced device look and feel
- Improved waveform capture, including extensive analysis tools
- Comprehensive alarm and event reporting for immediate diagnosis of electrical system problems

HMI application size

- 20,000 points/tags in human machine interface (HMI) database (30,000 maximum)
- 600 HMI alarms configured maximum
- 600 trended points (eight maximum per device)
- HMI I/O rates, alarm rates, and logging rates not to exceed 750 pts/sec
- 17 device types supported with two wizard types (Basic and Advanced) that can be configured using PowerBuilder
- 10% of tags connected to enterprise solution
- Web-enabled only via CIMPLICITY WebView; no waveform or event viewers

Special application issues

- No redundancy

Performance

Response times:

- One second or less to open an HMI screen
- One second update time to populate a screen per device per serial port (except for UR-series and ELVS400 devices)
- 4 to 7 second time delay to display event in PMCS Event Viewer
- One second response time to make device change (settings/command coil) not including device feedback
- 1000 device events/sec burst support

Configuration:

- Maximum 15 devices per serial port
- Device baud rates set to maximum
- CIMPLICITY HMI points set for on-demand
- Devices supporting 125 register block reads
- Average CPU utilization <35%
- 99% system uptime

OPC client data items size

- Up to 65,000 points/tags in OPC clients
- 10% of tags connected to enterprise solution

Devices supported

PMCS supports GE Multilin and third-party devices, including Modbus-based devices.

The table outlines the devices supported. The numbered products 239, 339, and so on, are also referred to as SR239, SR339, and so on. Firmware revisions other than those listed may not be compatible. When in doubt, contact your GE Sales Representative or GE Digital Energy as outlined in the **For further assistance** section.

Table 1: Devices supported by PMCSDevices

Device family	Device	Firmware
ATS	MX150	5.4x, 6.0x
	MX250	5.4x, 6.0x
	MX350	1.2x
UPS	UPS, UPS LP, UPS SG	1.0
Trip Units/Switchgear	Spectra MicroVersa Trip	5.1x
	Enhanced MicroVersa Trip C	4.1x
	Enhanced MicroVersa Trip D	4.1x
	GTU (EntelliGuard TU Trip Unit)	7.0x
	ELVS (Entellisys)	4.5x
	MET	12.02.02
Meters/Switches	PQM	3.3x to 3.6x
	PQMII	1.0x to 2.2x
	EPM1000	3.8x
	EPM2000	1.0x
	EPM2200	1.0x
	EPM4000	3.8x
	EPM5000P	2.4x
	EPM5300P	2.4x
	EPM5350P	2.4x
	EPM6000	1.0x
	EPM9450Q	2.1x
	EPM9650Q	2.1x
	EPM9800	6.1x
	ML2400	3.0x
Distribution Feeder	350	1.2x to 1.4x
	F35	2.6x to 5.9x
	F60	2.6x to 5.9x
	F650	1.6x to 5.4x
	MIF 2	4.0
	735/737	1.5x
	750/760	3.6x to 7.4x
	G30	4.4x to 5.9x
	G60	2.6x to 5.9x
Generator	489	1.3x to 4.03x
	D30	5.0x to 5.9x
	D60	2.6x to 5.9x
	D90^{Plus}	1.8x

Device family	Device	Firmware
Line Current Differential Protection	L30	5.6x to 5.9x
	L60	2.6x to 5.9x
	L90	2.6x to 5.9x
Transformer	745	2.4x to 5.2x
	T35	2.6x to 5.9x
	T60	2.6x to 5.9x
	345	1.3x to 1.4x
Motor	239	2.3x to 2.7x
	269+	6.0x
	339	1.3x to 1.4x
	369	1.6x to 3.4x
	469	2.5x to 5.1x
	MM200	1.0x to 1.2x
	MM300	1.2x to 1.5x
	MMII	4.0x to 5.2x
	MMIII	1.0 to 1.2x
	RRTD	1.4x, 1.5x
	SPM	2.0x, 2.1x
	M60	2.6x to 5.9x
Network	N60	3.4x to 5.9x
Bus	B30	2.6x to 5.9x
	B90	4.8x to 5.9x
Specialized	C30	2.6x to 5.9x
	C60	2.6x to 5.9x
	C90^{Plus}	1.6x to 1.8x
Miscellaneous	MRPO	1.0
	FIRETRACER	1.0
	VERSAMAX	1.0

PMCS includes a set of customized wizard screens for the devices listed in the following table.

Table 2: Customized wizard screens

Device family	Device
Trip Units/Switchgear	Spectra MicroVersa Trip
	Enhanced MicroVersa Trip C
	Enhanced MicroVersa Trip D
	GTU (EntelliGuard TU Trip Unit)
	ELVS (Entellisys)
Meters	PQM
	PQMII
	EPM9450Q
	EPM9650Q
Distribution Feeder	735/737
	750/760

Device family	Device
Generator	489
Transformer	745
Motor	469
Universal Relays	UR

For further assistance

For product support, contact the information and call center as follows. Have your software key(s) ready.

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North America toll-free: 1 877 547 8630
Fax: +1 905 927 5098
E-mail: multilin.tech@ge.com
Website: http://gedigitalenergy.com/multilin

Comments about new features or modifications for specific requirements are welcome.

PMCS

Chapter 2: Configure CIMPLICITY

To use PMCS in CIMPLICITY, the latter needs to be configured for it. This chapter outlines how to add a project for PMCS in CIMPLICITY.

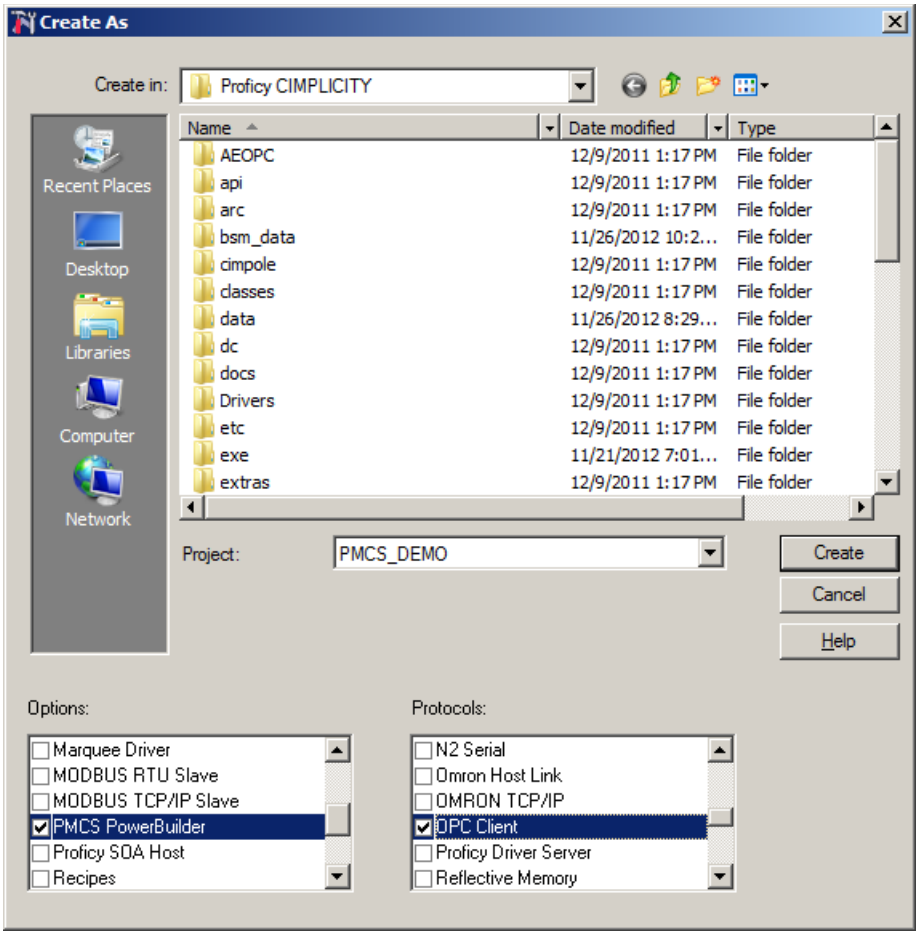
Add PMCS project in CIMPLICITY

This section outlines how to place and configure a PMCS wizard in CIMPLICITY HMI. You do this by adding a project in CIMPLICITY for PMCS.

To add a PMCS project in CIMPLICITY:

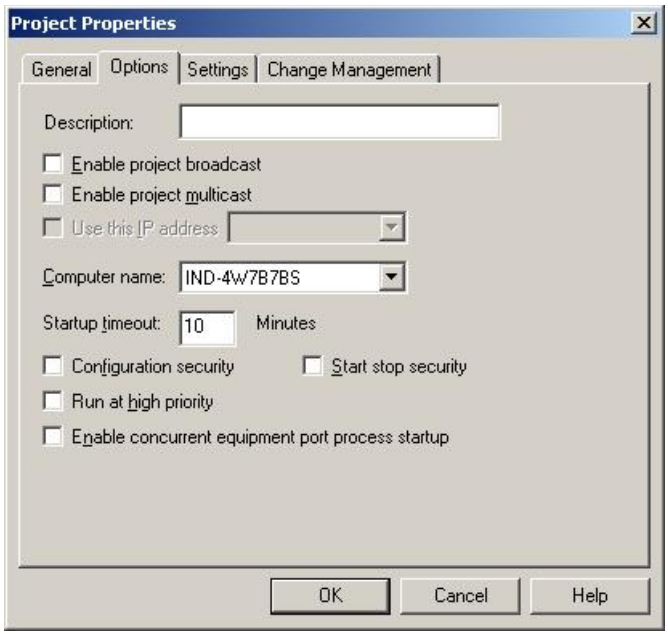
1. In CIMPLICITY HMI, create a new project by clicking the **New Project** button or selecting **File > New Project**. A window opens.
2. Enter a **Project Name** and select a folder in which to store the project (usually in the cimplicity\hmi\projects\ folder). Under **Options**, select **PMCS PowerBuilder** and under **Protocols**, select **OPC Client**. Click the **Create** button to write the project file to disk and open the Project Properties window. See the following figure.

Figure 1: Creating a new project in CIMPLICITY



3. In the Project Properties window, click the **Options** tab, and select the **Enable project broadcast** checkbox if you want to use CIMPLICITY HMI remote view nodes. Ensure that the **Computer name** field matches the name of the host machine. Disregard the **Startup timeout** field and the **General** tab. Click **OK** to open the CIMPLICITY HMI Project Wizard.

Figure 2: Project Properties window

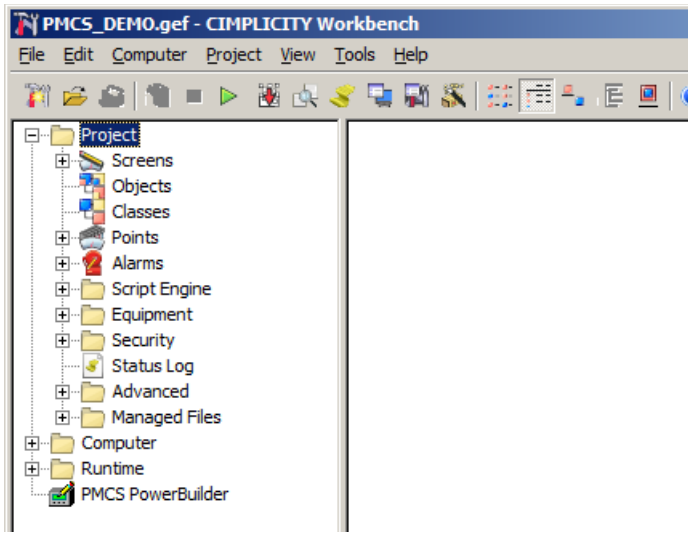


4. Complete the CIMPLICITY Project Wizard. At the end, click **Finish** to complete the setup.

Figure 3: CIMPLICITY Project Wizard

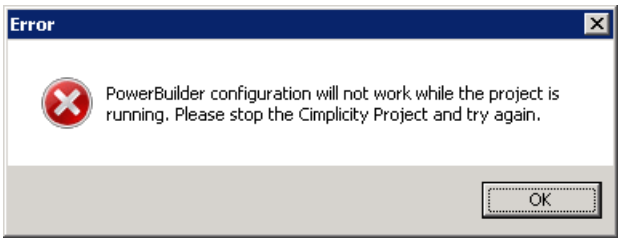
5. Access the CIMPLICITY Workbench view for the project.

Figure 4: CIMPLICITY Workbench window



6. With CIMPLICITY Project no longer running, double-click the **PMCS PowerBuilder** item. When CIMPLICITY Project is still running, the following error message displays; close the project window. Once PMCS PowerBuilder has launched, you can view device data as outlined in the next chapter.

Figure 5: Error message when CIMPLICITY still running



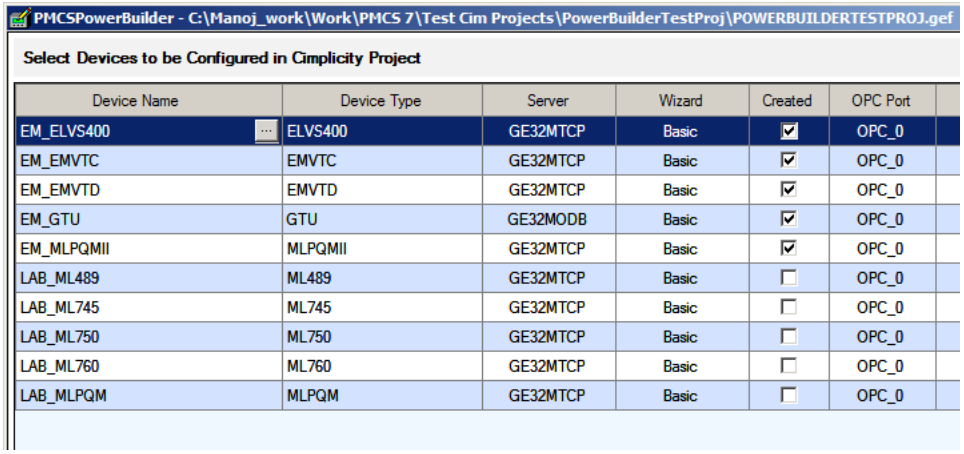
With successful launch of PMCS PowerBuilder, any supported devices configured in the PMCS configurator display in a list. If this configuration has not been done, do so now using the Quickstart Guide, then run PowerBuilder after device configuration is complete.

On first run, PowerBuilder reads the device configuration details from the server topic files (TOPIC.CFG). It populate the list with configured devices in the default one-line options, as shown in the following figure.

On next run, PowerBuilder loads the device details from the topic files and sets the one-line preferences of already configured devices as per previous configuration. The **Created** check box is enabled for these devices.

The next chapter explains how to use the main PowerBuilder window and the information available for various devices.

Figure 6: Devices listed in PMCS PowerBuilder



Device Name	Device Type	Server	Wizard	Created	OPC Port
EM_ELVS400	ELVS400	GE32MTCP	Basic	☑	OPC_0
EM_EMVTC	EMVTC	GE32MTCP	Basic	☑	OPC_0
EM_EMVTD	EMVTD	GE32MTCP	Basic	☑	OPC_0
EM_GTU	GTU	GE32MODB	Basic	☑	OPC_0
EM_MLPQMII	MLPQMII	GE32MTCP	Basic	☑	OPC_0
LAB_ML489	ML489	GE32MTCP	Basic	☐	OPC_0
LAB_ML745	ML745	GE32MTCP	Basic	☐	OPC_0
LAB_ML750	ML750	GE32MTCP	Basic	☐	OPC_0
LAB_ML760	ML760	GE32MTCP	Basic	☐	OPC_0
LAB_MLPQM	MLPQM	GE32MTCP	Basic	☐	OPC_0

PMCS

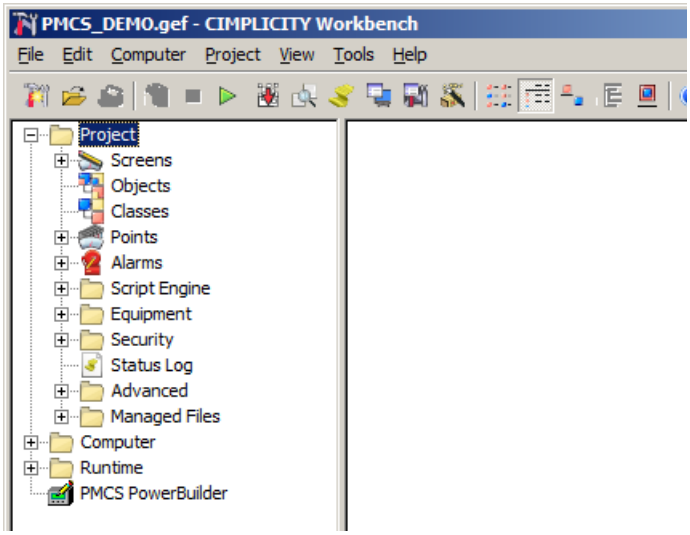
Chapter 3: PowerBuilder window

The main window PMCS PowerBuilder allows access to device information. This chapter explains the window. The information displayed was entered during installation of PMCS; to add devices, see the PMCS Quickstart Guide.

PowerBuilder window explained

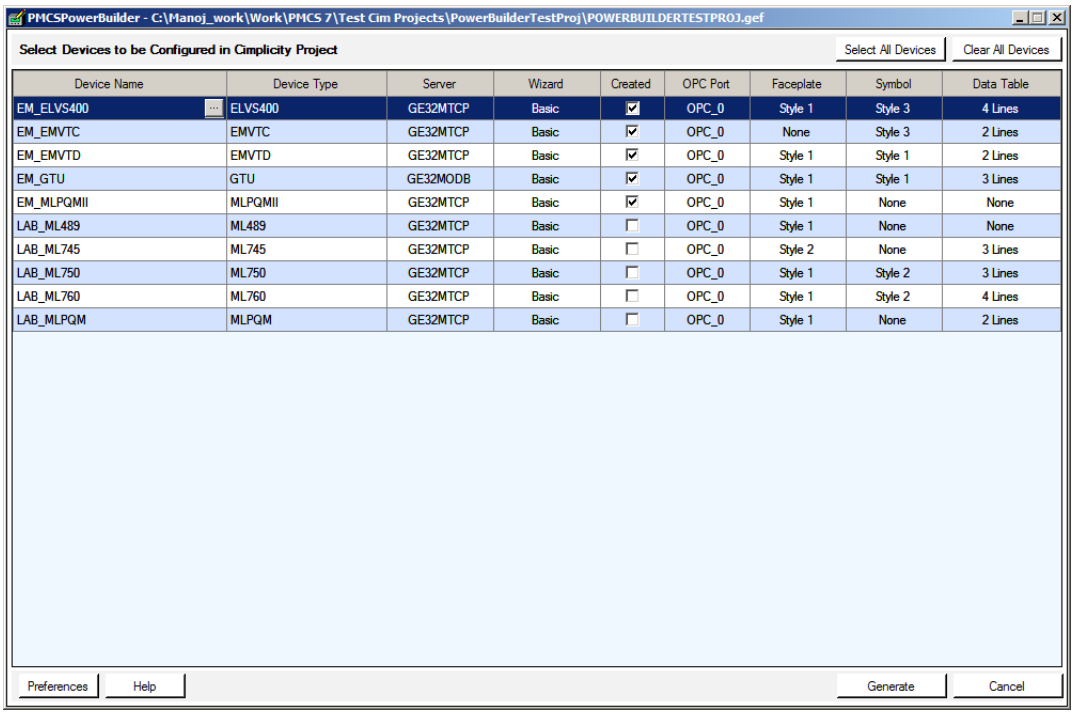
To launch PowerBuilder, double-click the **PMCS PowerBuilder** menu item as outlined at the end of the previous chapter.

Figure 7: CIMPLICITY Workbench window



The following figure shows an example of the main PMCS PowerBuilder window. Devices with an ML prefix refer to GE Multilin products. Such products are referred to elsewhere in this document without the prefix, for example 369 instead of ML369.

Figure 8: Devices listed in PMCS PowerBuilder



Settings

The following settings are available in the PowerBuilder window.

Device Name

This is a read-only field populated from the device name topic file. An example is Mill_Relay.

Device Type

This is a read-only field populated from the device type topic file. An example is EMVTC.

Server

This is a read-only field populated from the device name and based on the Server (GE32MTCP/GE32MODB) topic file.

Wizard

Two types of wizards are available: basic and advanced. This field indicates the available wizard. By default, basic is selected. The basic wizard contains a single **Overview** tab, which consists metering data and device front panel LED status. The advanced wizard contains multiple tabs, including the **Overview**, **Settings**, **Commands**, **IO**, and **Analysis** tabs.

Created

When a checkbox is already selected, it means that the device has already been configured in CIMPLICITY Project. To configure any additional devices, enable the appropriate checkbox.

Normally, after first installation, you ensure that all checkboxes are selected so that all devices are configured. Then when you later add devices, you select the checkboxes here, then click the **Generate** button to proceed with configuration. The **Generate** button is explained later in this chapter.

OPC Port

The object linking and embedding for process control (OPC) port. The default is OPC_0.

This setting controls how CIMPLICITY manages devices. Giving several devices the same OPC Port, such as OPC_0, means that there is a collection of devices in a virtual port, similar to a group devices.

Faceplate

The faceplate style available. The default value is taken from the preference option for that device type:

- None
- Style 1
- Style 2

This setting is not for setting the faceplates displayed in the windows for each device (as shown in the next chapter).

Table 3: Faceplate styles

Device name	Style 1 - 2D small faceplate	Style 2 - 3D small faceplate
GTU		
MVT		
EMVT		
469		
489		

Device name	Style 1 - 2D small faceplate	Style 2 - 3D small faceplate
735/737		
745		
750/760		
PQM		
PQMII		
UR		
EPM9450		
EPM9650		
ELVS400		

Symbol

The list of available symbol options. The default value is taken from the preference option for that device type:

- None
- Style 1
- Style 2
- Style 3

Table 4: Symbols

Style	No communication	Breaker open	Breaker closed	Breaker trip	Breaker racked out
None					
Style 1					
Style 2					
Style 3					

Data Table

The available data display options. The default value is taken from the preference option for that device type.

Table 5: Data Table

Data Table option	Data displayed
None	
2 Lines	Line 1, 2
3 Lines	Line 1, 2, 3
4 Lines	Line 1, 2, 3, 4
5 Lines	Line 1, 2, 3, 4, 5

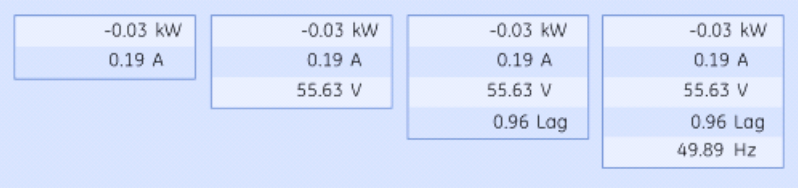
Table 6: Data Table lines

Device	Line 1	Line 2	Line 3	Line 4	Line 5
ELVS	Real Power	Avg Current	Avg Voltage	% LOAD	FREQ
EMVTC	Real Power	Avg Current	Avg Voltage	% LOAD	Avg PF
EMVTD	Real Power	Avg Current	Avg Voltage	% LOAD	Avg PF
MVT	Real Power	Avg Current	Avg Voltage	% LOAD	Avg PF
GTU	Real Power	Avg Current	Avg Voltage	% LOAD	Avg PF
PQM	Real Power	Avg Current	Avg Voltage	FREQ	Avg PF
PQMII	Real Power	Avg Current	Avg Voltage	FREQ	Avg PF
EPM9650/9450	Real Power	Avg Current	Avg Voltage	FREQ	Avg PF
469	Real Power	Avg Current	Avg Voltage	RPM	Thermal Capacity
489	Generator Load	Avg Current	Avg Voltage	RPM	GEN LOAD
735/737	Average Current	Ground Current	--	--	--
745	W1 Real Power	W1 Avg Current	W2 Real Power	W2 Avg Current	FREQ
750/760	Real Power	Avg Current	Avg Voltage	% LOAD	FREQ
UR	Src1 Real Power	Src1 Avg Current	Src1 Avg Voltage	AvgPF	FREQ

The figure shows the formats for the two to five-line options, followed by an example.

Figure 9: Two to five-line formats

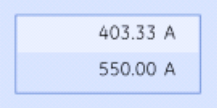
Figure 10: Two to five-line examples



The 735 and 737 have two lines of data available, these being average and ground current.

Figure 11: Display for 735/737

Figure 12: Example for 735/737



Buttons

The following buttons are available in the PowerBuilder window.

Select All Devices

Sets the **Created** checkboxes for all the devices to the checked state.

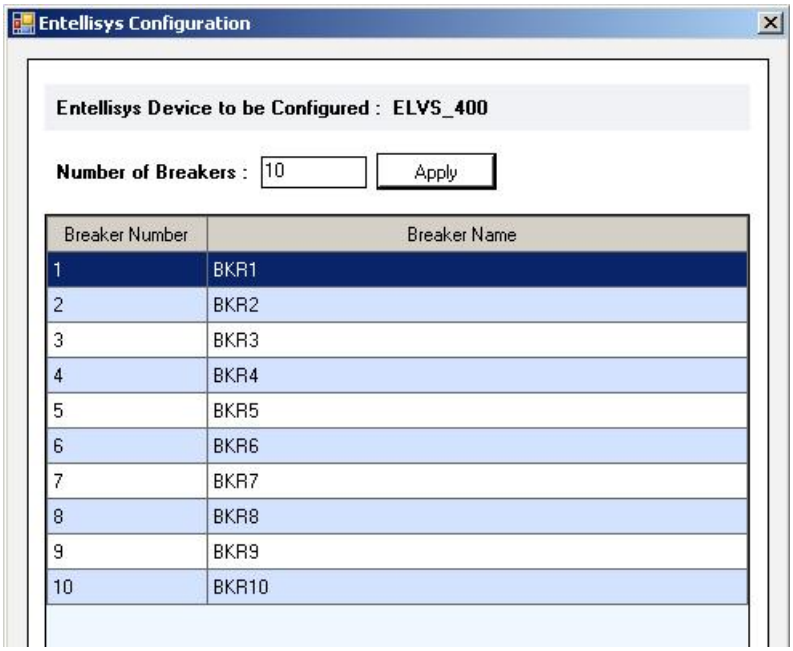
Clear All Devices

Sets the **Created** checkboxes for all the devices to the unchecked state.

ELVS Device Name

ELVS devices have a button beside the device name. Click the button to show the Entellisys breaker configuration window, where you specify the number of breakers and a name for each. The default name for each breaker is in the form BKR1, BKR2, and so on. To change the name, type in the field. The information is used in class object creation and passed on to the respective CIMPLICITY screens. When the number of breakers specified is greater than the actual number, blank rows appear at the end. When the number of breakers specified is less than the actual number, rows are removed from the end.

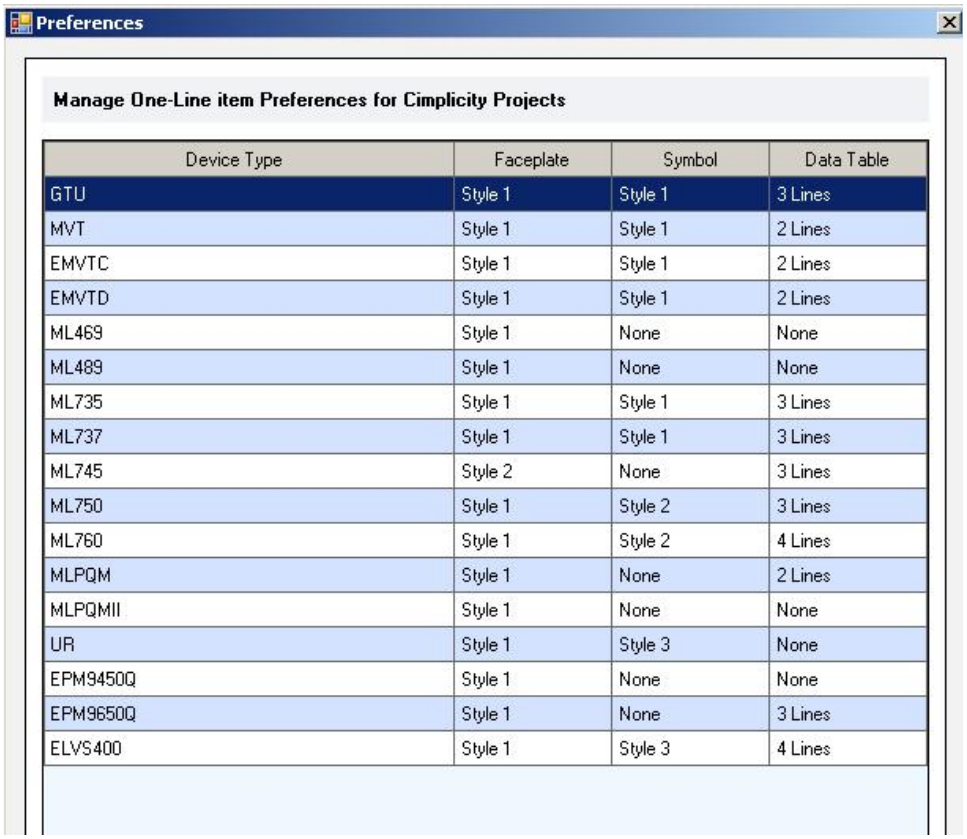
Figure 13: Entellysis breaker configuration window



Preferences

Opens the Preferences window to configure the default one-line options for each device type supported in PMCS. To change a value, type in the field.

Figure 14: Set default values in Preferences window



Help

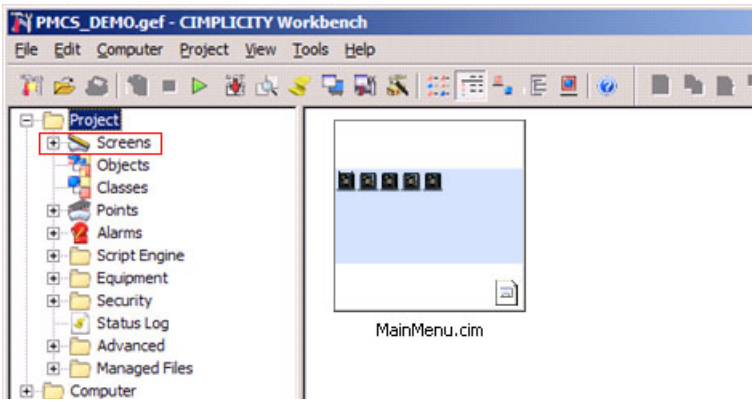
Opens the PMCS online help window.

Generate

Initiates CIMPLICITY project creation and includes all the devices that have the **Created** checkbox enabled. It also removes any devices that were configured in the project and have the **Created** checkbox unselected. See the previous chapter for instruction on creating a project.

Once the **Generate** button is clicked, it generates a MainMenu.cim file, which can be viewed by clicking the **Screens** menu item.

Figure 15: Viewing the MainMenu.cim file



For devices with the Created checkbox enabled, based on the default options set, such as Faceplate, Symbol, and Data Table, the options generate as objects in the MainMenu.cim file and are overlaid on one another.

Figure 16: Objects in the MainMenu.cim file

Cancel

Discards any changes done in the configuration options and closes the PowerBuilder window.

PMCS

Chapter 4: Device information

This chapter explains the information displayed for several devices.

The windows vary with device. Content can include the following:

- Tabs with data
- Event log button, including the ability to clear the logs
- Trend data button
- Waveform button

The buttons are inactive when not applicable, for example when no trend window was specified in the Objects Properties window or when waveform capture is not supported by a device.

Content also varies with security level. When security is enabled in your application, the user 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 CIMPLICITY documentation for information on how to use security features.

469

This section explains the information displayed in PMCS for 469 motor management relays, which are also referred to as ML469 and SR469.

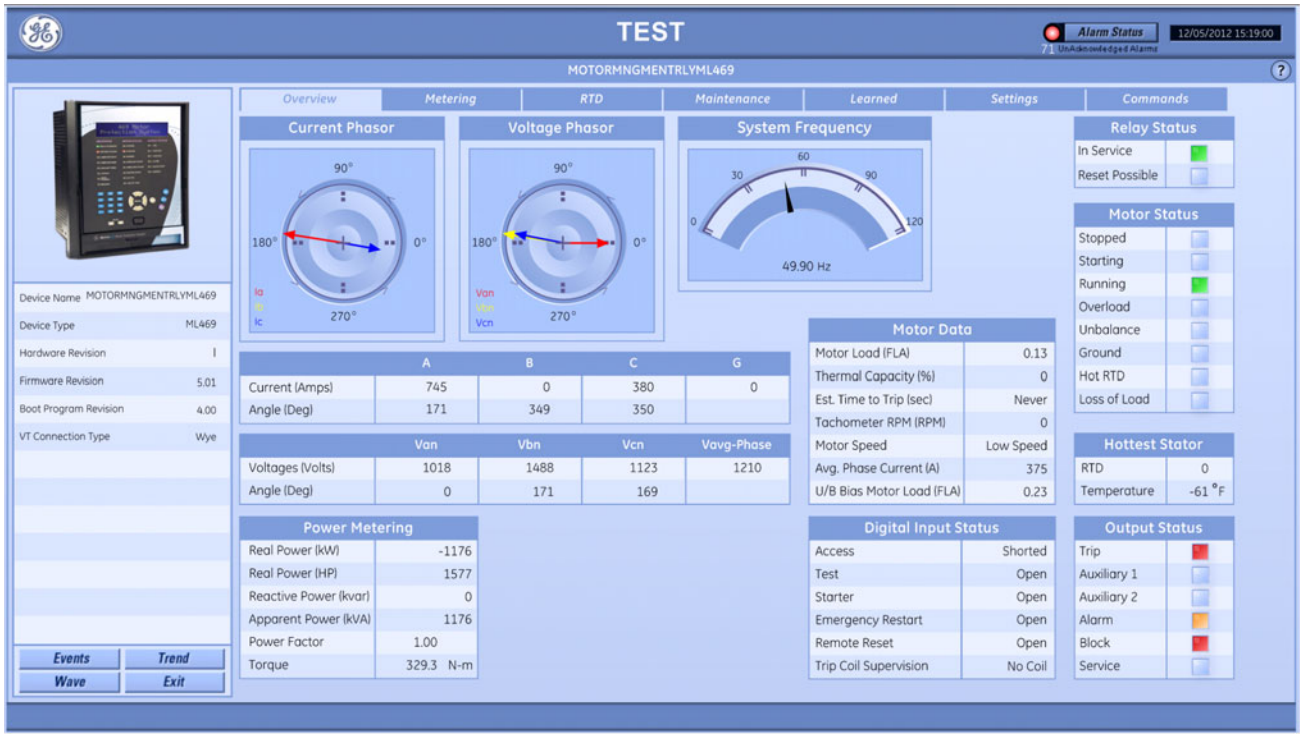
Overview tab

This tab displays

- Current
- Voltage
- Power
- System frequency
- Motor data
- Digital input status
- Relay status
- Motor status

- Hottest stator
- Output status

Figure 17: 469 Overview tab

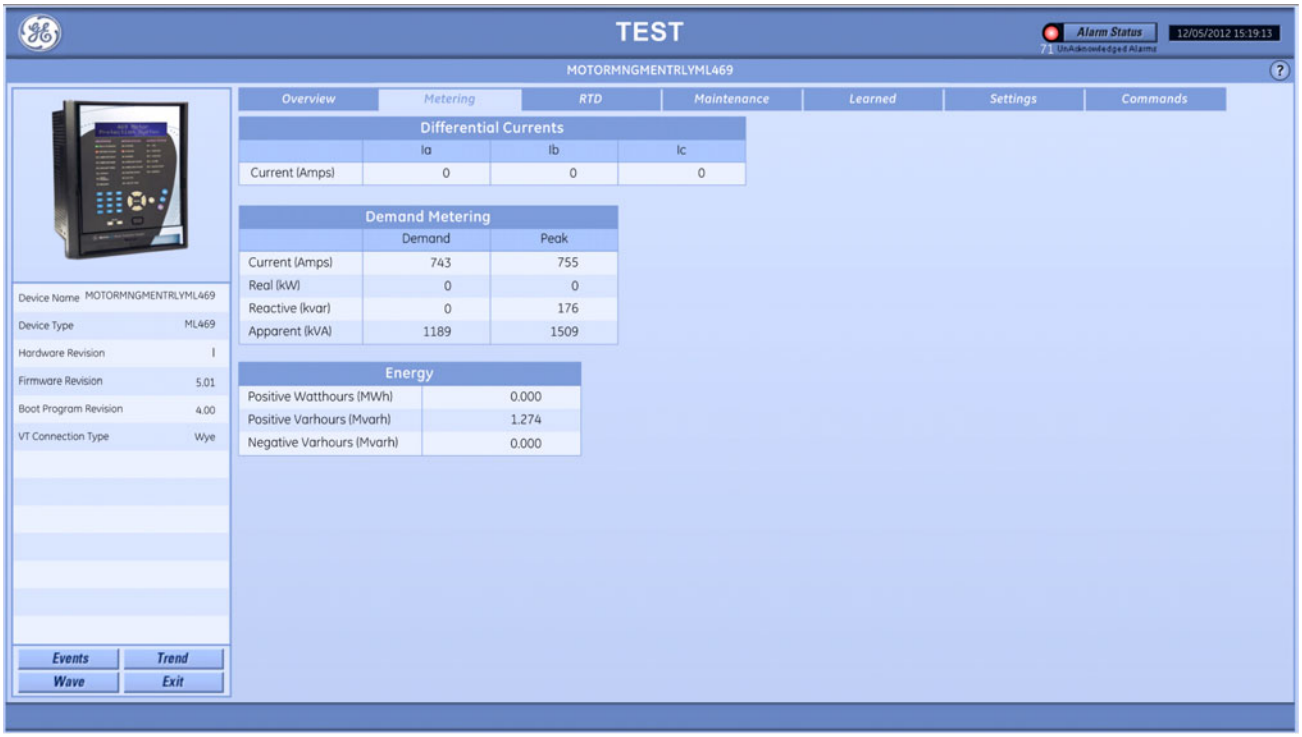


Metering tab

This tab displays

- Differential currents
- Demand metering
- Energy consumption of the 469

Figure 18: 469 Metering tab

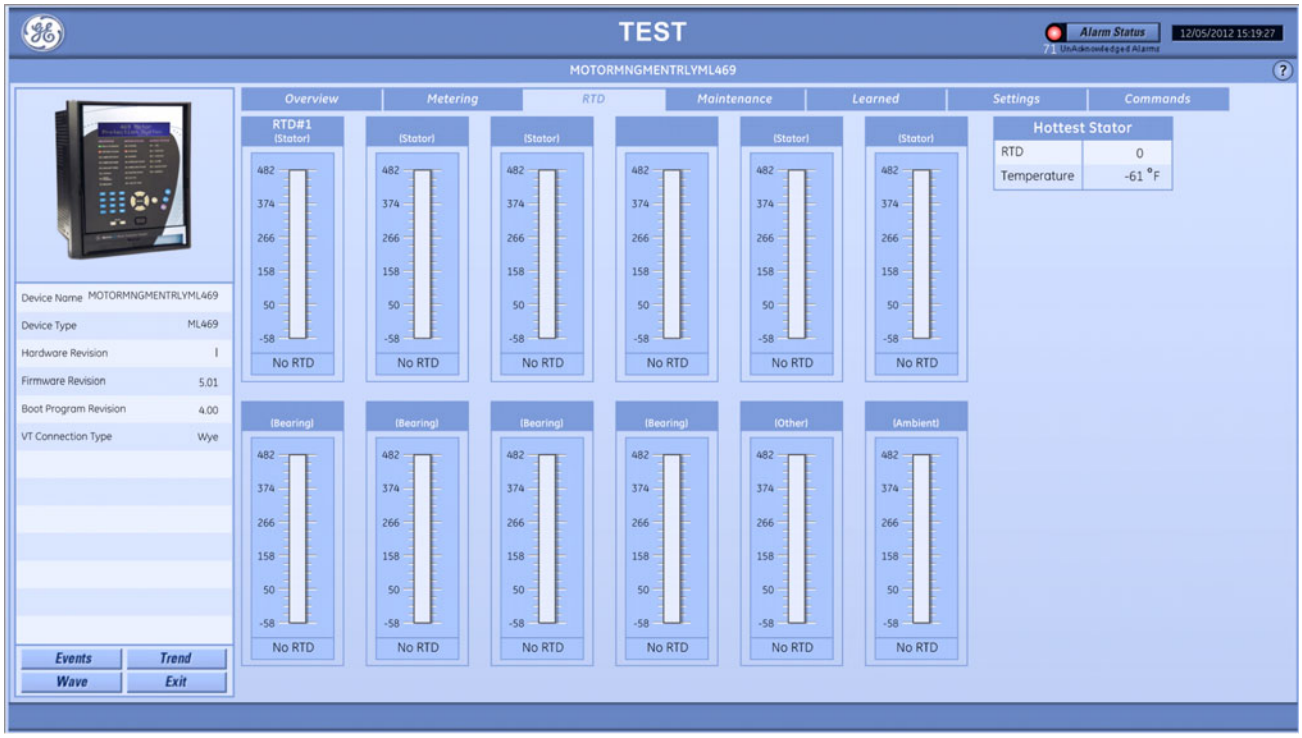


RTD tab

This tab displays

- Resistive temperature device (RTD) information

Figure 19: 469 RTD tab

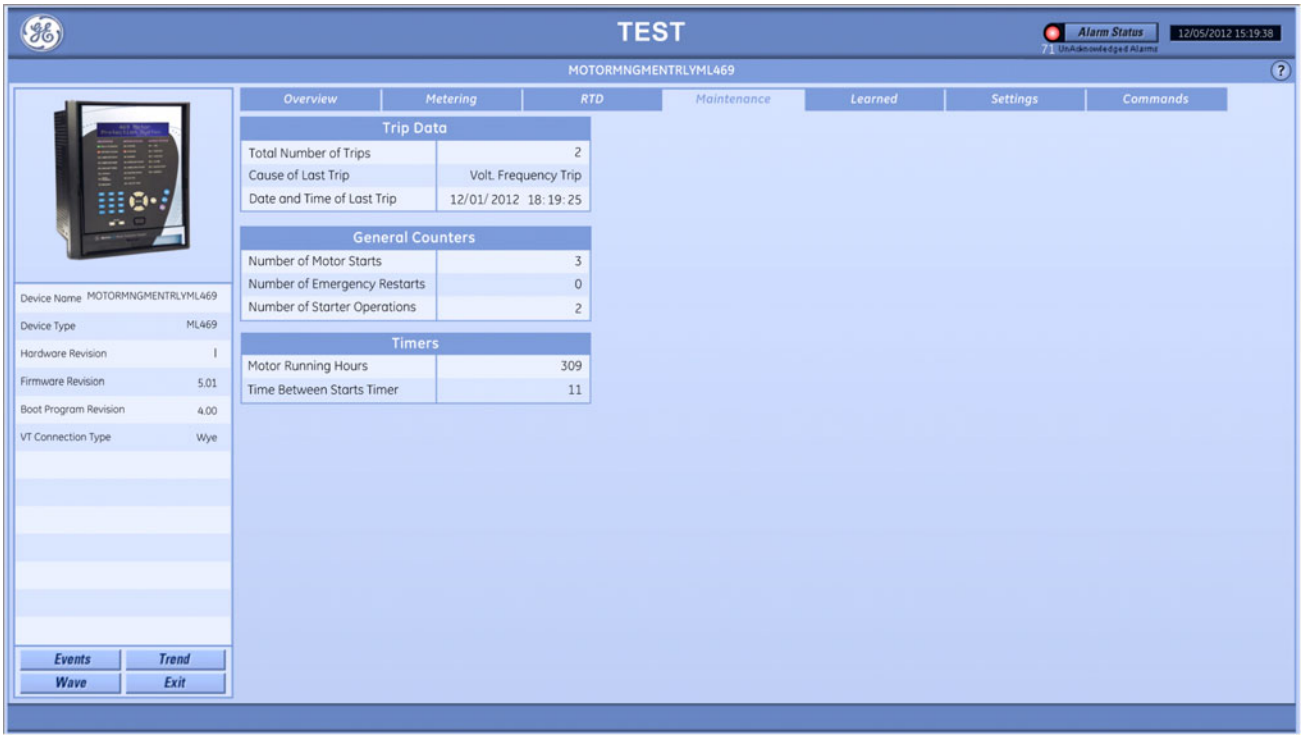


Maintenance tab

This tab displays

- Trip data
- General timers and counters

Figure 20: 469 Maintenance tab

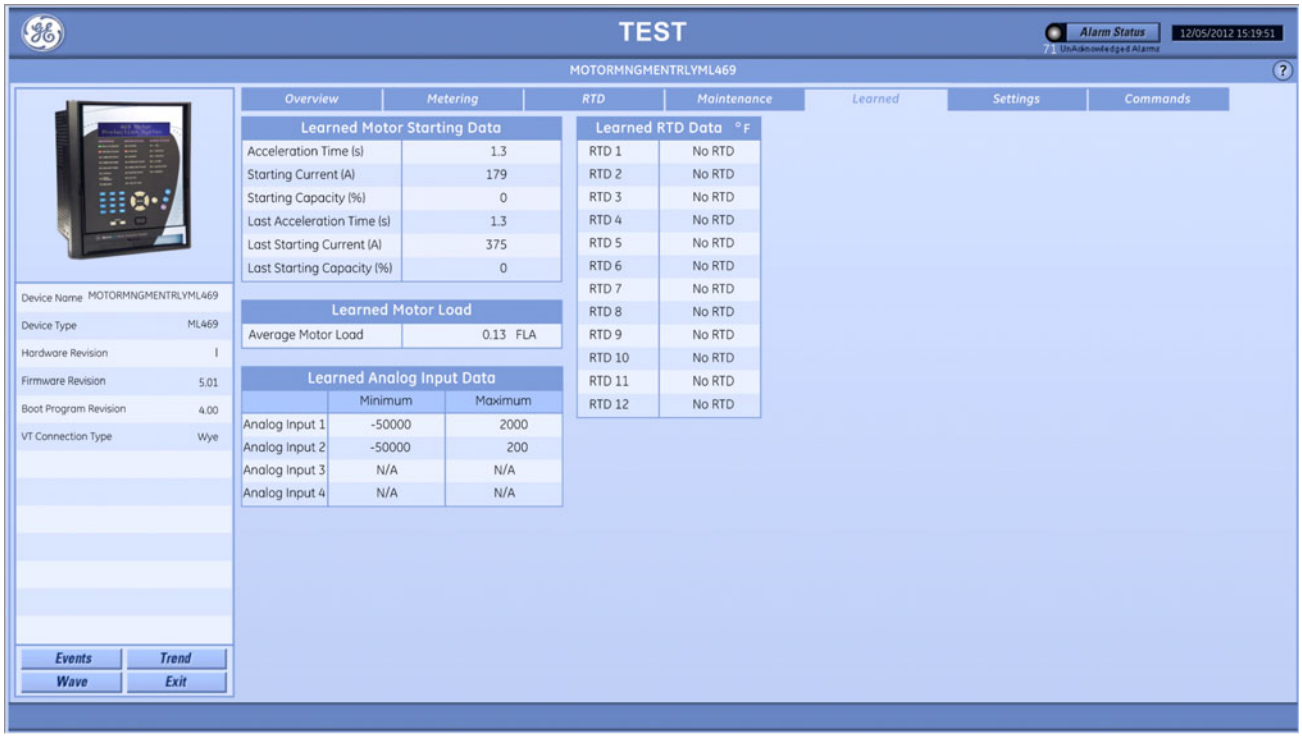


Learned tab

This tab displays

- Learned motor starting data
- Learned motor load
- Learned analog input data
- Learned resistive temperature device (RTD) data

Figure 21: 469 Learned tab

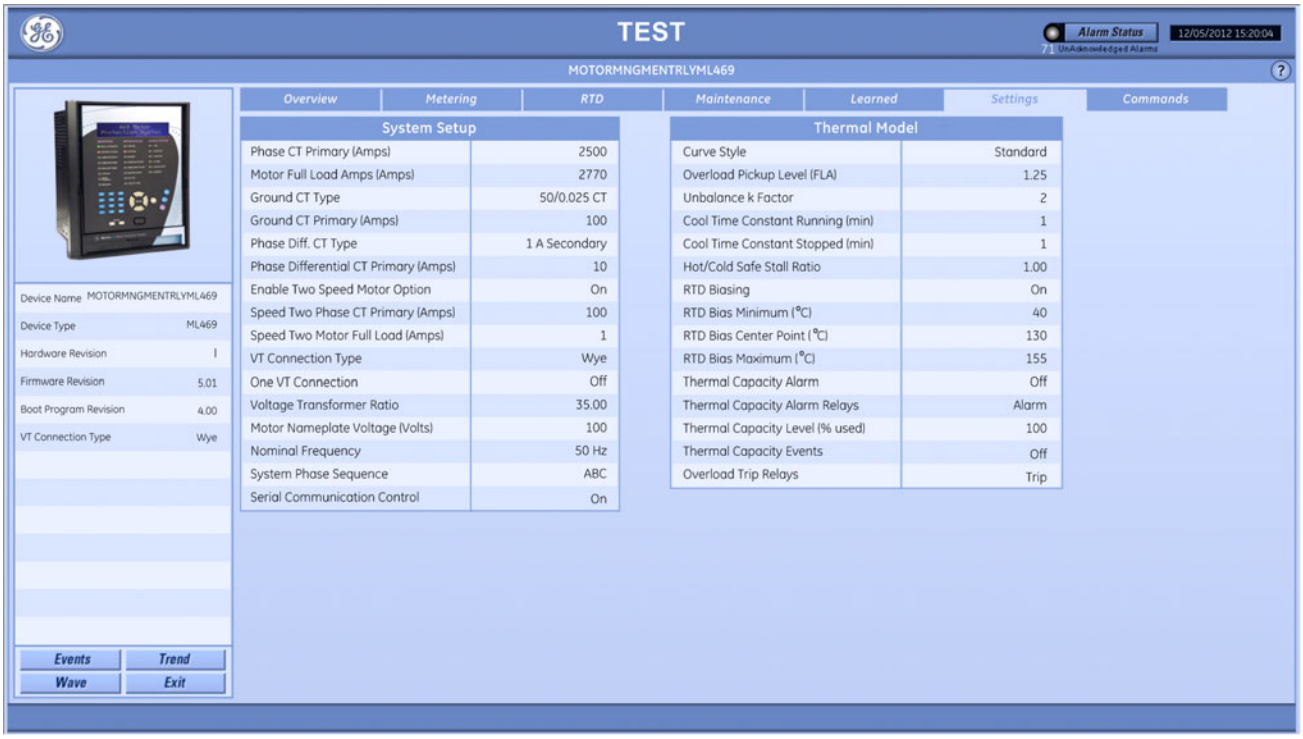


Settings tab

This tab displays

- System setup
- Thermal model

Figure 22: 469 Settings tab



Commands tab

The following functions are available.

Table 7: 469 commands available

Button	Function
Reset Device	Issues a reset command to the 469
Motor Start	Issues Motor Start command
Motor Stop	Issues Motor Stop command
Reset MWh & Mvarh	Clears these values from the 469 memory
Clear Peak Demand	Clears this data from memory
Clear Analog Input Min/Max	Clears this data from memory
Clear RTD Maximums	Resets the RTD maximums data
Clear Trip Counters	Clears the trip count data from memory
Clear Last Trip Data	Clears this data from memory
Reset Starter Information	Clears motor start information from memory

Figure 23: 469 Commands tab

489

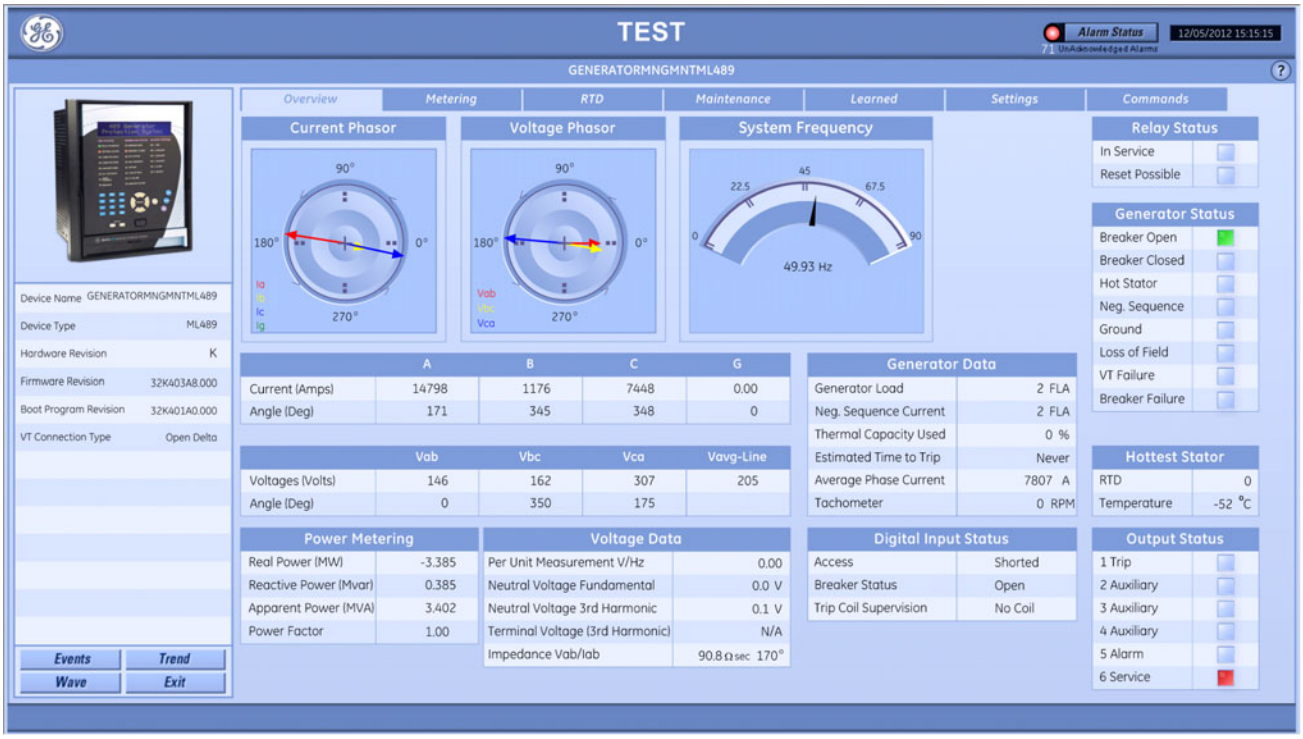
This section explains the information displayed in PMCS for 489 generator management relays, which are also referred to as ML489 and SR489.

Overview tab

This tab displays

- Current
- Voltage
- Power
- Voltage data
- System frequency
- Generator data
- Digital input status
- Relay status
- Generator status
- Hottest stator
- Output status

Figure 24: 489 Overview tab

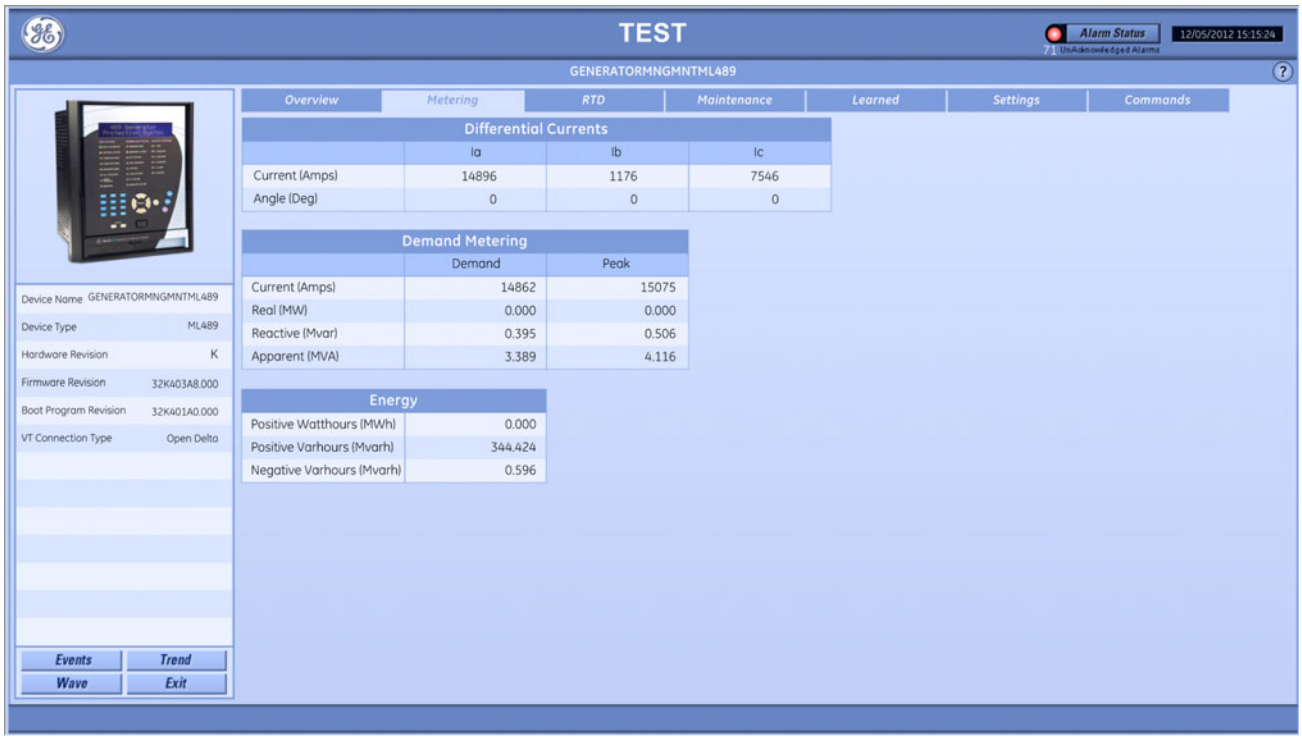


Metering tab

This tab displays

- Differential currents
- Demand metering
- Energy

Figure 25: 489 Metering tab

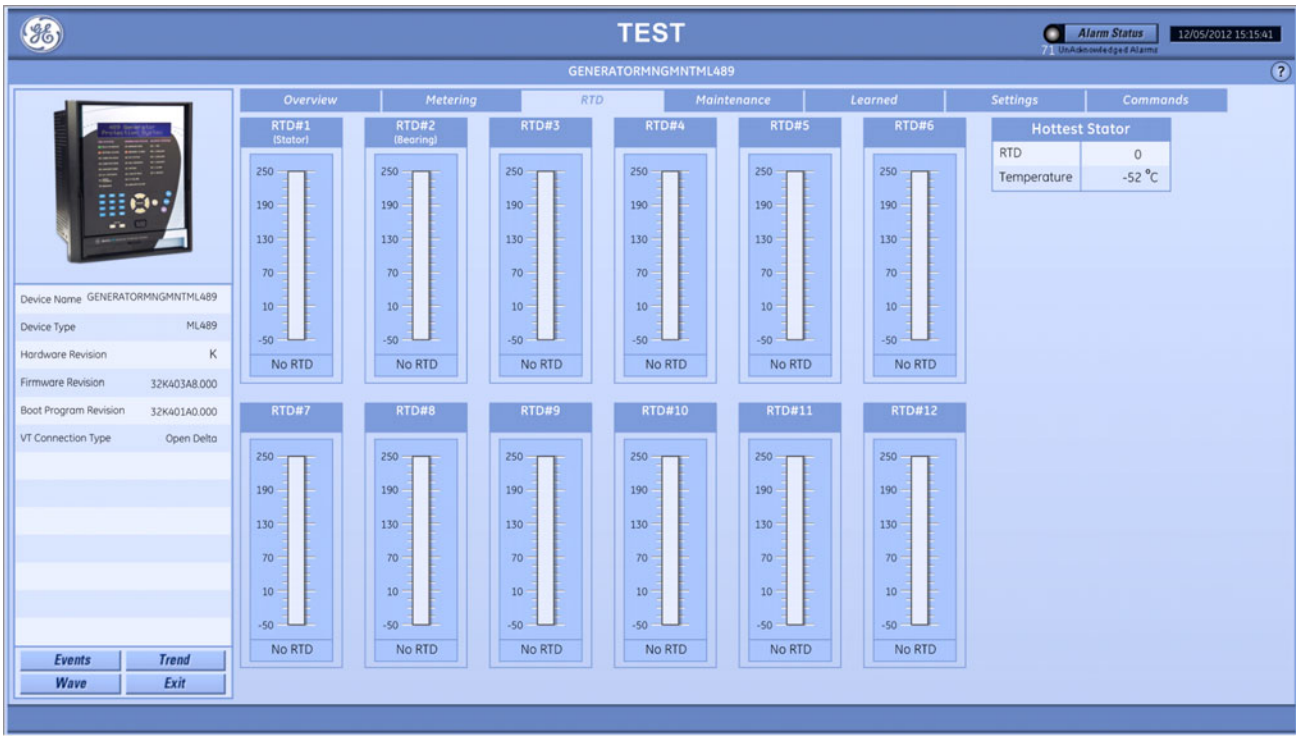


RTD tab

This tab displays

- Resistive temperature device (RTD) information, where this function varies resistance based on temperature

Figure 26: 489 RTD tab

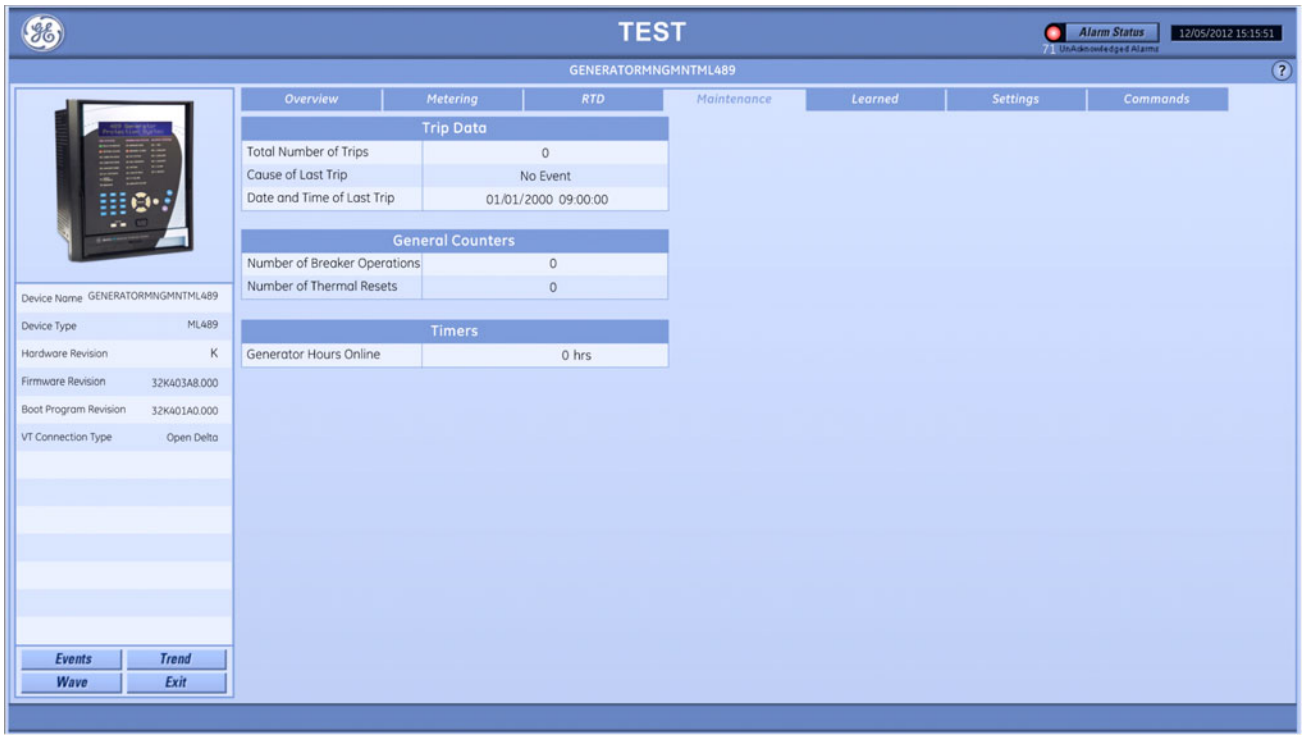


Maintenance tab

This tab displays

- Trip data
- General timers and counters

Figure 27: 489 Maintenance tab

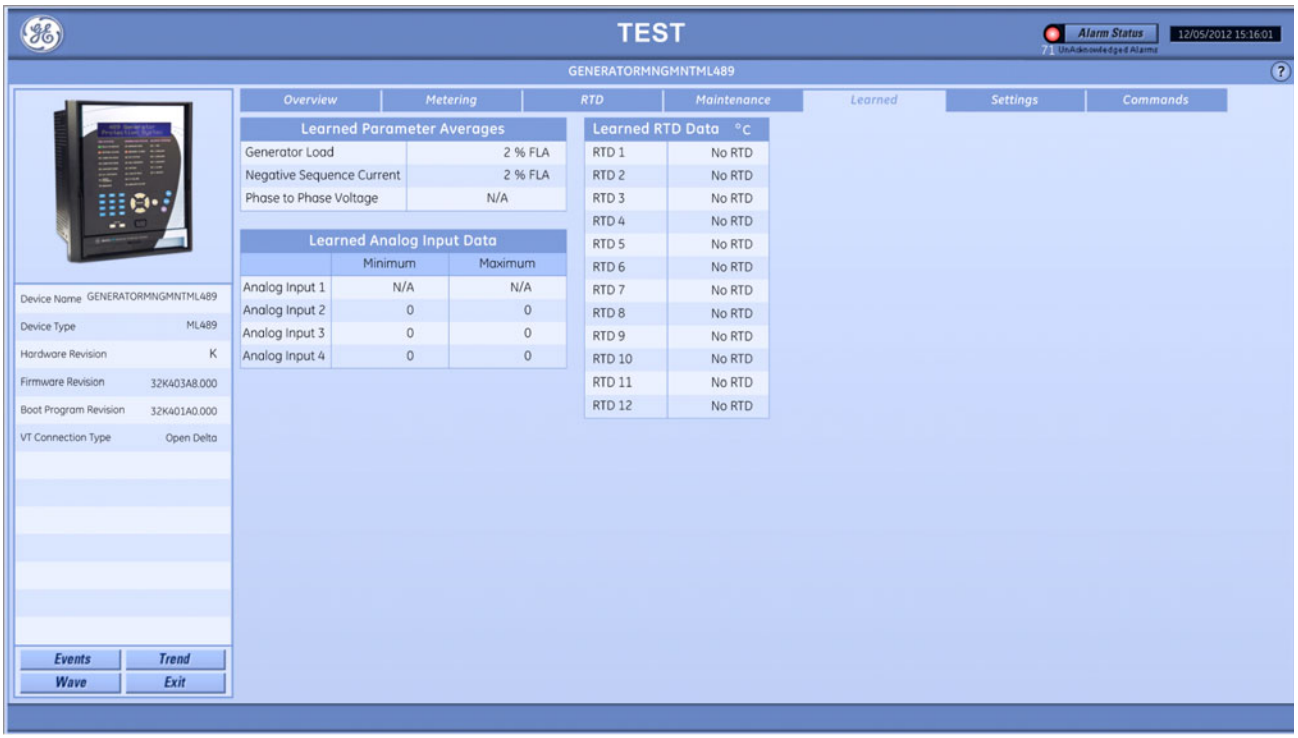


Learned tab

This tab displays

- Learned parameter averages
- Learned analog input data
- Learned resistive temperature device (RTD) data

Figure 28: 489 Learned tab

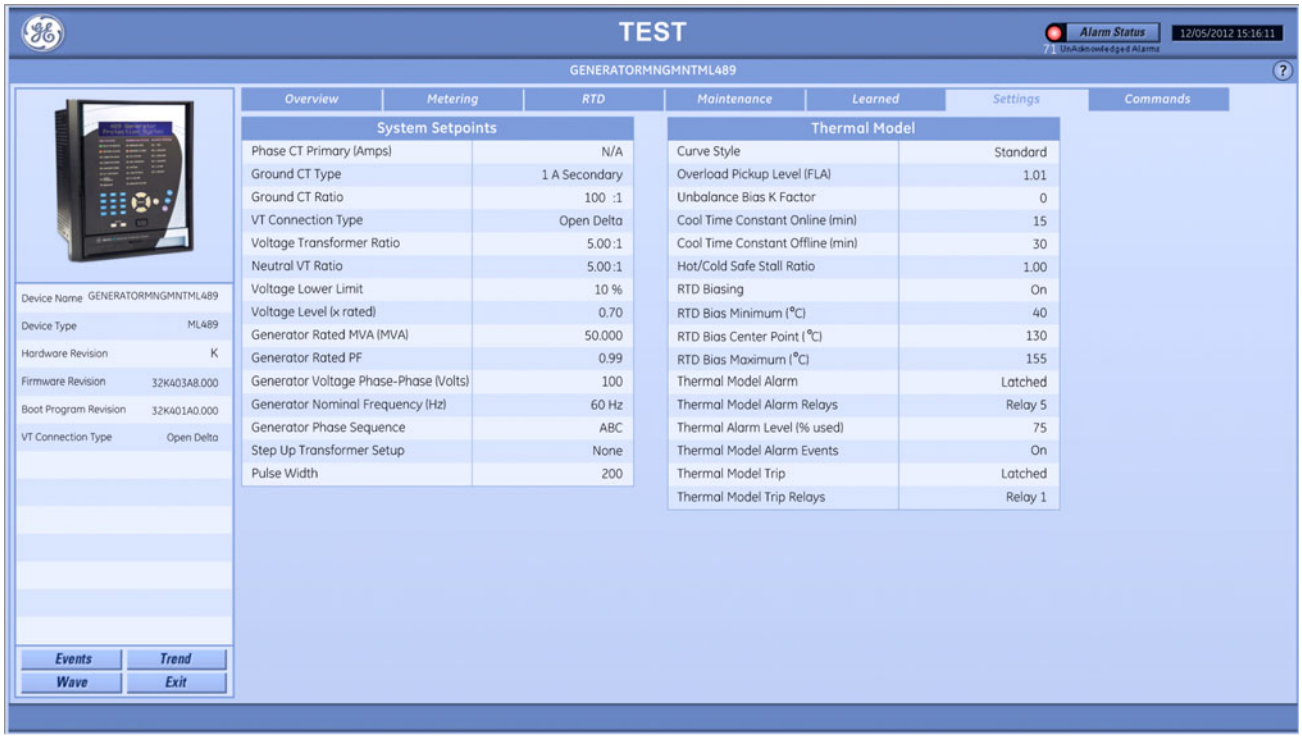


Settings tab

This tab displays

- System setpoints
- Thermal model

Figure 29: 489 Settings tab



Commands tab

The following functions are available.

Table 8: 489 commands available

Button	Function
Reset Device	Issues a reset command to the 489
Reset Breaker Information	Clears the breaker data from memory
Reset Generator Information	Clears the generator data from memory
Clear RTD Maximums	Clears the maximum RTD data from memory
Reset MWh & Mvarh Data	Clears the MWh and Mvarh data from memory
Clear Peak Demand Data	Clears the peak demand data from memory
Clear Analog Input Min/Max	Clears the analog input minimum/maximum data from memory
Clear Trip Counters	Clears the trip counter data from memory
Clear Last Trip Data	Clears the last trip data from memory

Figure 30: 489 Commands tab

735/737

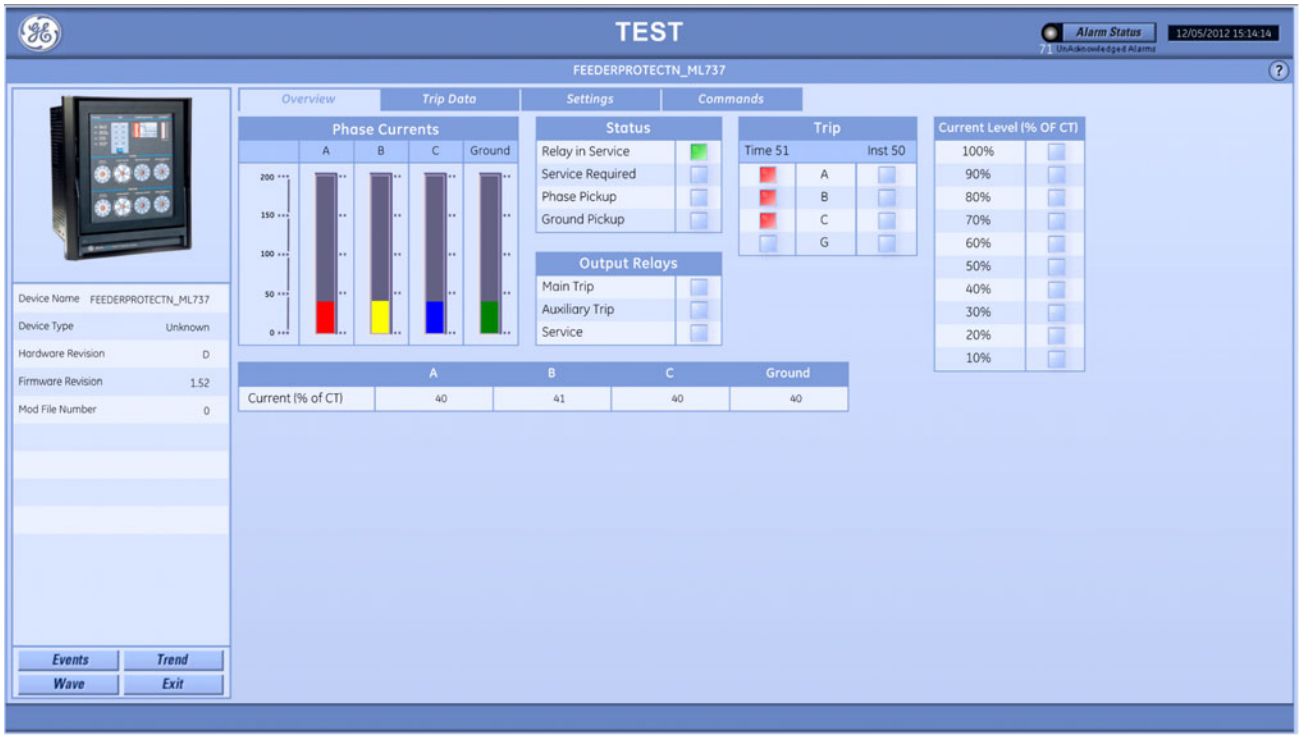
This section explains the information displayed in PMCS for 735 and 737 products, which are also referred to as ML735/ML737 and SR735/SR737.

Overview tab

This tab displays

- Phase currents
- Status
- Output relays
- Trip
- Current level

Figure 31: 737 Overview tab

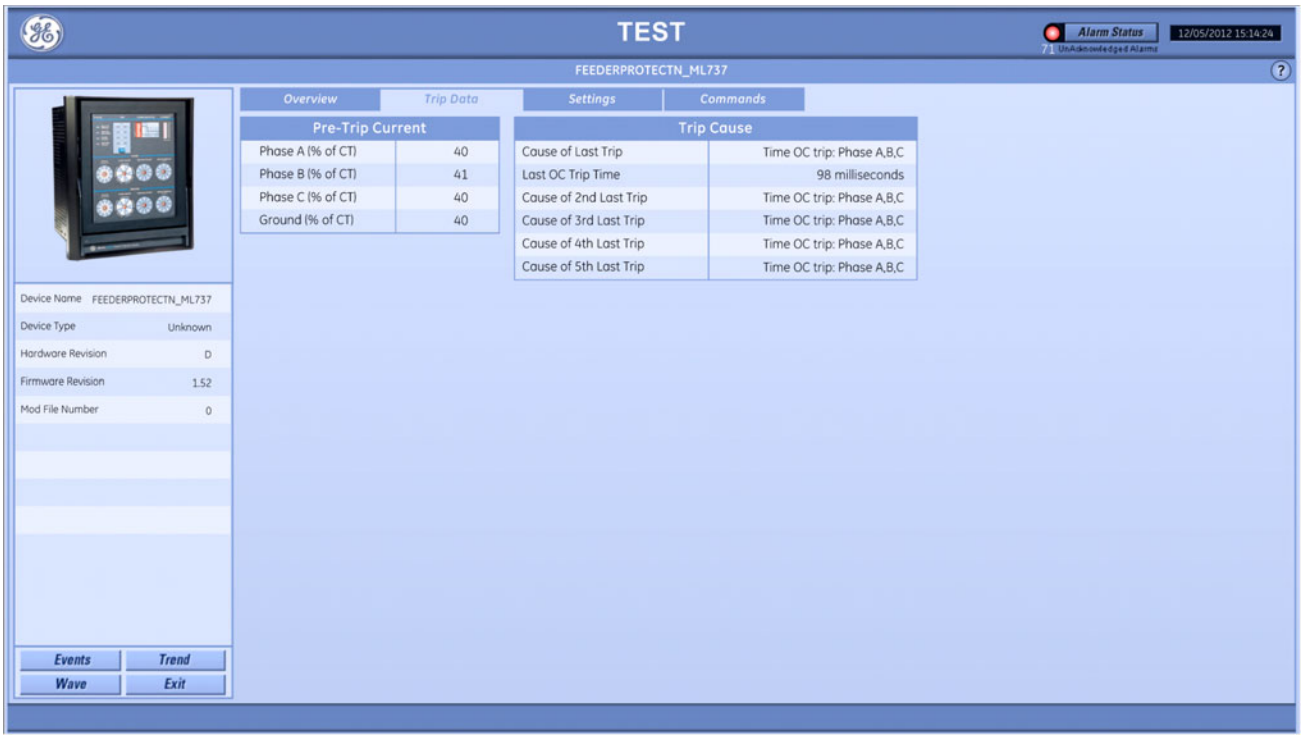


Trip Data tab

This tab displays

- Pre-trip current
- Trip cause

Figure 32: 737 Trip Data tab

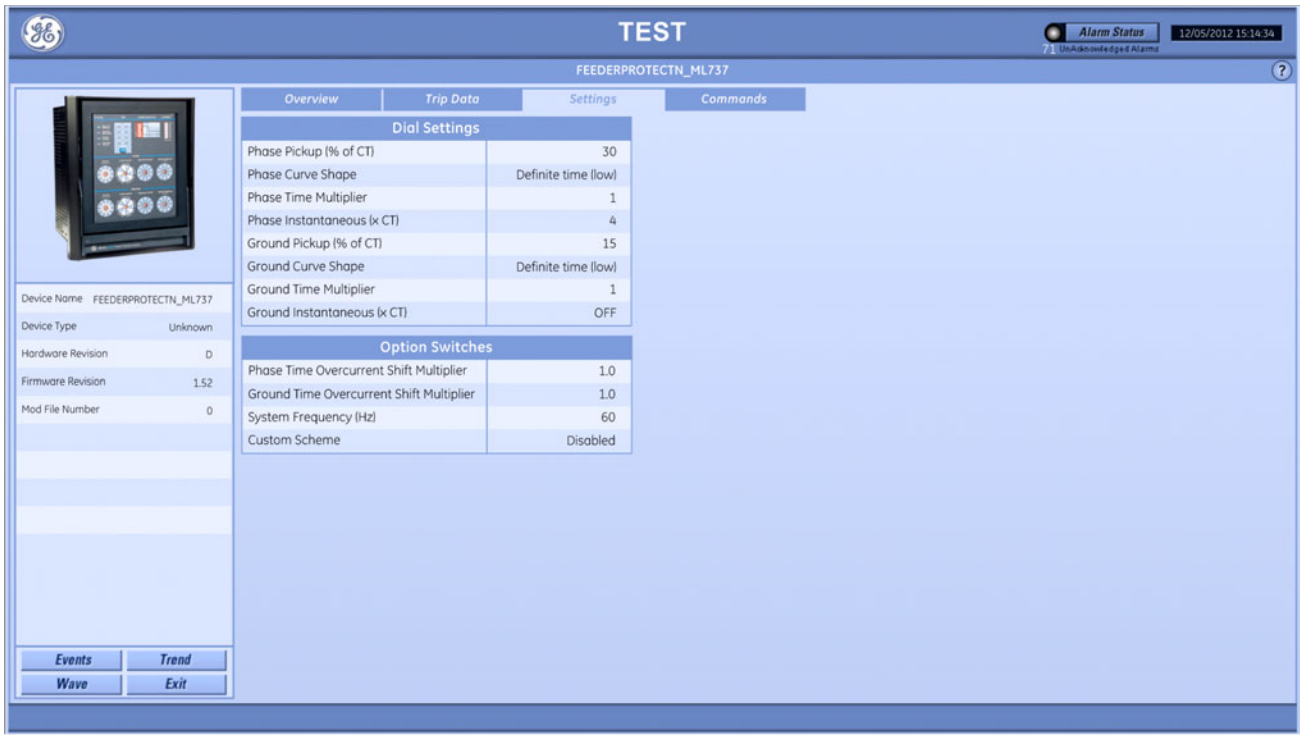


Settings tab

This tab displays

- Dial settings
- Option switches

Figure 33: 737 Settings tab



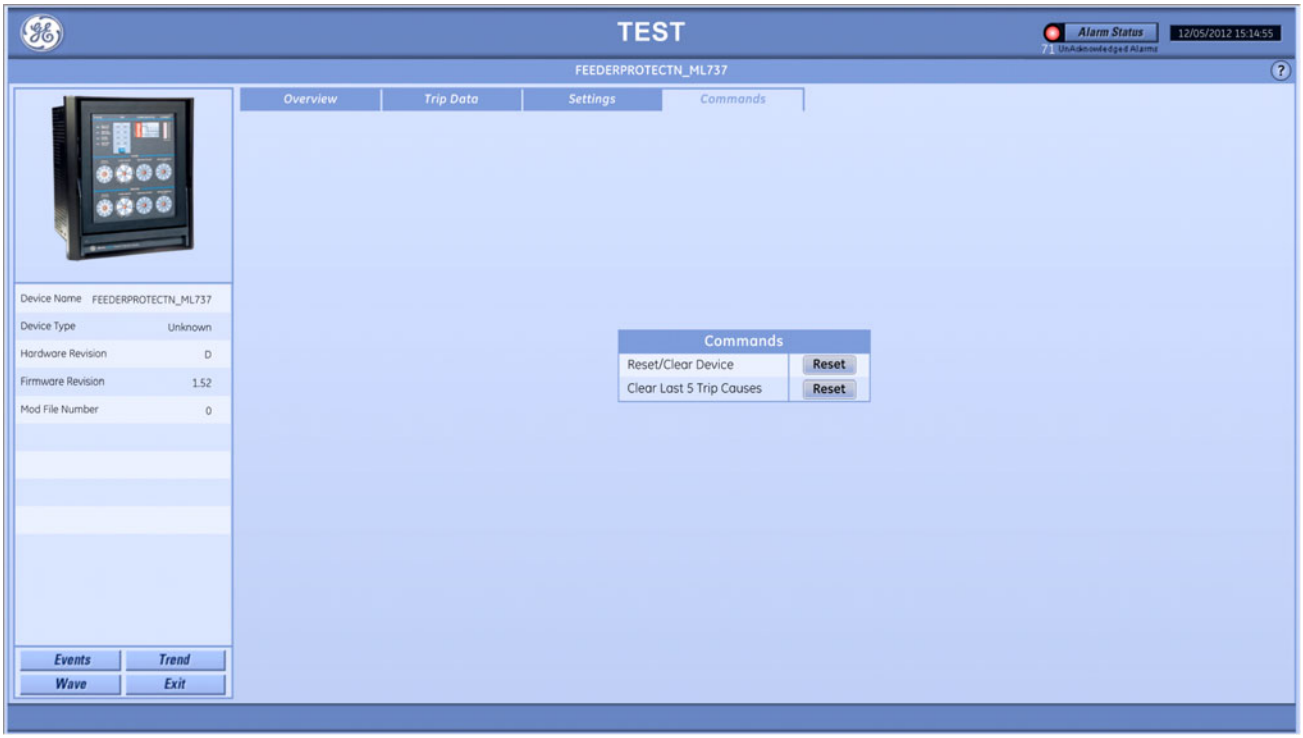
Commands tab

The following functions are available.

Table 9: 735/737 commands available

Button	Function
Reset/Clear Device	Issues a reset command to the device.
Clear Last 5 Trip Causes	Clears the last five trip causes from the device

Figure 34: 737 Commands tab



745

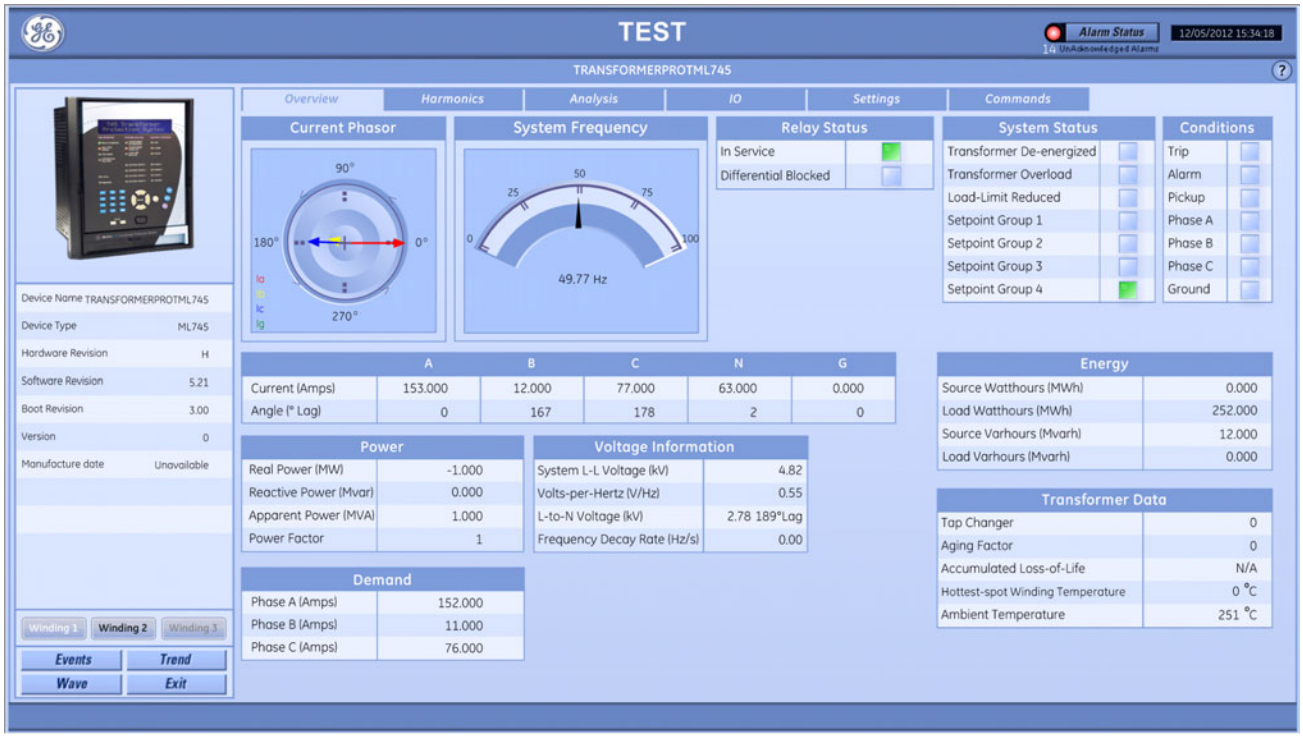
This section explains the information displayed in PMCS for 745 transformer management relays, which are also referred to as ML745 and SR745.

Overview tab

This tab displays

- Current
- Power
- Demand
- Energy
- Voltage information
- System frequency
- Relay status
- System status
- Conditions
- Transformer data

Figure 35: 745 Overview tab

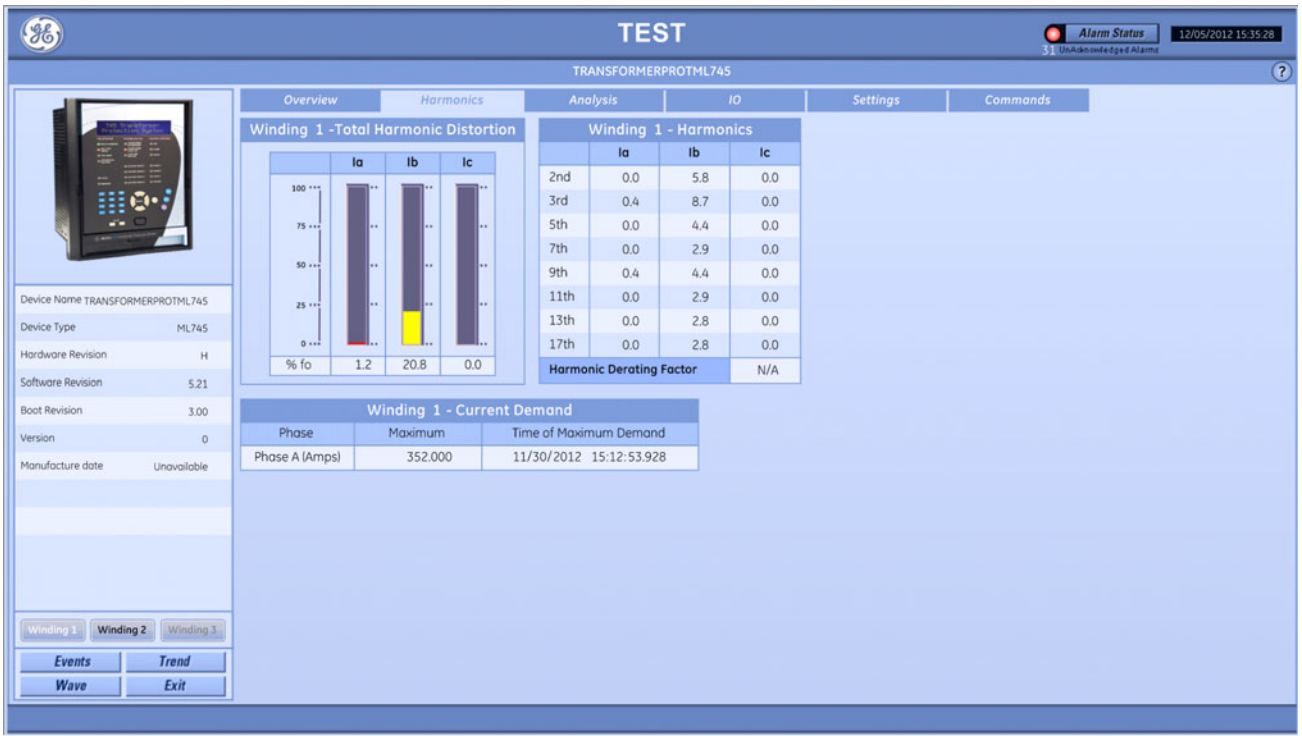


Harmonics tab

This tab displays

- Winding 1 - Total harmonic distortion (THD)
- Winding 1 - Harmonics
- Winding 1 - Current demand

Figure 36: 745 Harmonics tab

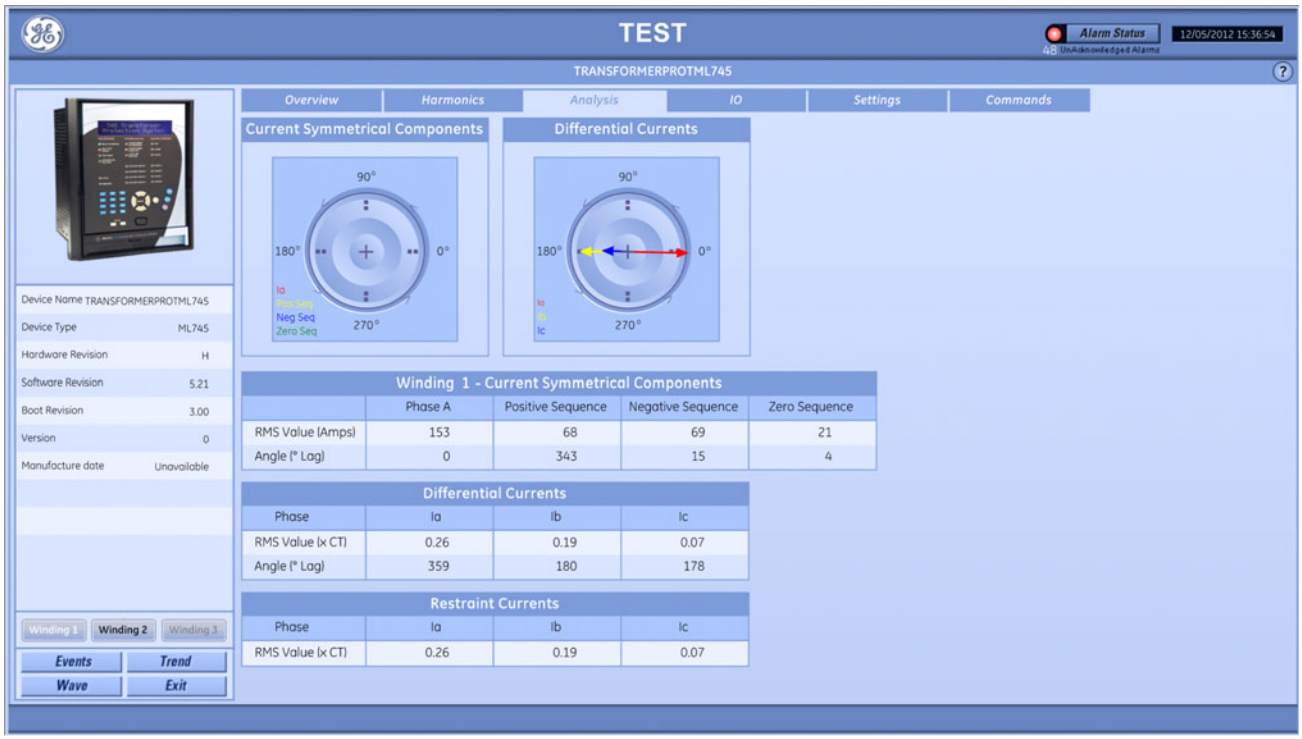


Analysis tab

This tab displays

- Winding 1 - Current symmetrical components
- Differential currents
- Restraint currents

Figure 37: 745 Analysis tab

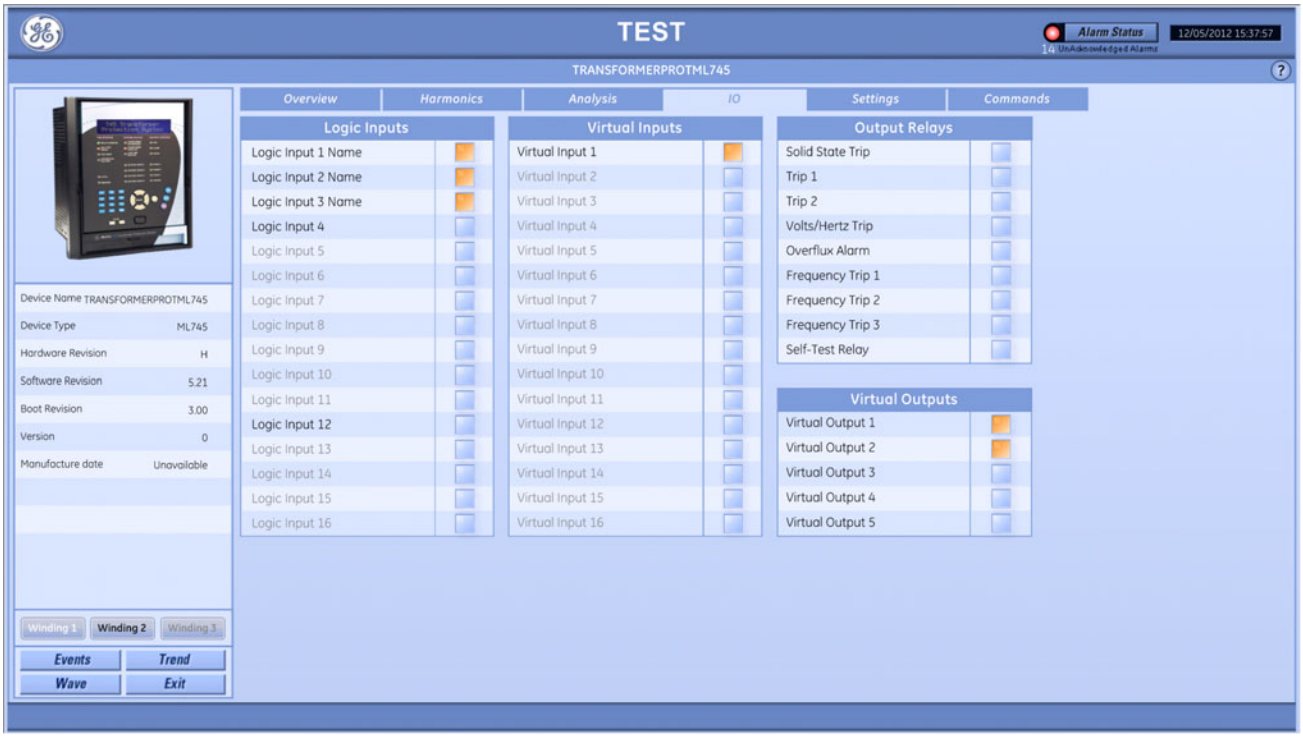


IO tab

This tab displays

- Logic inputs
- Virtual inputs
- Output relays
- Virtual outputs

Figure 38: 745 IO tab

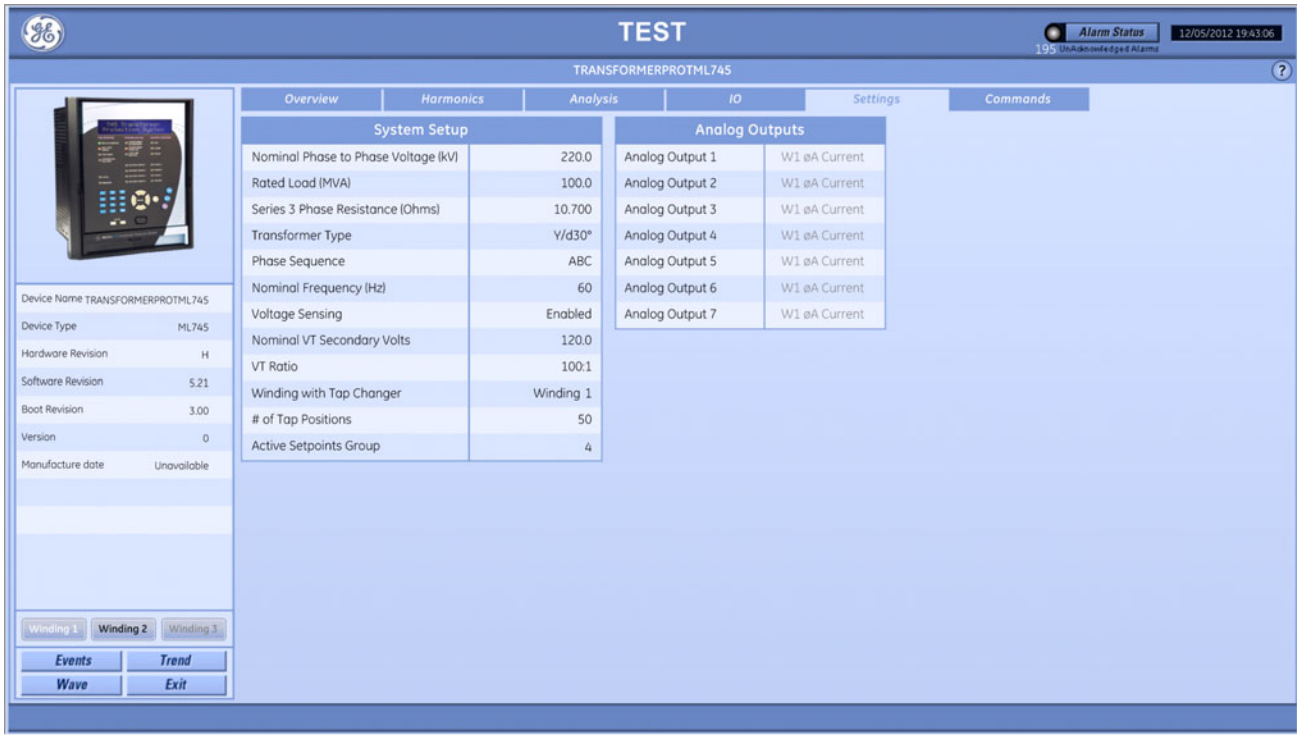


Settings tab

This tab displays

- System setup
- Analog outputs

Figure 39: 745 Settings tab



Commands tab

The following functions are available.

Table 10: 745 commands available

Button	Function
Reset Relay	Issues a reset command to the device
Reset Peak Demand	Clears the maximum demand data from the 745 memory
Reset Energy	Resets the energy counters to zero
Reset Loss of Life	Clears loss-of-life data from the 745 memory

Figure 40: 745 Commands tab

750/760

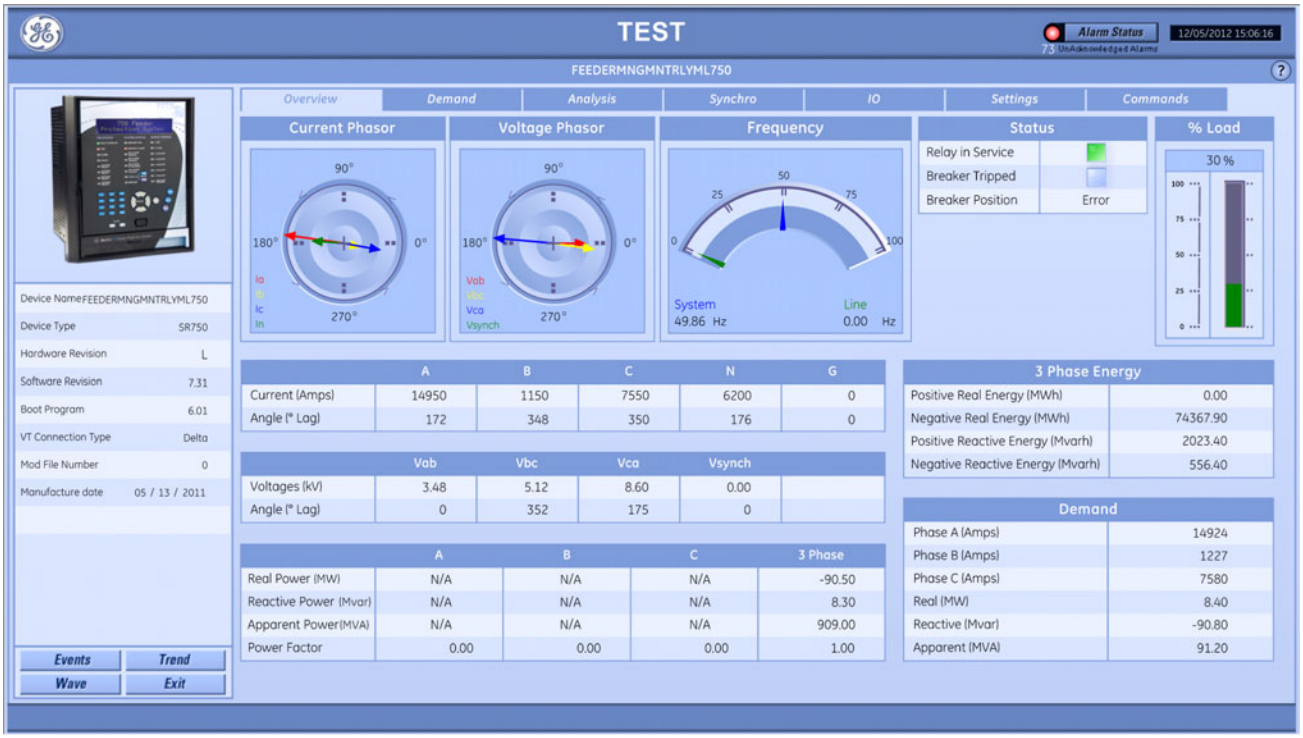
This section explains the information displayed in PMCS for 750 and 760 feeder management relays, which are also referred to as ML750/ML760 and SR750/SR760.

Overview tab

This tab displays

- Current
- Energy
- Voltage
- Power

Figure 41: 750 Overview tab

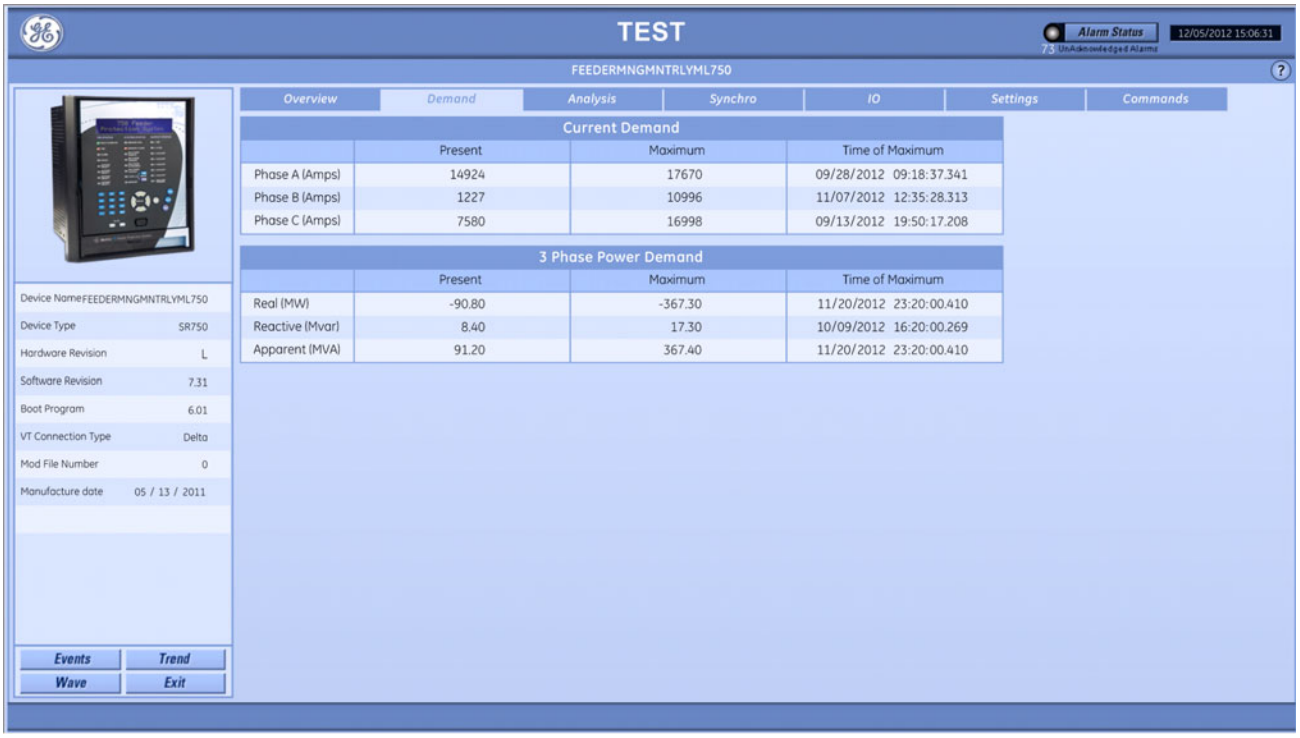


Demand tab

This tab displays

- Current demand
- Three-phase power demand

Figure 42: 750 Demand tab

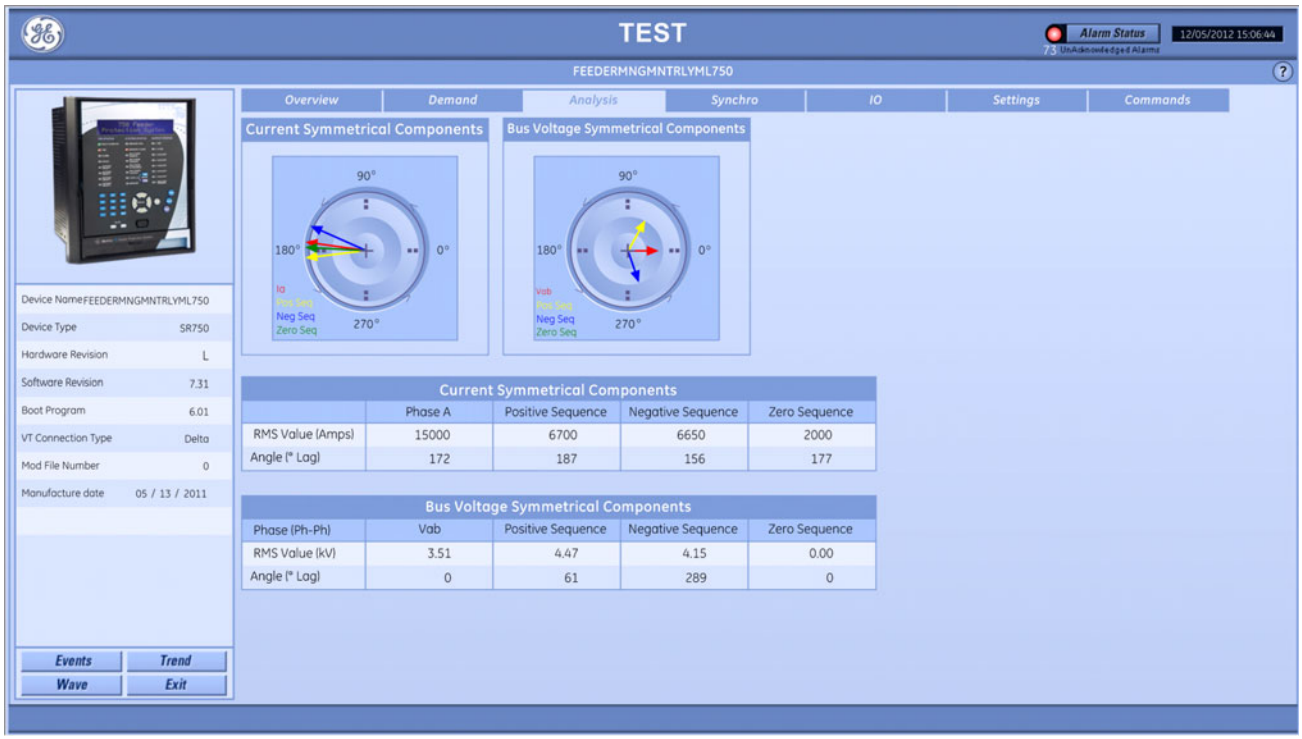


Analysis tab

This tab displays

- Current symmetrical components
- Bus voltage symmetrical components

Figure 43: 750 Analysis tab

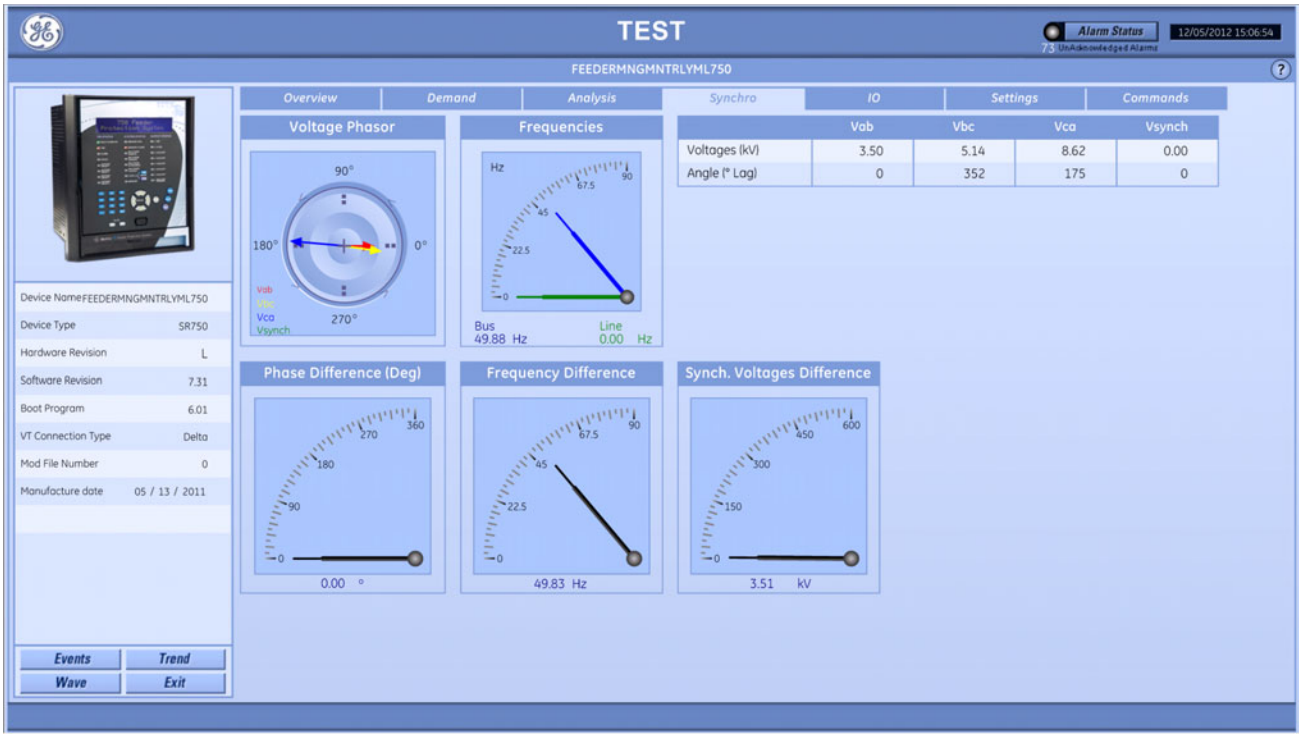


Synchro tab

This tab displays

- Voltage phasor
- Frequencies
- Phase difference
- Frequency difference
- Synchronous voltages difference

Figure 44: 750 Synchro tab

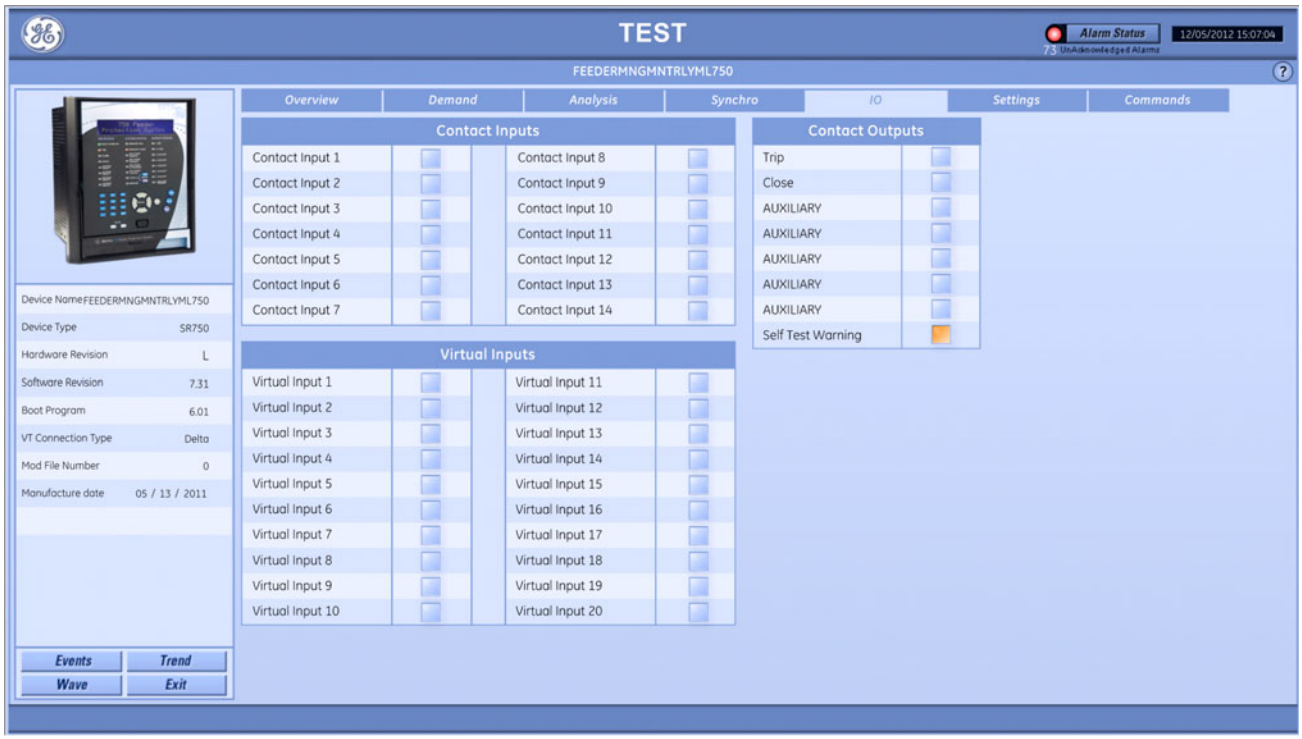


IO tab

This tab displays

- Contact inputs
- Contact outputs
- Virtual inputs

Figure 45: 750 IO tab

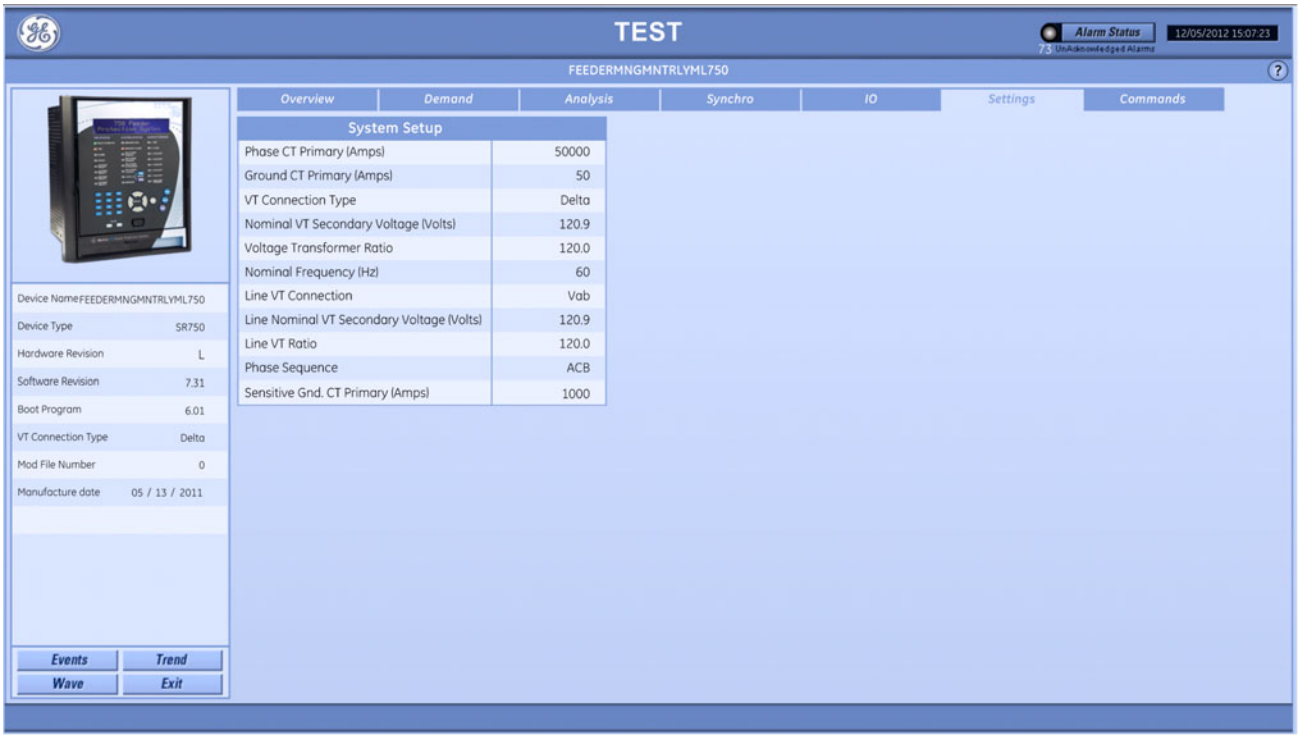


Settings tab

This tab displays

- System setup

Figure 46: 750 Settings tab



Commands tab

The following functions are available.

Table 11: 750/760 commands available

Button	Function
Reset Device	Issues a reset command to the 750/760
Reset Energy	Resets the energy counters to zero
Open Breaker	Issues Open Breaker command
Close Breaker	Issues Close Breaker command
Reset Trip Counters	Resets the 750/760 trip counters to zero
Reset Max Demand	Clears the maximum demand data from the 750/760 memory
Reset Arcing Current	Resets the arcing current data

Figure 47: 750 Commands tab

ELVS

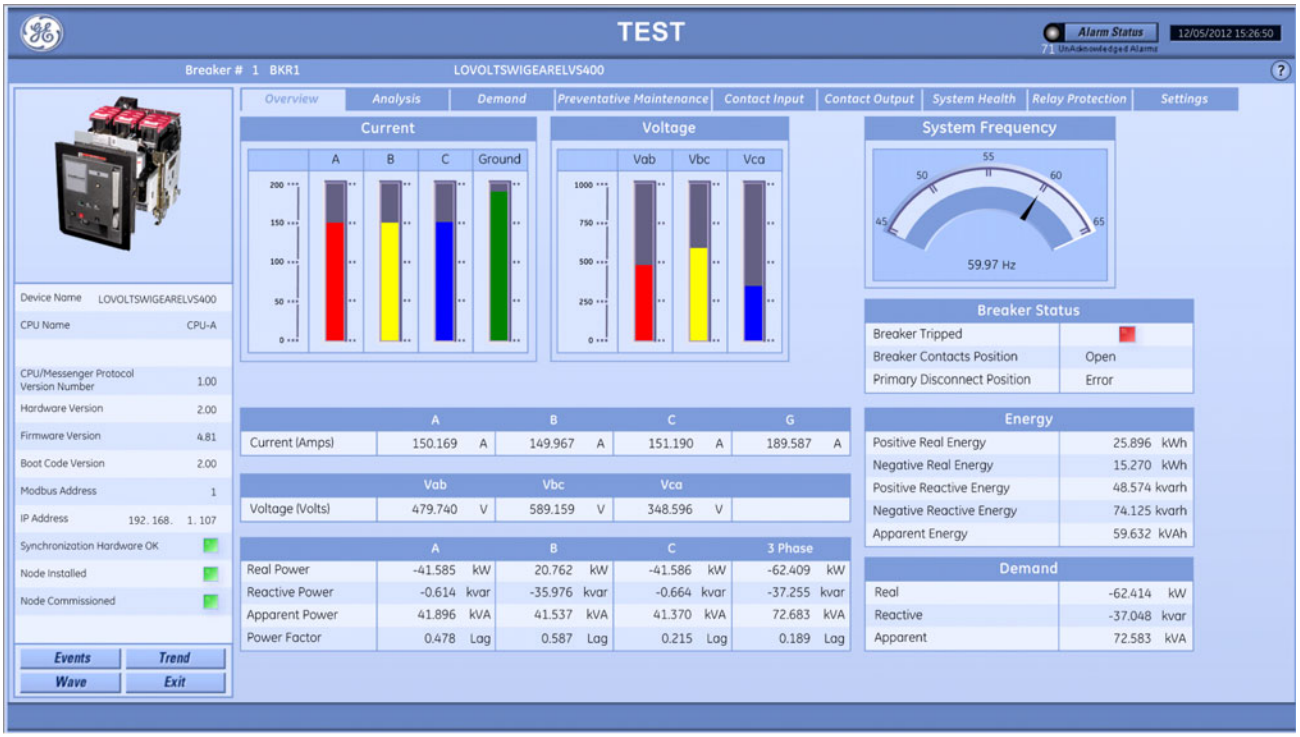
This section explains the information displayed in PMCS for EntellisysLVS (ELVS) products.

Overview tab

This tab displays

- Current
- Voltage
- System frequency
- Breaker status
- Energy
- Demand

Figure 48: ELVS Overview tab

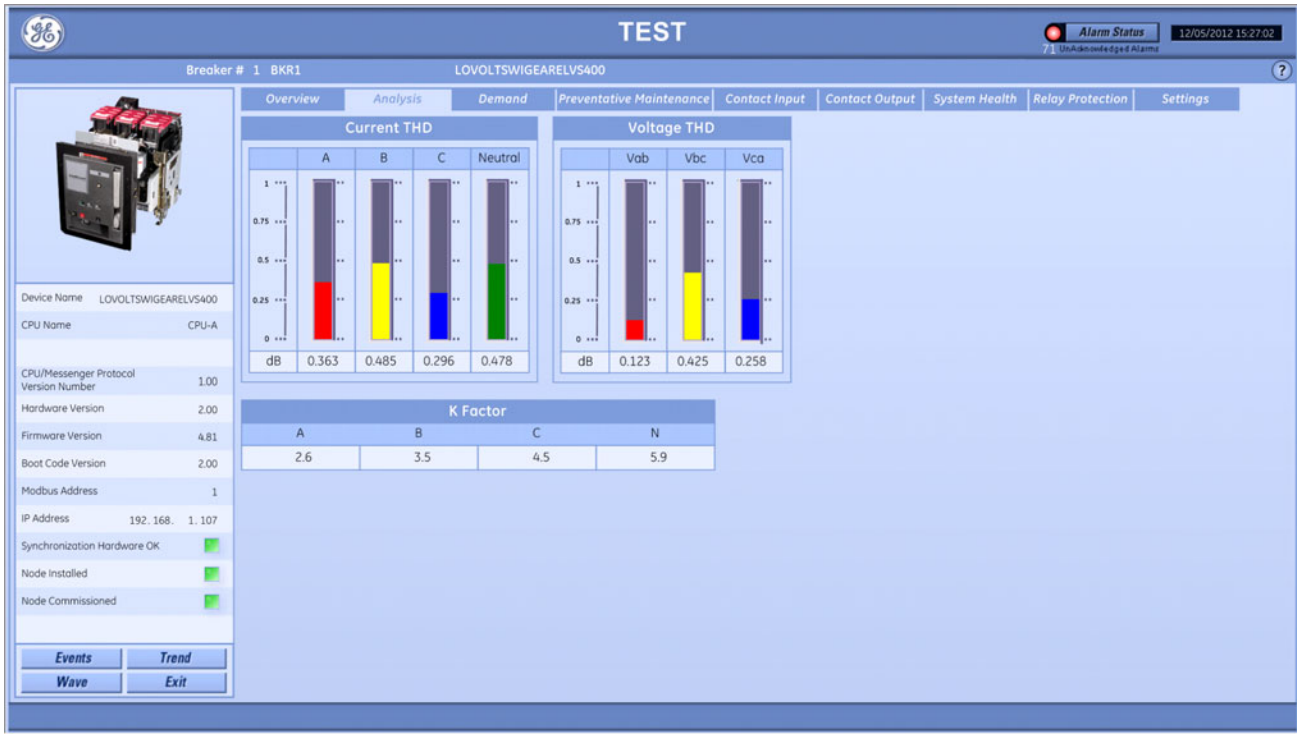


Analysis tab

This tab displays

- Current total harmonic distortion (THD)
- Voltage THD
- K factor

Figure 49: ELVS Analysis tab

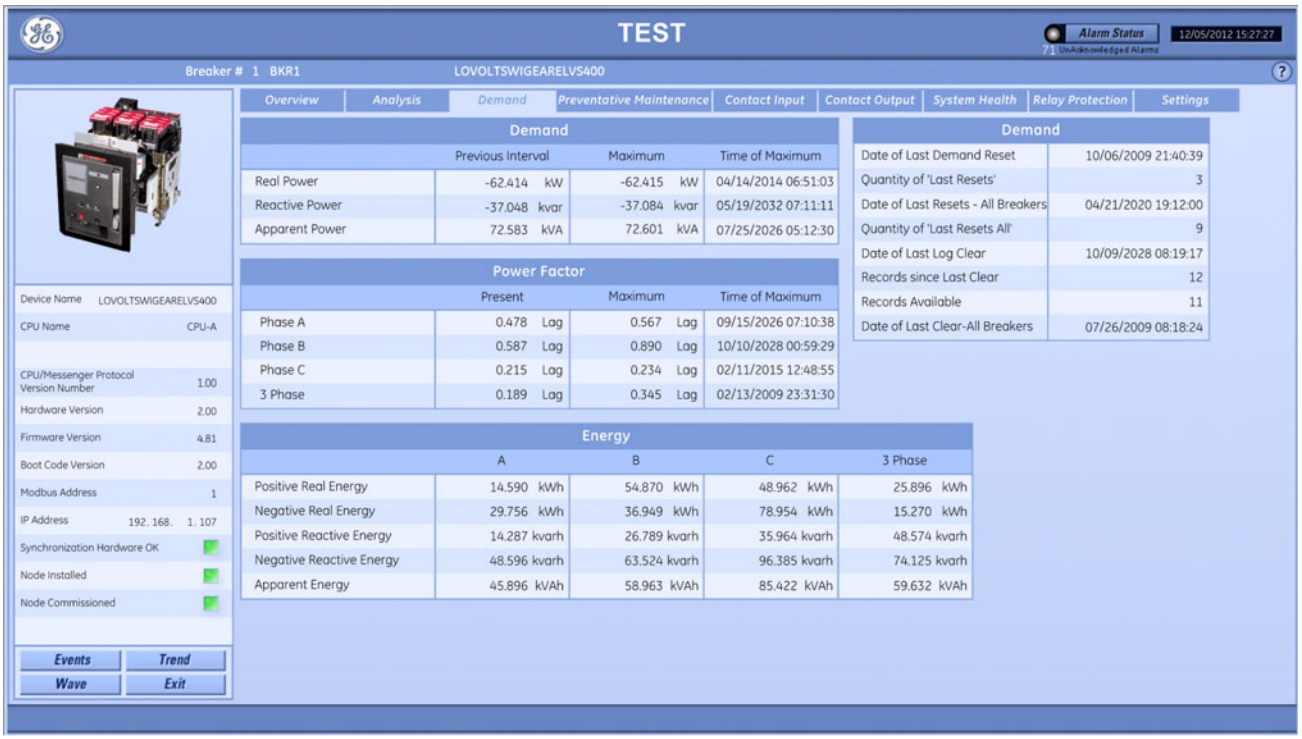


Demand tab

This tab displays

- Demand
- Power factor
- Energy

Figure 50: ELVS Demand tab

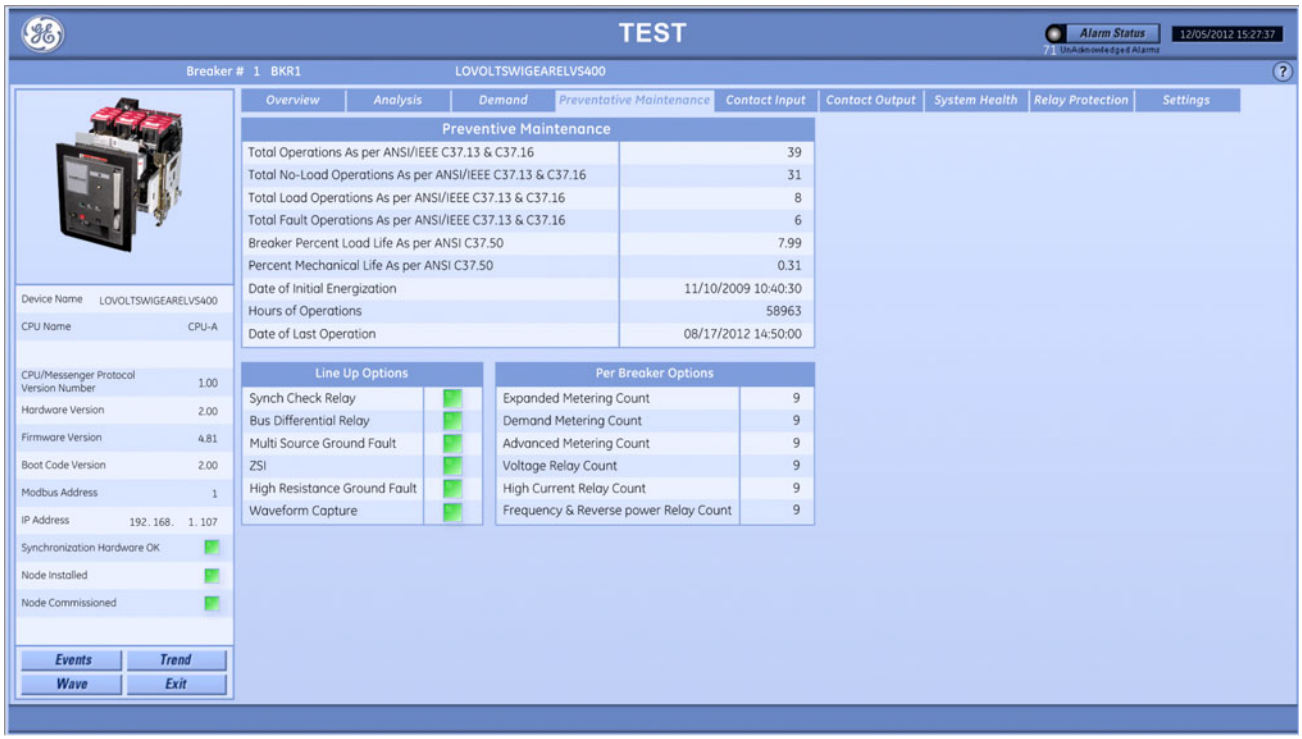


Preventative Maintenance tab

This tab displays

- Operation and preventative maintenance information
- Line up options
- Per breaker options

Figure 51: Preventative Maintenance tab

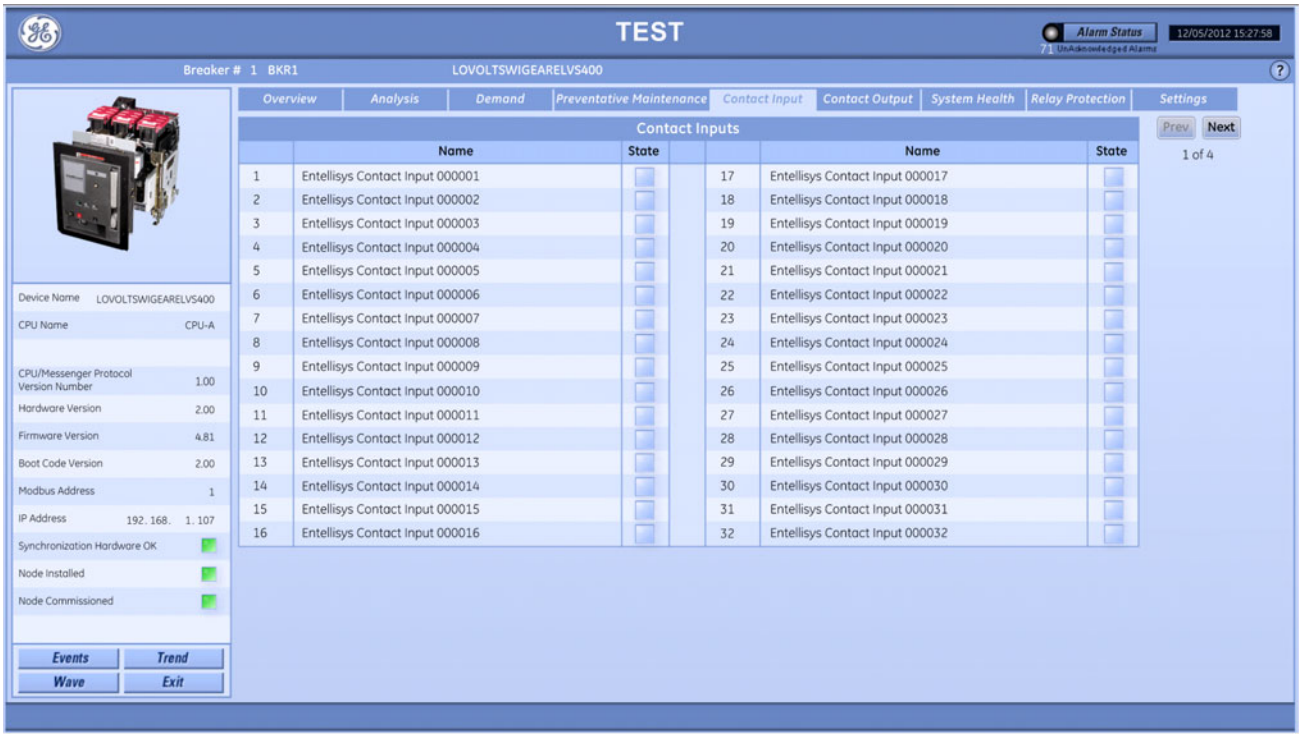


Contact Input tab

This tab displays

- Contact inputs

Figure 52: ELVS Contact Input tab

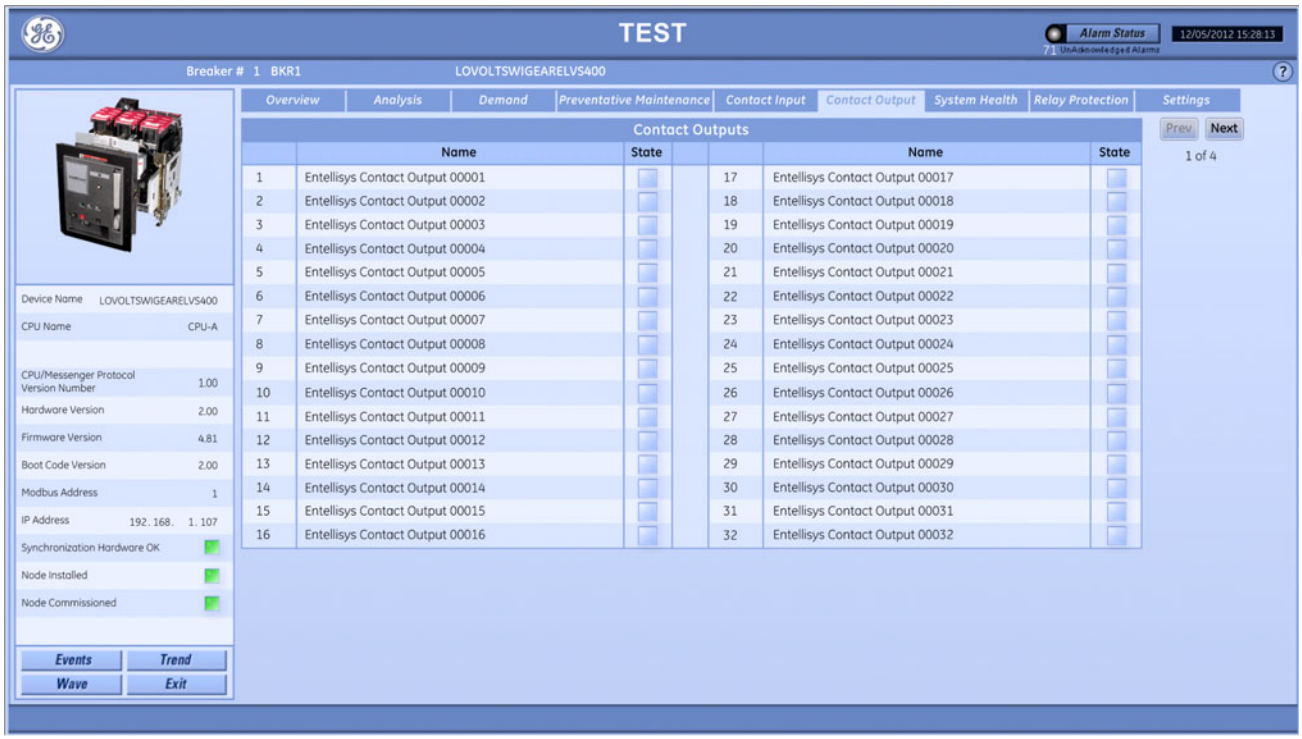


Contact Output tab

This tab displays

- Contact outputs

Figure 53: ELVS Contact Output tab

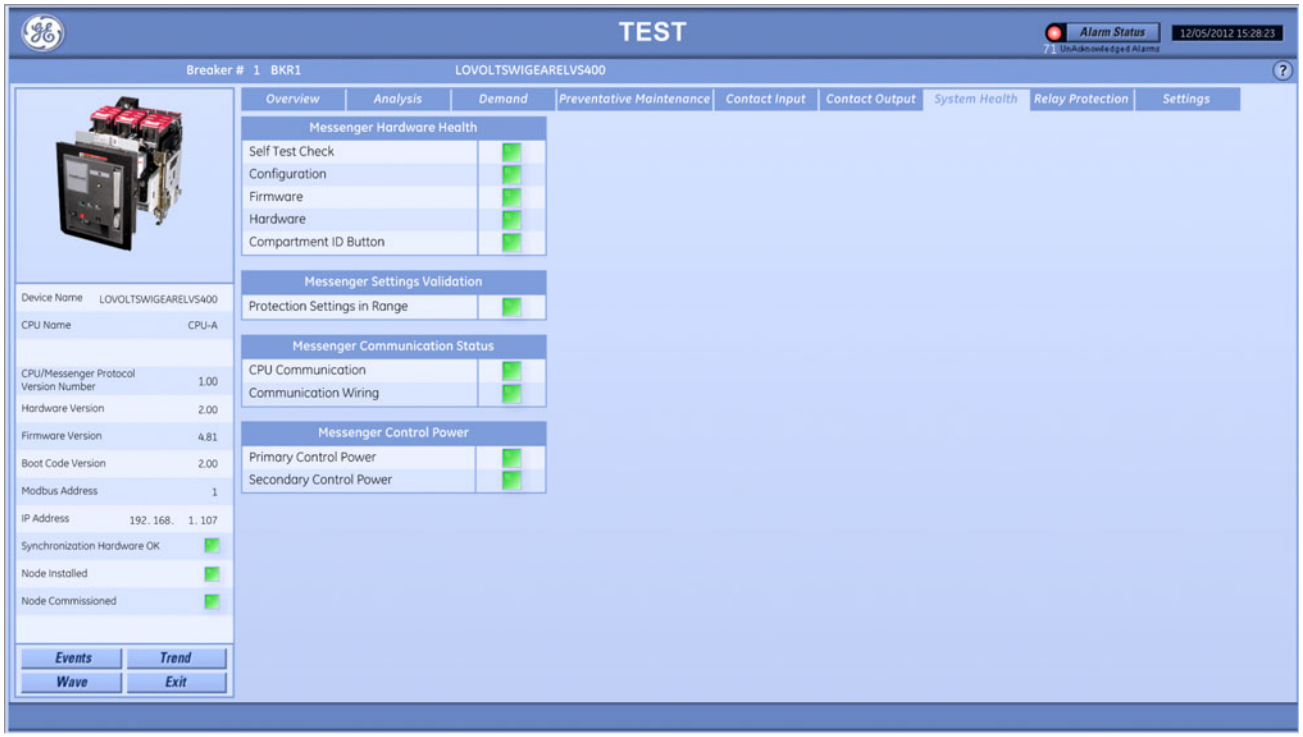


System Health tab

This tab displays

- Messenger hardware health
- Messenger settings validation
- Messenger communication status
- Messenger control power

Figure 54: ELVS System Health tab

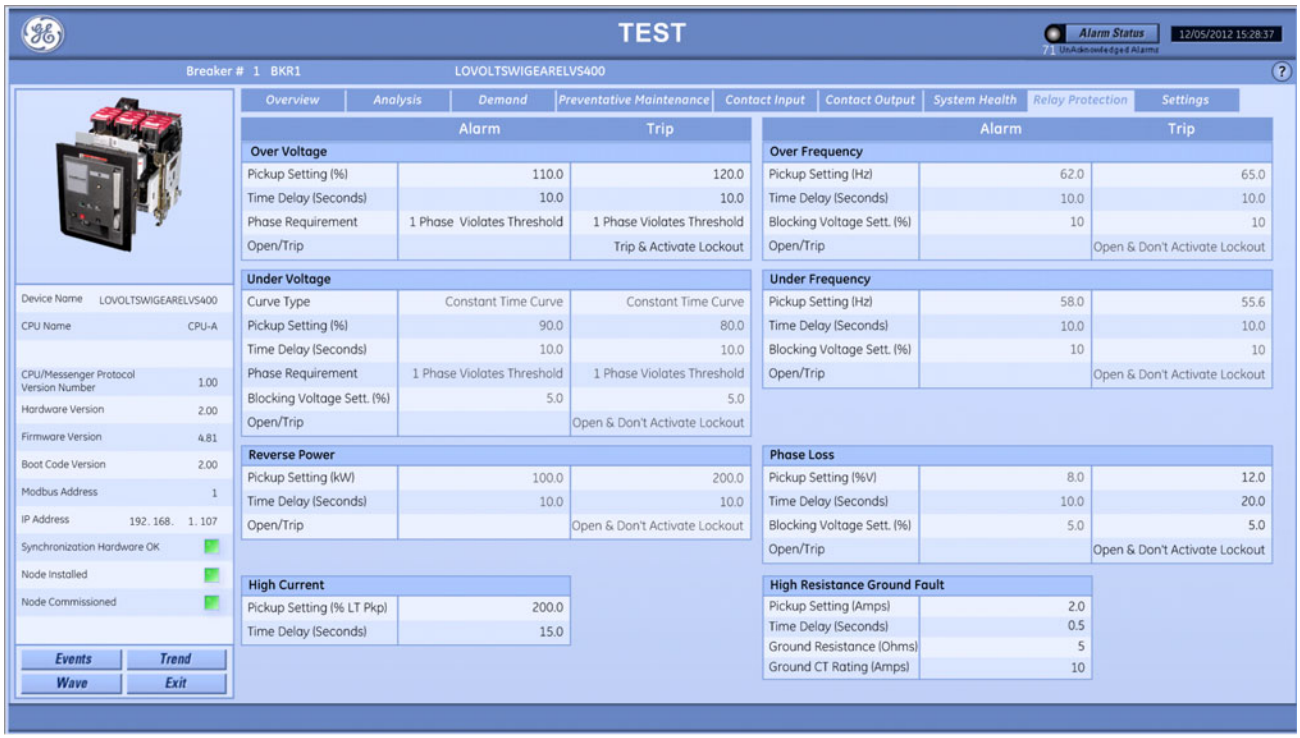


Relay Protection tab

This tab displays

- Over voltage
- Over frequency
- Under voltage
- Under frequency
- Reverse power
- Phase loss
- High current
- High resistance ground fault

Figure 55: ELVS Relay Protection tab

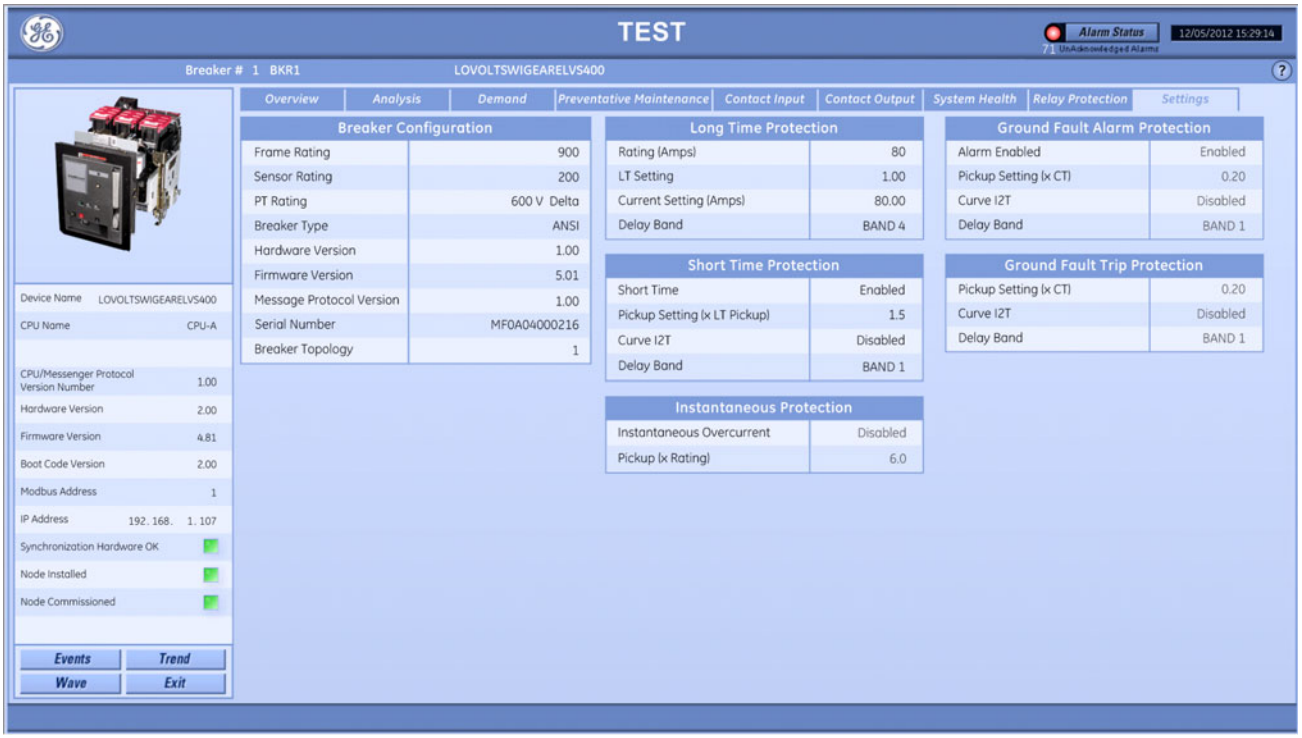


Settings tab

This tab displays

- Breaker configuration
- Long time protection
- Ground fault alarm protection
- Short time protection
- Ground fault trip protection
- Instantaneous protection

Figure 56: ELVS Settings tab



EMVTC

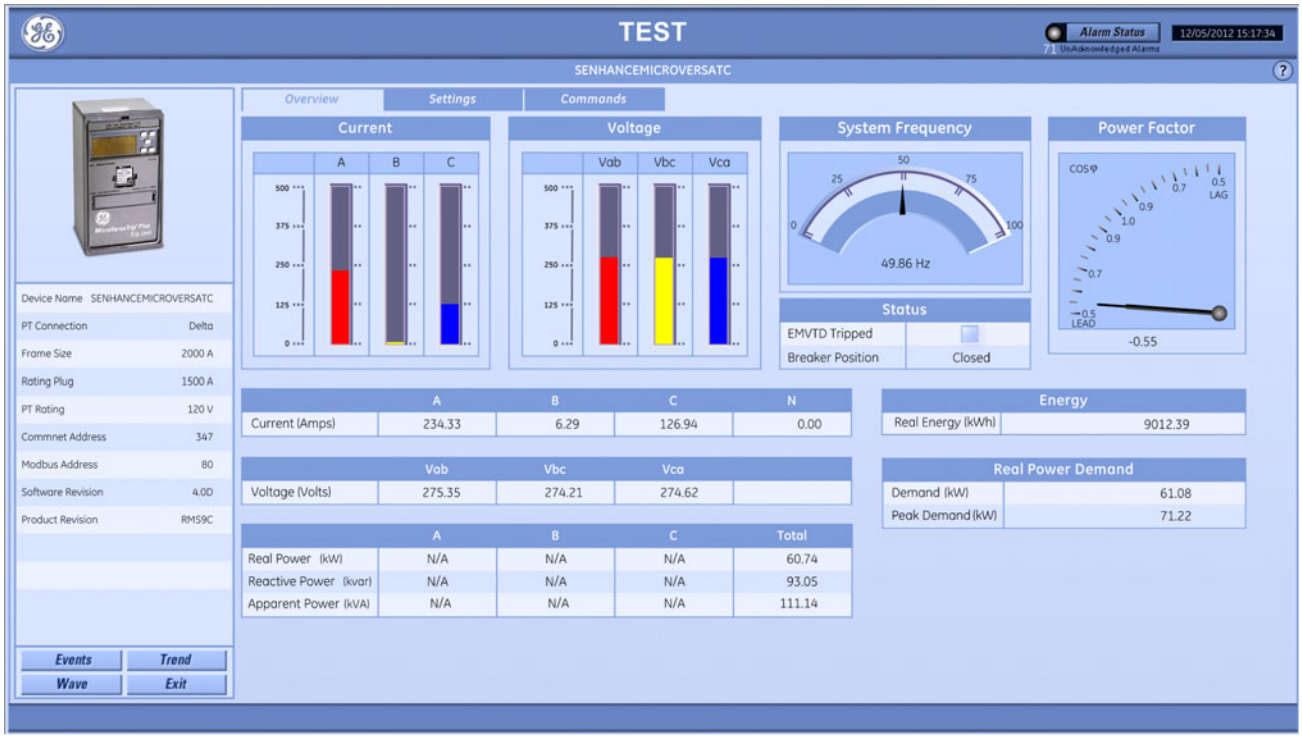
This section explains the information displayed in PMCS for Enhanced MicroVersa Trip C (EMVTC) products.

Overview tab

This tab displays

- Current
- Voltage
- System frequency
- Status
- Power factor
- Energy
- Real power demand

Figure 57: EMVTC Overview tab

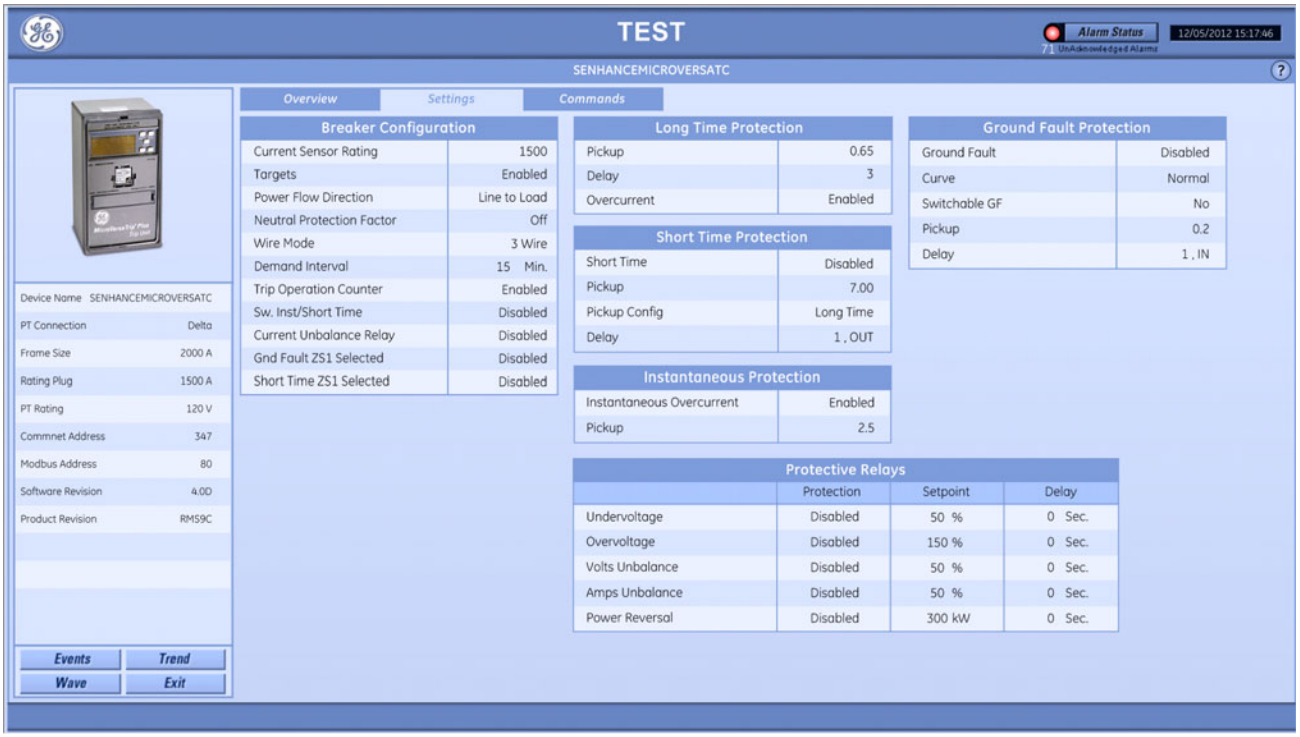


Settings tab

This tab displays

- Breaker configuration
- Long time protection
- Short time protection
- Instantaneous protection
- Protective relays
- Ground fault protection

Figure 58: EMVTC Settings tab



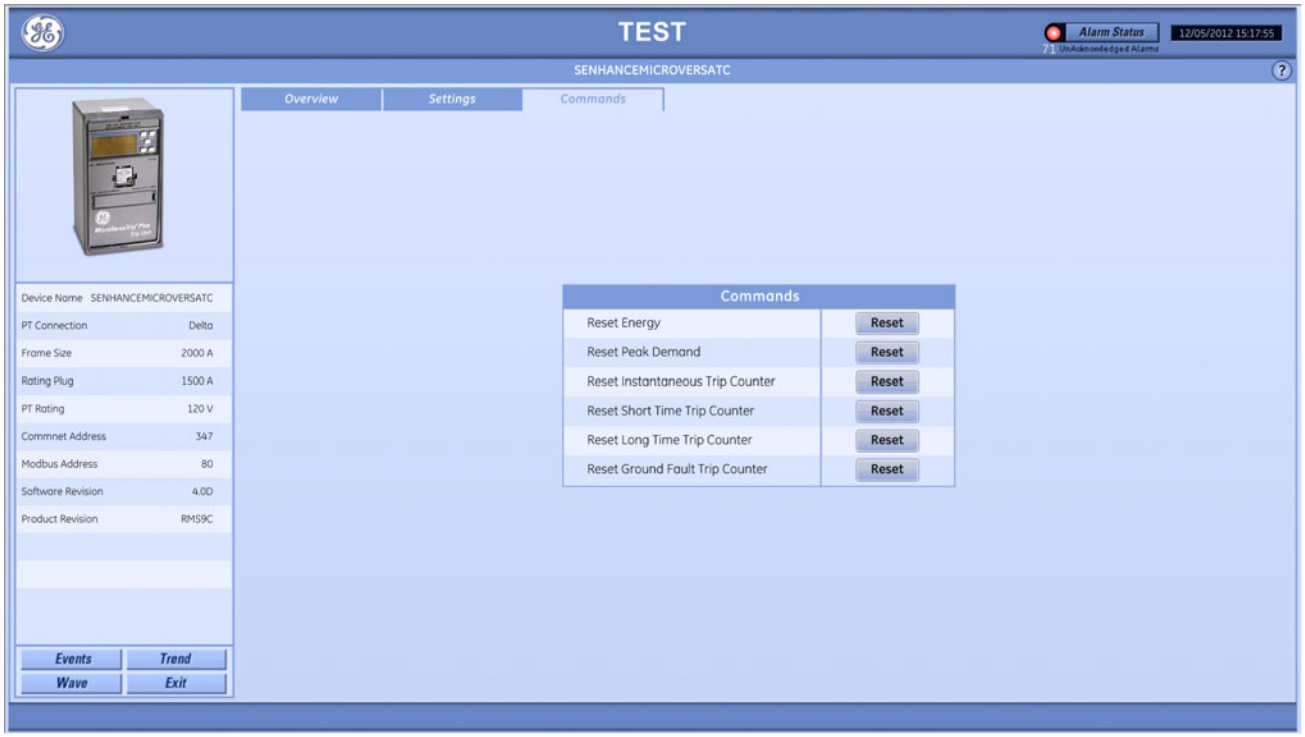
Commands tab

The following functions are available.

Table 12: EMVTC commands available

Button	Function
Reset Energy	Clears energy data in the device
Reset Peak Demand	Clears peak demand data in the device
Reset Instantaneous Trip Counter	Clears instantaneous trip counters from the device
Reset Short Time Trip Counter	Clears short time trip counters from the device
Reset Long Time Trip Counter	Clears long time trip counters from the device
Reset Ground Fault Trip Counter	Clears ground fault trip counters from the device

Figure 59: EMVTC Commands tab



EMVTD

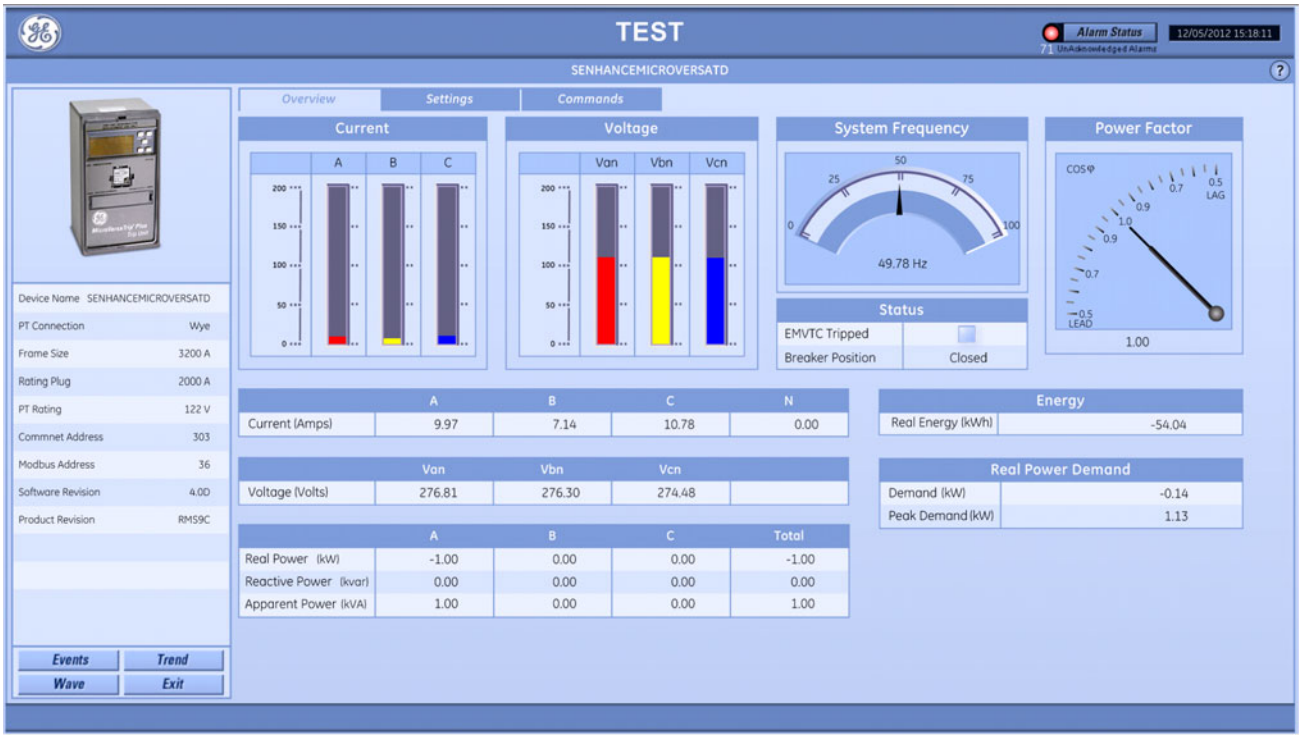
This section explains the information displayed in PMCS for the Enhanced MicroVersa Trip D (EMVTD) products.

Overview tab

This tab displays

- Current
- Voltage
- System frequency
- Status
- Power factor
- Energy
- Real power demand

Figure 60: EMVTD Overview tab

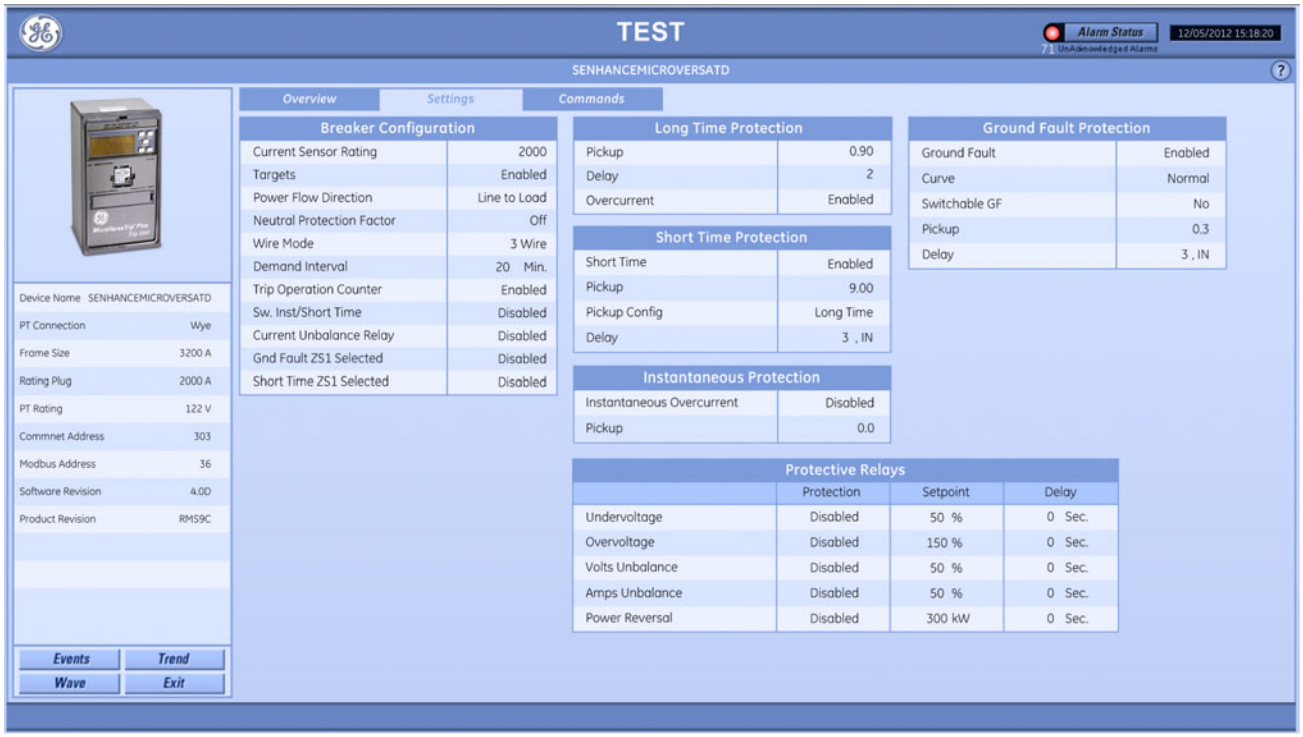


Settings tab

This tab displays

- Breaker configuration
- Long time protection
- Short time protection
- Instantaneous protection
- Protective relays
- Ground fault protection

Figure 61: EMVTD Settings tab



Commands tab

The following functions are available.

Table 13: EMVTD commands available

Button	Function
Reset Energy	Clears energy data in the device
Reset Peak Demand	Clears peak demand data in the device
Reset Instantaneous Trip Counter	Clears instantaneous trip counters from the device
Reset Short Time Trip Counter	Clears short time trip counters from the device
Reset Long Time Trip Counter	Clears long time trip counters from the device
Reset Ground Fault Trip Counter	Clears ground fault trip counters from the device

Figure 62: EMVTD Commands tab

EPM9650/EPM9450

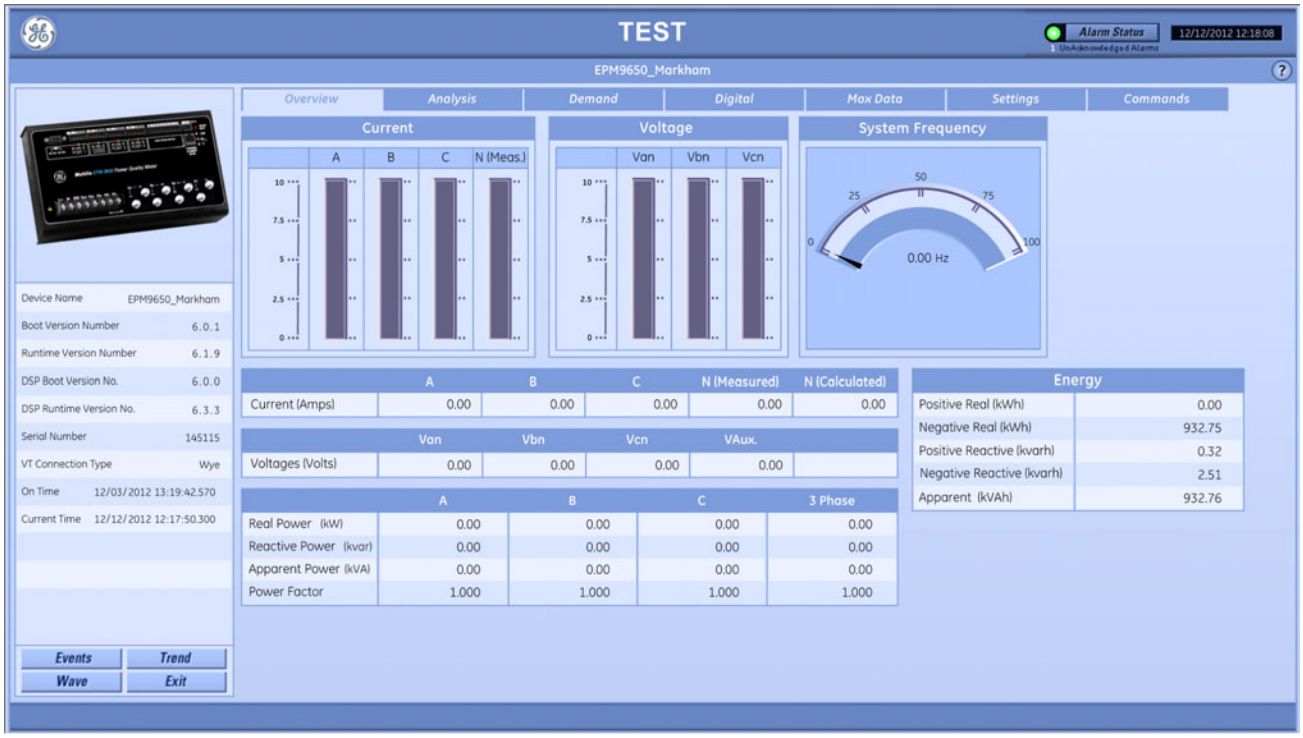
This section explains the information displayed in PMCS for EPM9650 and EPM9450 meters.

Overview tab

This tab displays

- Currents
- Voltages
- Energy
- Power
- System frequency

Figure 63: EPM9650 Overview tab

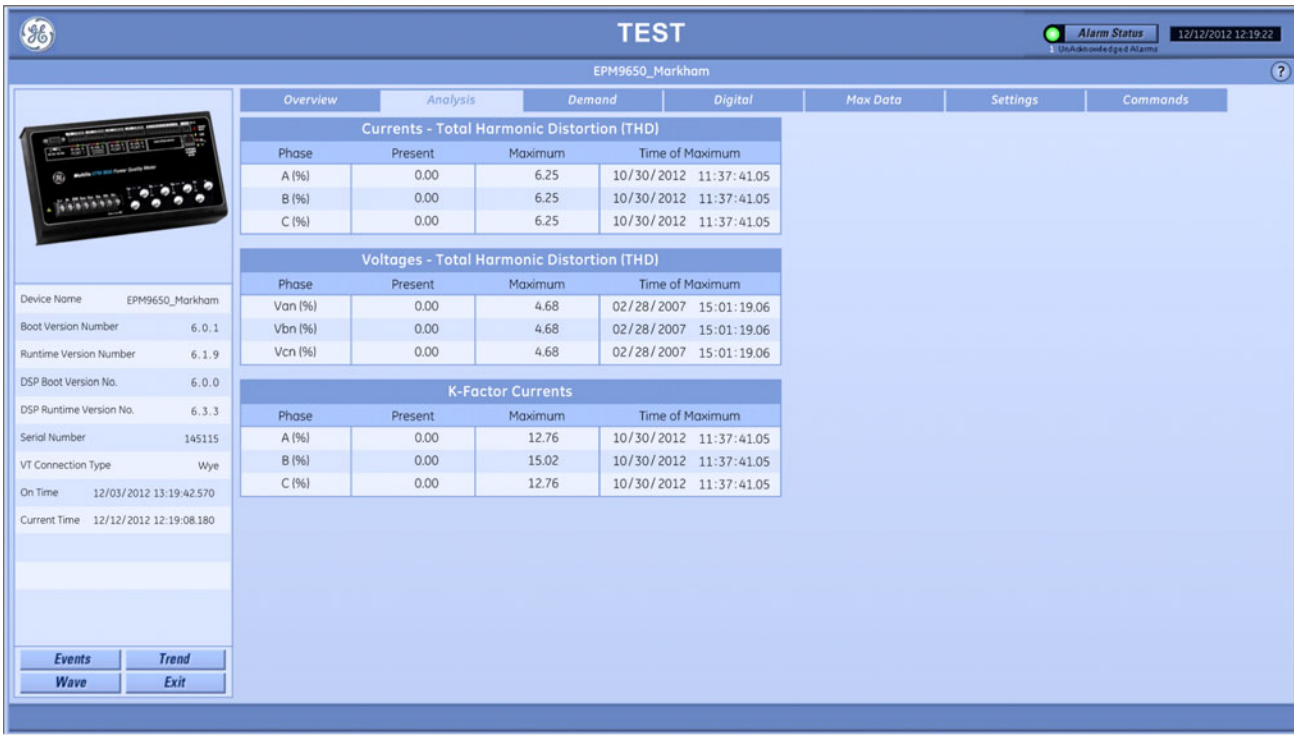


Analysis tab

This tab displays present, maximum, and timestamp of maximum of

- Currents - Total harmonic distortion (THD)
- Phase Voltage - THD
- K-factor currents

Figure 64: EPM9650 Analysis tab

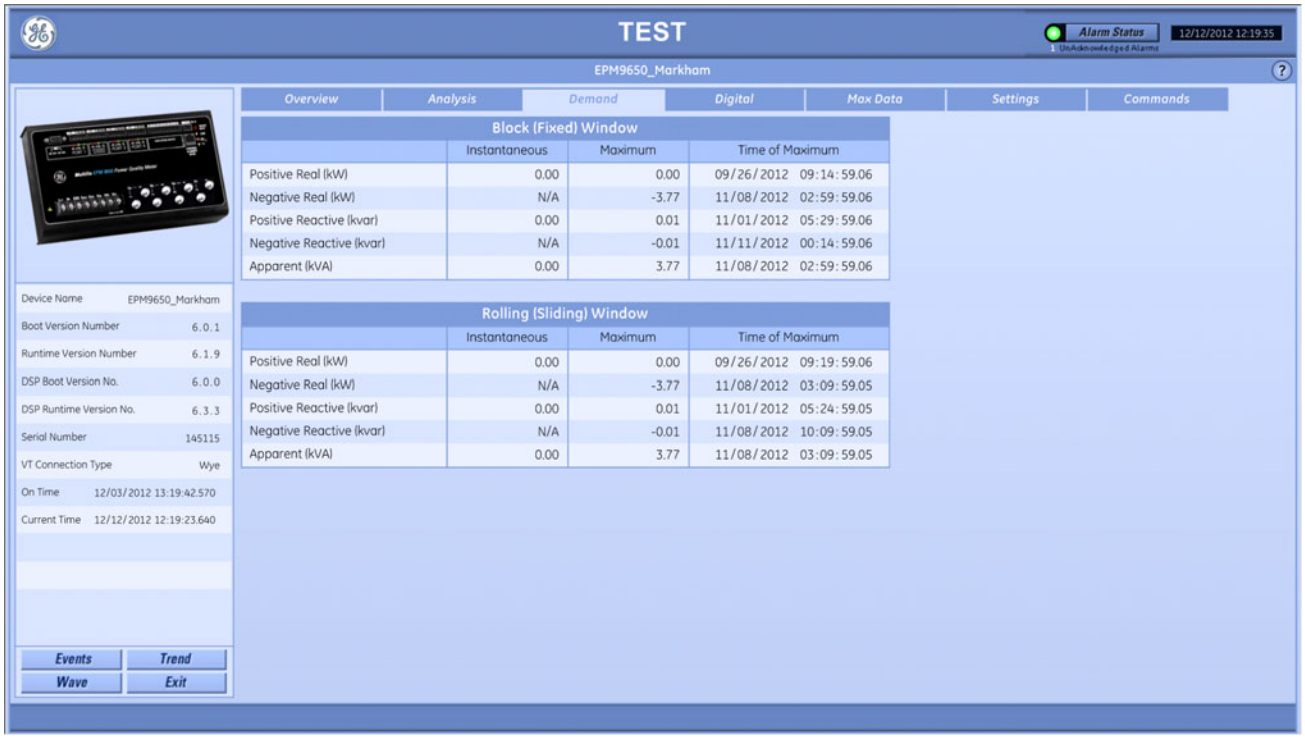


Demand tab

This tab displays

- Fixed window power
- Predictive sliding window

Figure 65: EPM9650 Demand tab



Digital tab

This tab displays

- Digital inputs

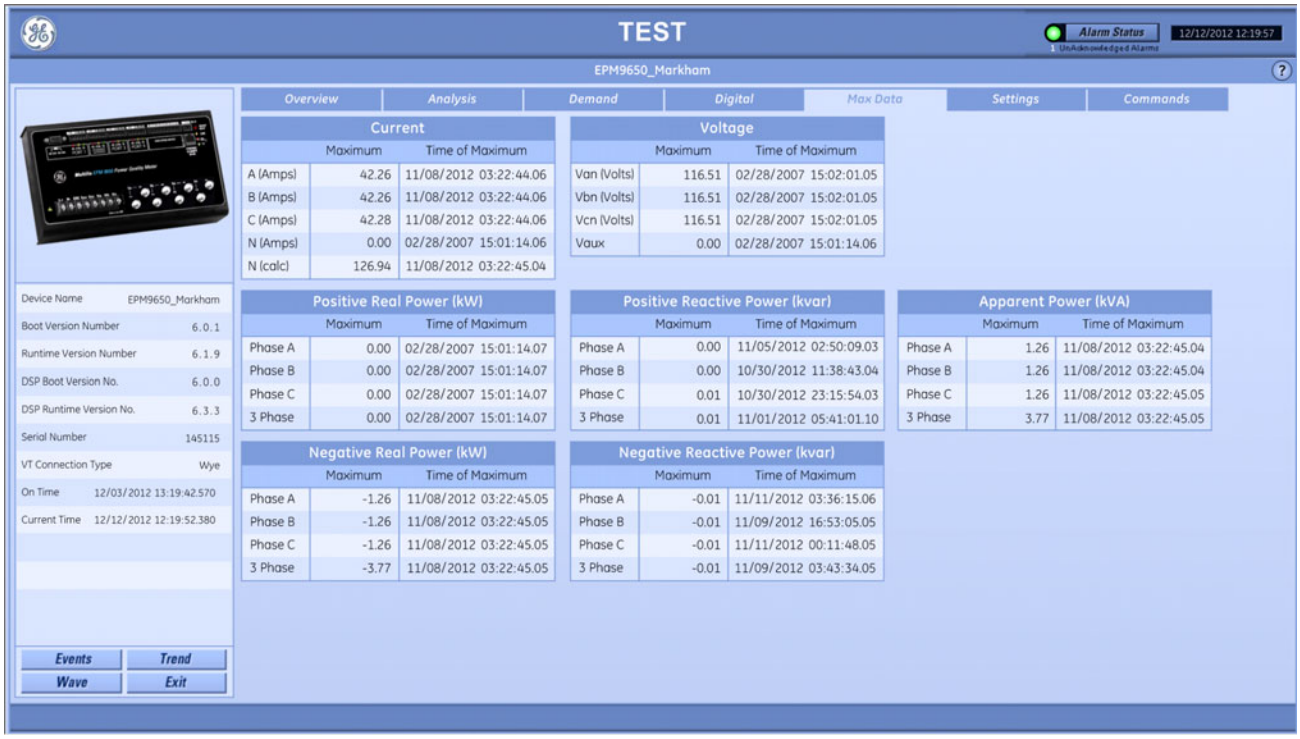
Figure 66: EPM9650 Digital tab

Max Data tab

This tab displays the maximum and its time stamp of

- Currents
- Voltages
- Positive real power
- Negative real power
- Positive reactive power
- Negative reactive power
- Apparent power

Figure 67: EPM9650 Max Data tab

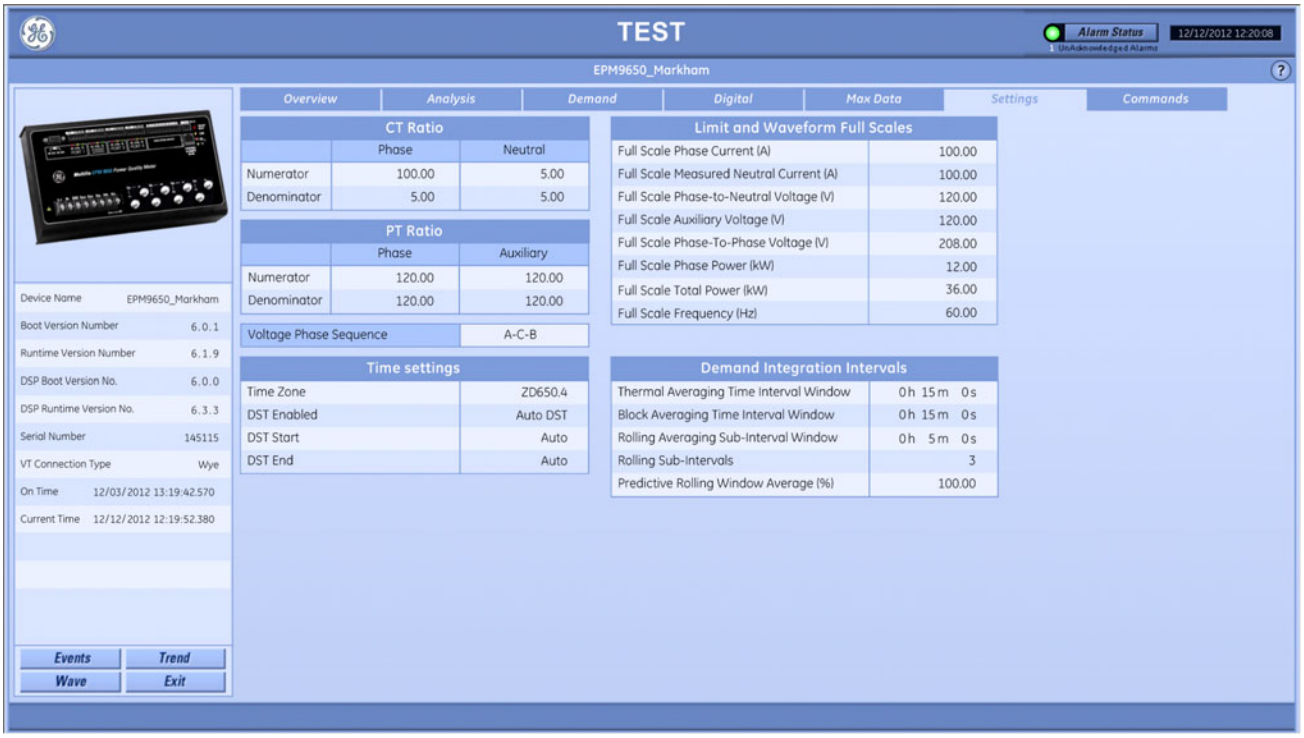


Settings tab

This tab displays

- Current setpoints
- Voltage setpoints
- Voltage phase sequence
- CT ratio
- PT ratio
- Time settings, including time zone

Figure 68: EPM9650 Settings tab



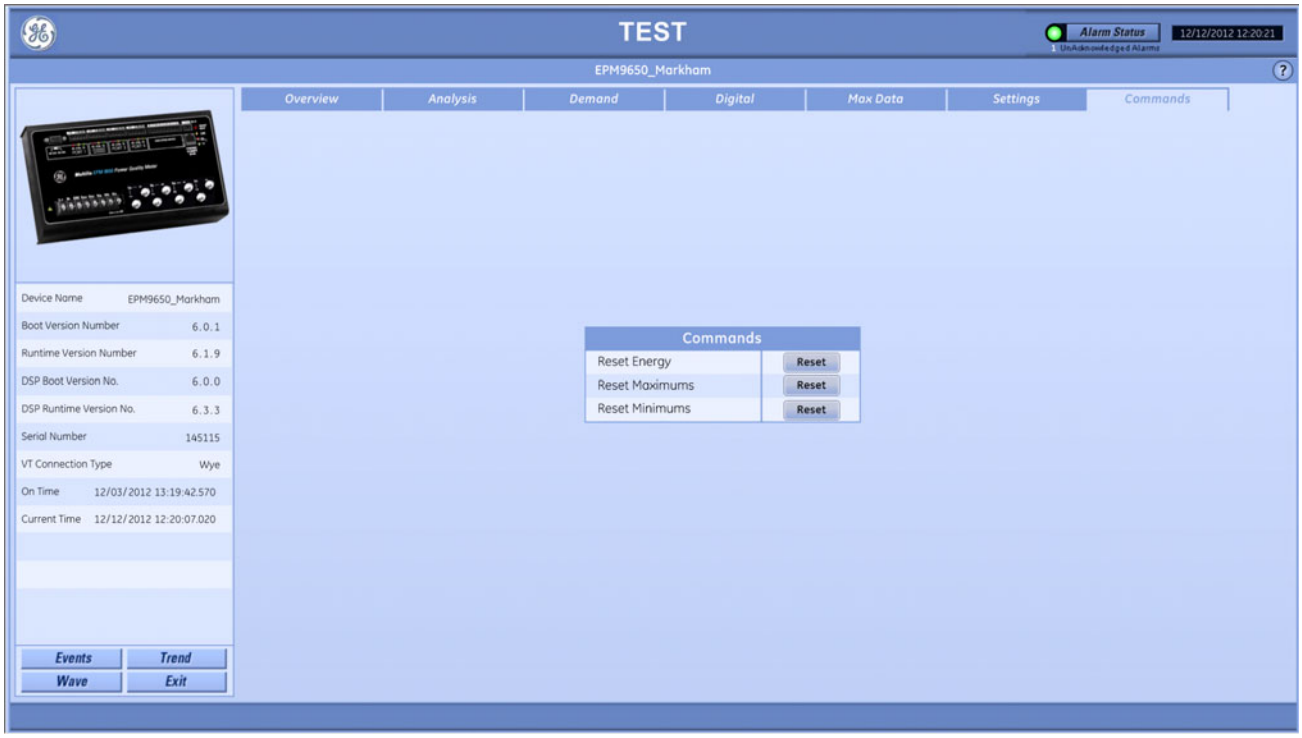
Commands tab

The following functions are available.

Table 14: EPM9650 commands available

Button	Function
Reset Energy	Clears the energy counters
Reset Maximums	Clears the maximum values from memory
Reset Minimums	Clears the minimum values from memory

Figure 69: EPM9650 Commands tab



GTU

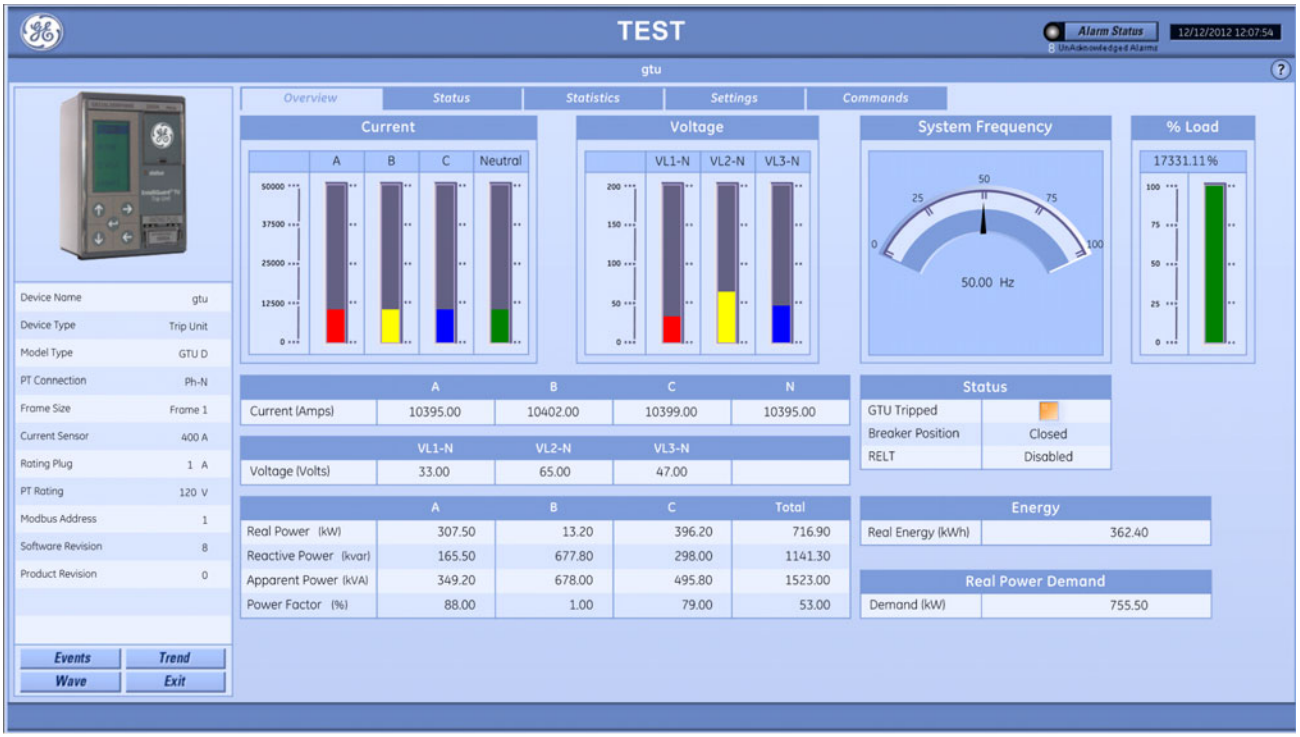
This section explains the information displayed in PMCS for Entelliguard Trip Unit (GTU) products.

Overview tab

This tab displays

- Currents
- Voltages
- System frequency
- Status
- Energy
- Real power demand

Figure 70: GTU Overview tab

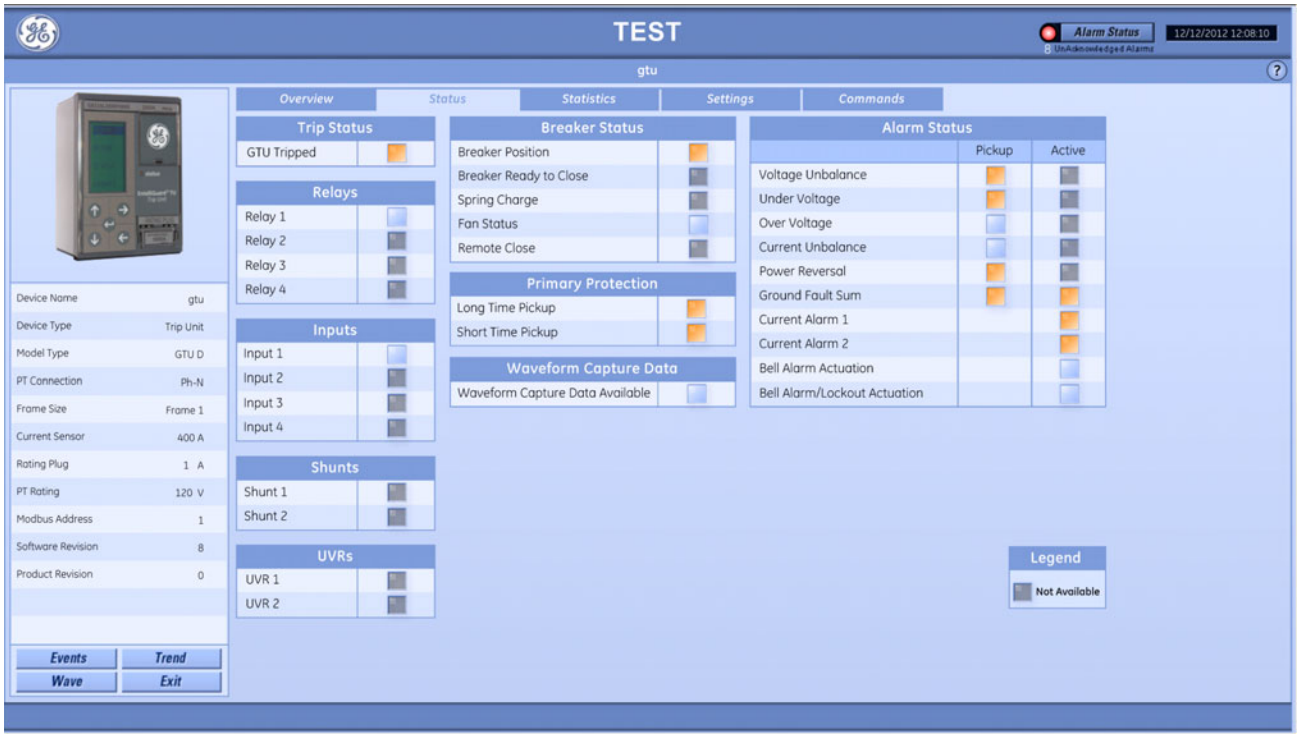


Status tab

This tab displays

- Trip status
- Breaker status
- Alarm status
- Primary protection
- Waveform capture data
- Relays
- Inputs
- Shunts
- Undervoltage release (UVR)

Figure 71: GTU Status tab



Statistics tab

This tab displays

- Trip counts

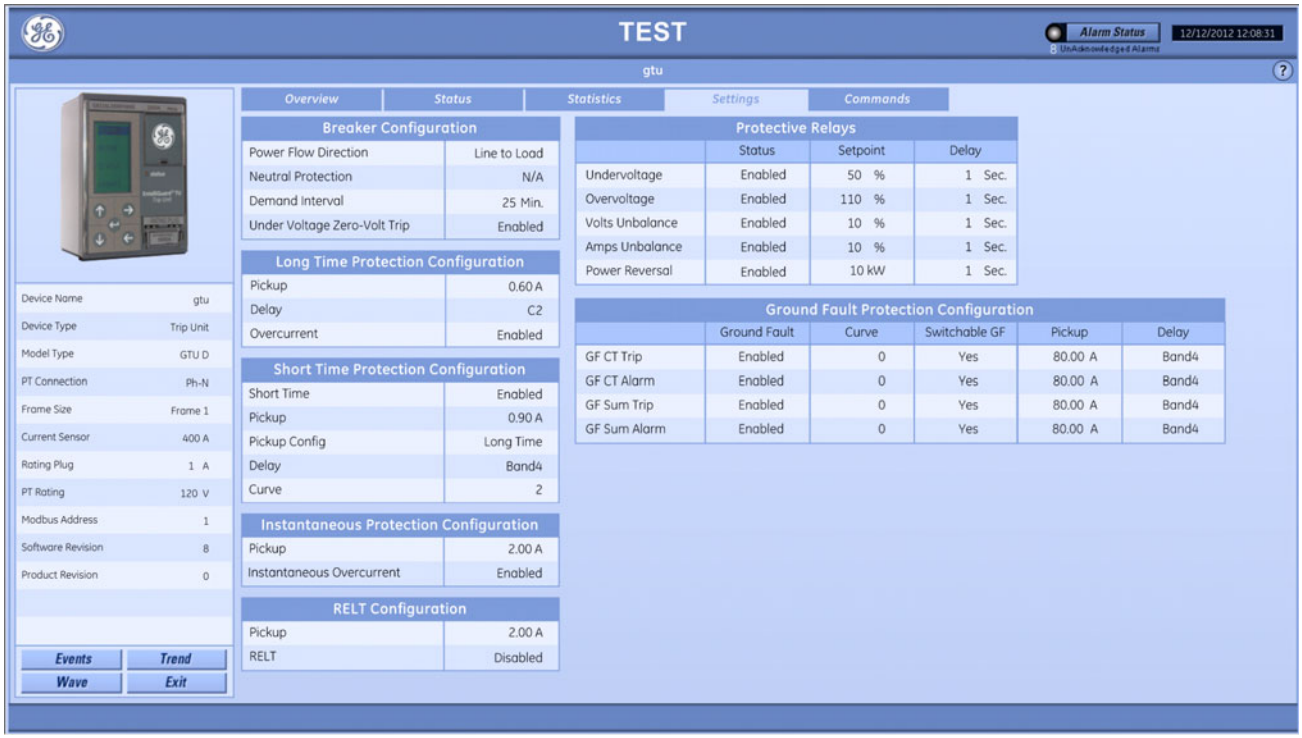
Figure 72: GTU Statistics tab

Settings tab

This tab displays

- Breaker configuration
- Long time protection configuration
- Short time protection configuration
- Instantaneous protection configuration
- Reduced energy let-through (RELT) instantaneous protection configuration
- Protective relays
- Ground fault protection configuration

Figure 73: GTU Settings tab



Commands tab

The following functions are available.

Table 15: GTU commands available

Button	Function
Reset Instantaneous Trip Counter	Clears Instantaneous trip counter data
Reset Short Time Trip Counter	Clears short time trip counter data
Reset Long Time Trip Counter	Clears long time trip counter data
Reset Ground Fault Trip Counter	Clears ground fault trip counter data
Reset RELT	Resets RELT
Reset Total Energy	Clears total energy

Figure 74: GTU Commands tab

MVT

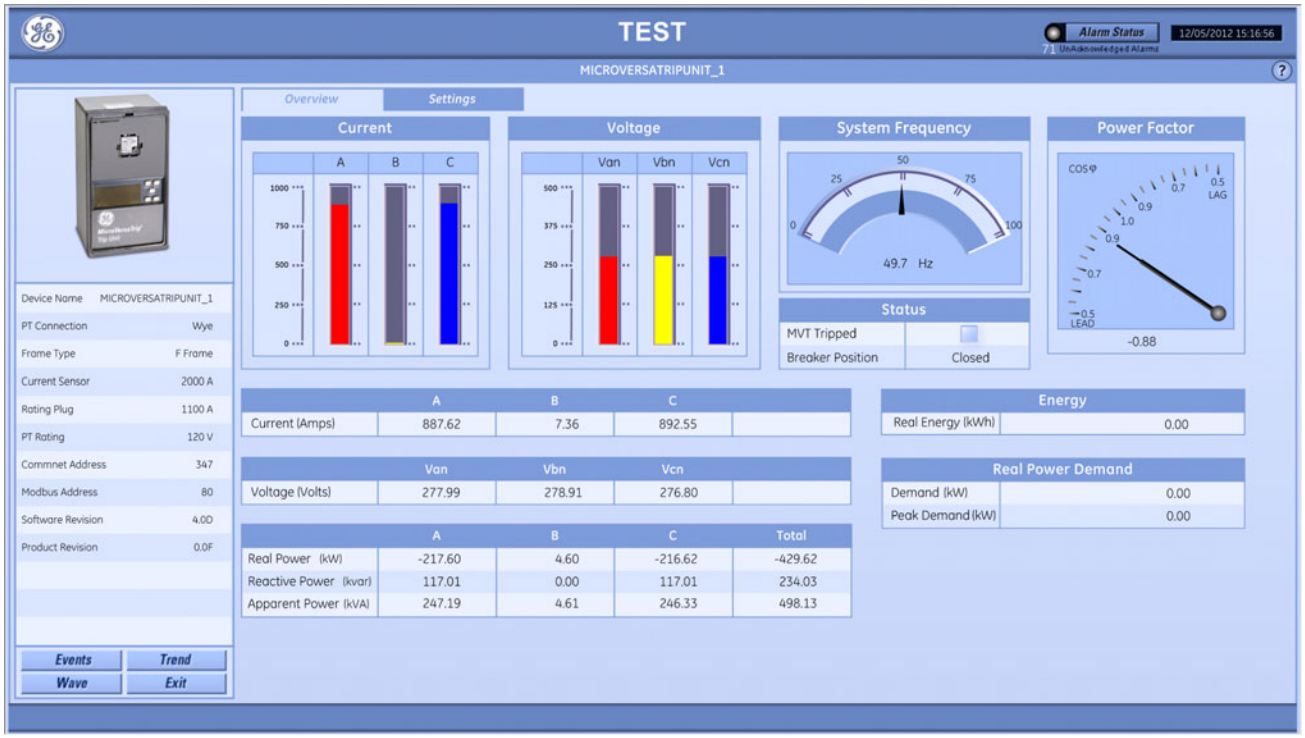
This section explains the information displayed in PMCS for MicroVersa Trip (MVT) products, excluding EMVTC and EMVTD.

Overview tab

This tab displays

- Current
- Voltage
- System frequency
- Status
- Power factor
- Energy
- Real power demand

Figure 75: MVT Overview tab

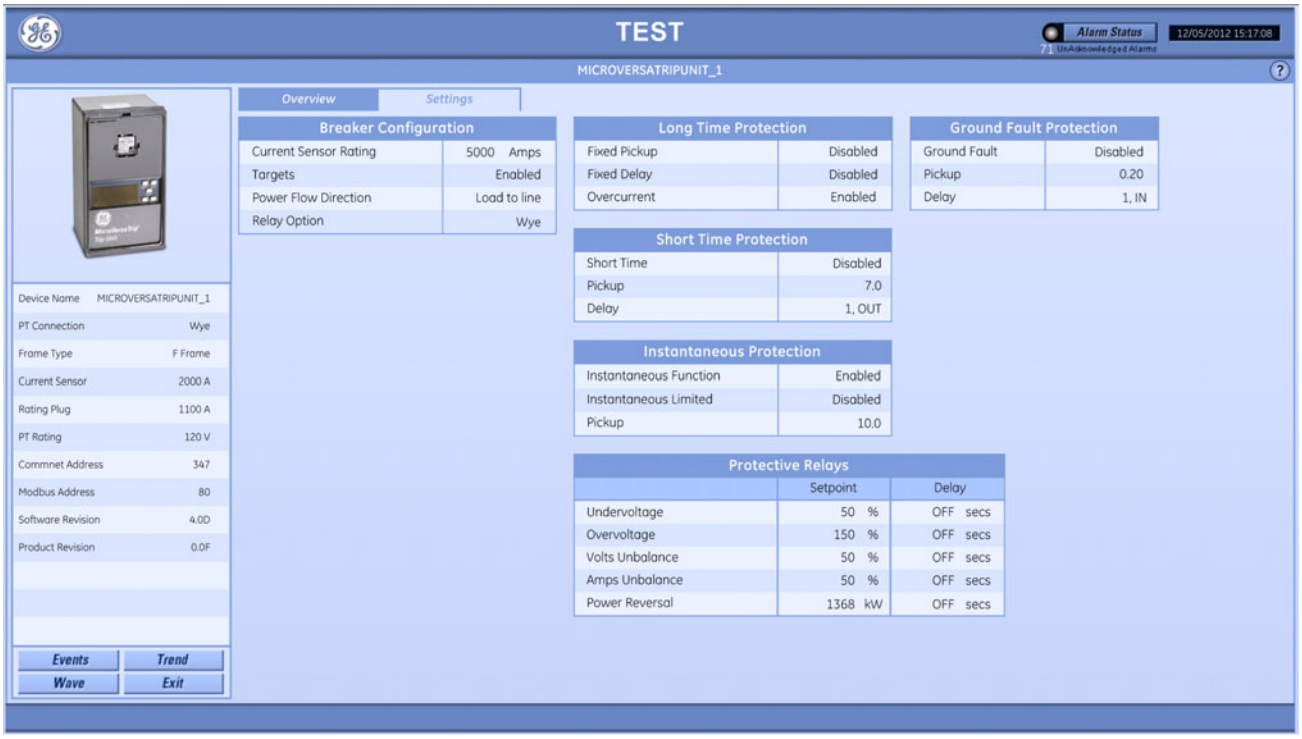


Settings tab

This tab displays

- Breaker configuration
- Long time protection
- Short time protection
- Instantaneous protection
- Protective relays
- Ground fault protection

Figure 76: MVT Settings tab



PQM/PQMII

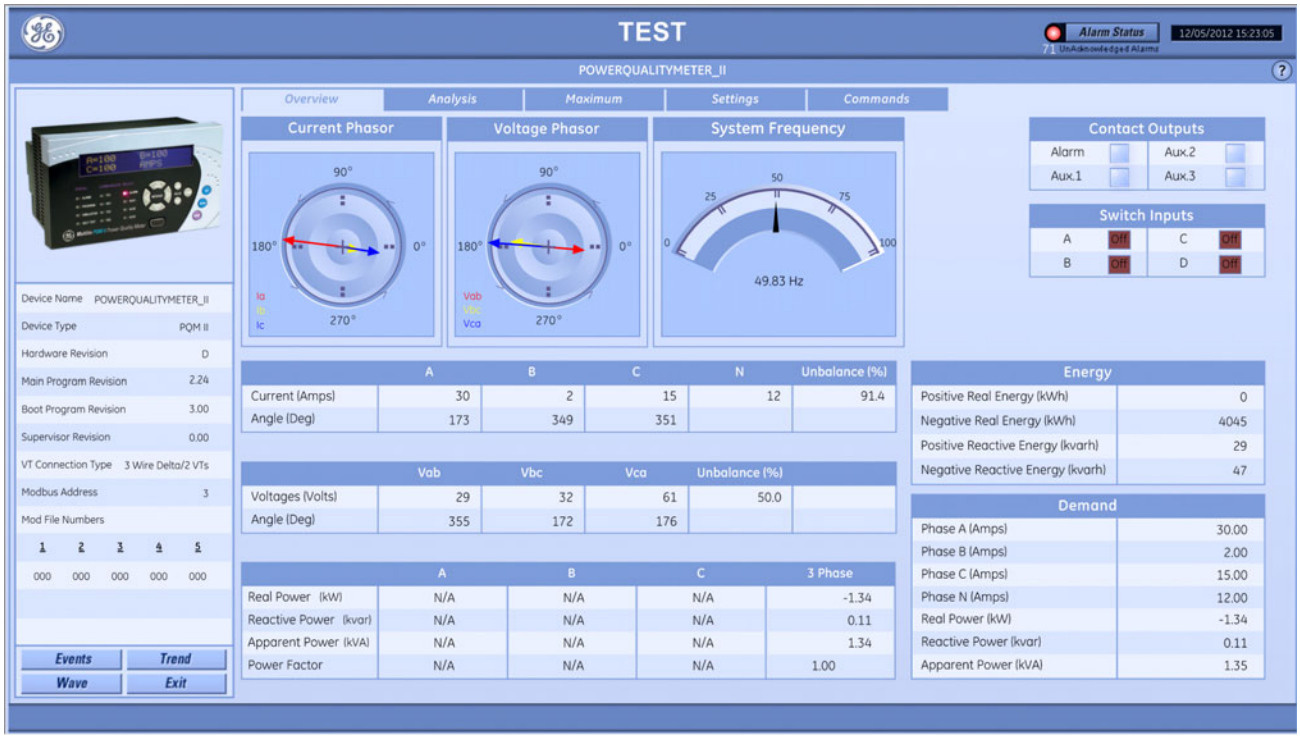
This section explains the information displayed in PMCS for power quality meter (PQM) and PQMII products.

Overview tab

This tab displays

- Current
- Voltage
- Power
- Energy
- Demand
- Contact outputs
- Switch inputs

Figure 77: PQMII Overview tab

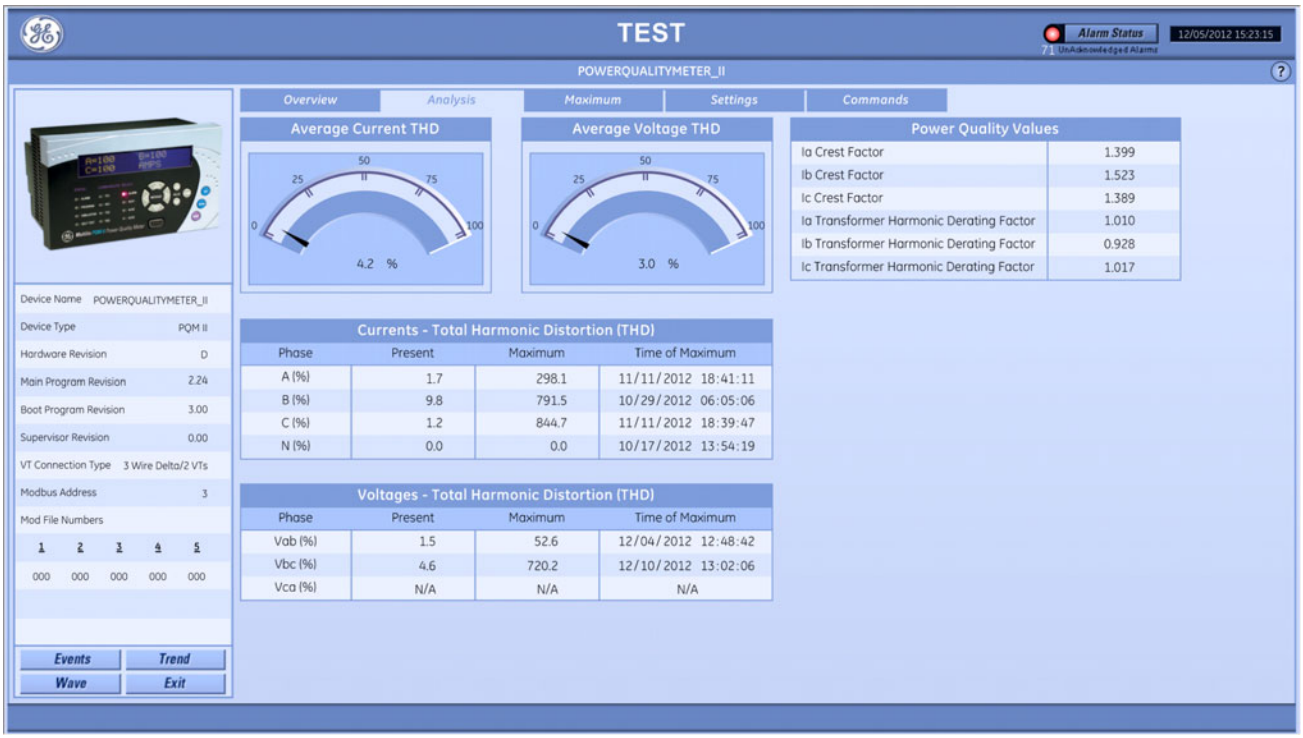


Analysis tab

This tab displays

- Currents - Total harmonic distortion (THD) (present and maximum values)
- Phase voltages - THD (present and maximum values)
- Power quality values

Figure 78: PQMII Analysis tab

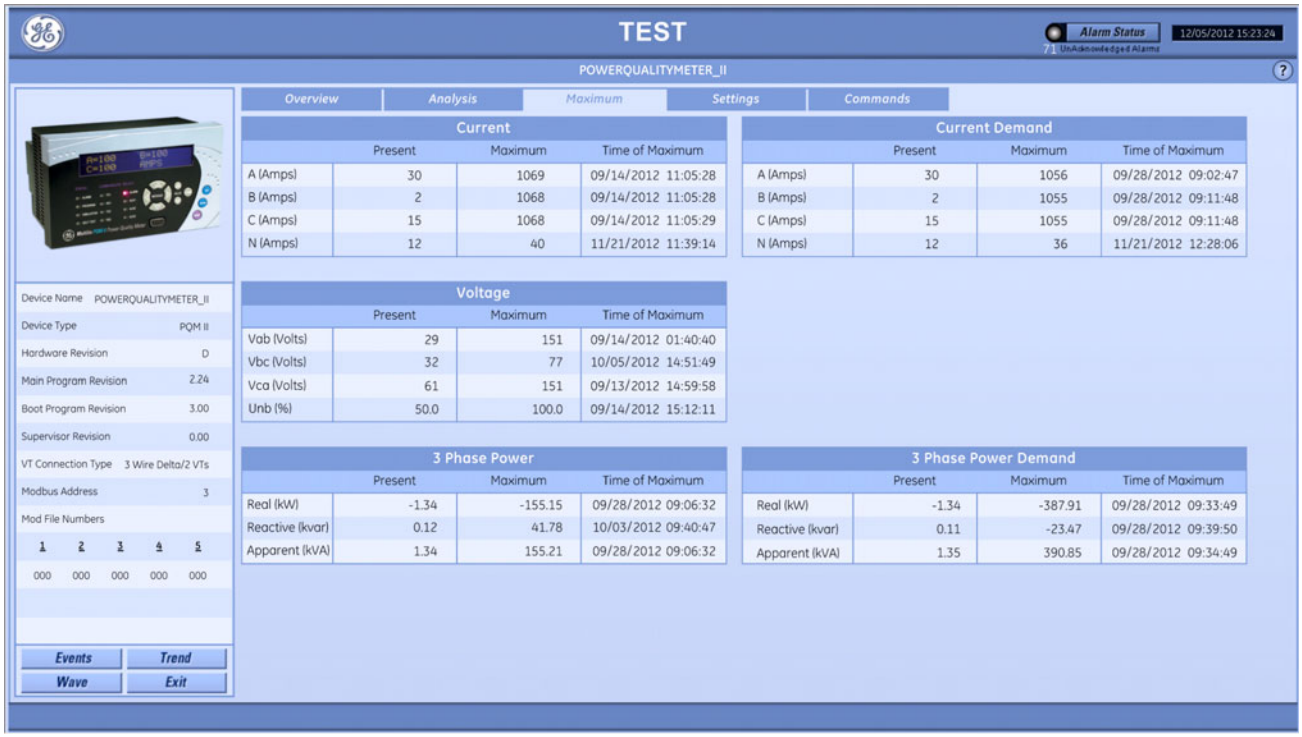


Maximum tab

This tab displays

- Current (present value, maximum value, and time stamp of maximum value)
- Voltage (present value, maximum value, and time stamp of maximum value)
- Three-phase power (present value, maximum value, and time stamp of maximum value)
- Current demand (present value, maximum value, and time stamp of maximum value)
- Three-phase power demand (present value, maximum value, and time stamp of maximum value)

Figure 79: PQMII Maximum tab

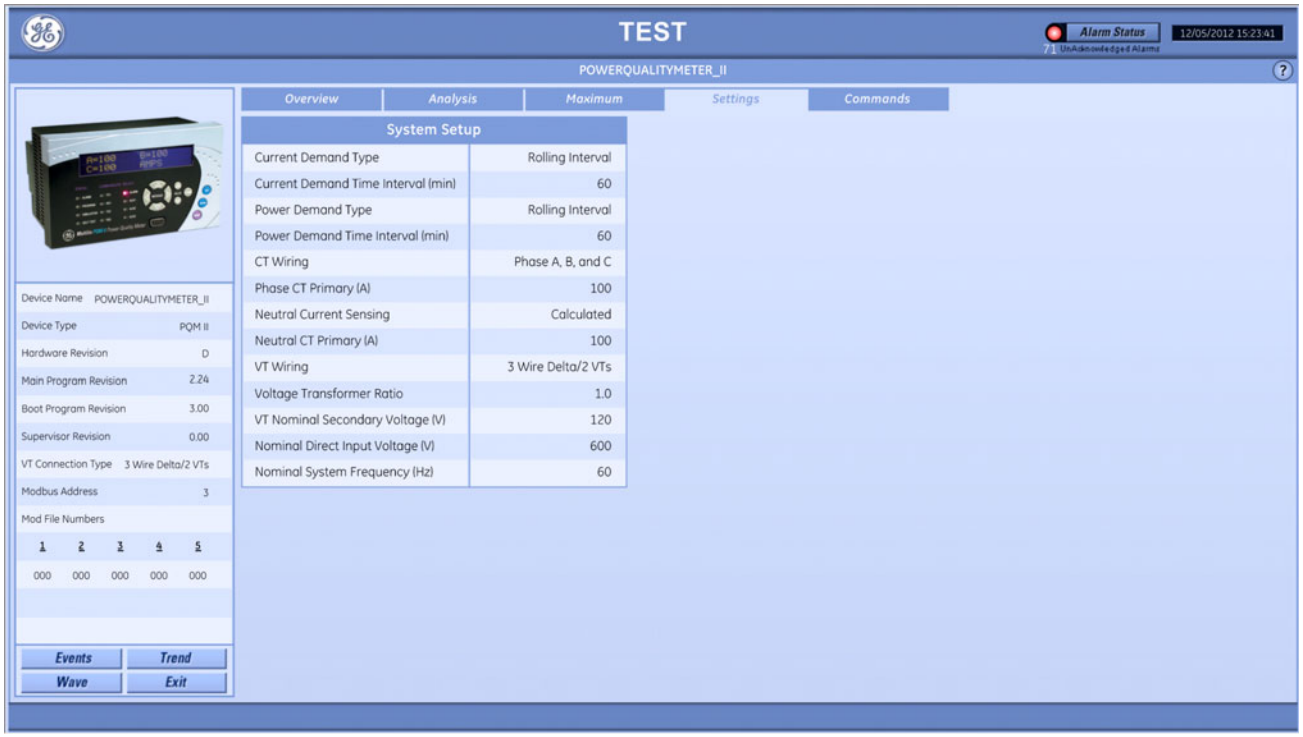


Settings tab

This tab displays

- System setup

Figure 80: PQMII Settings tab



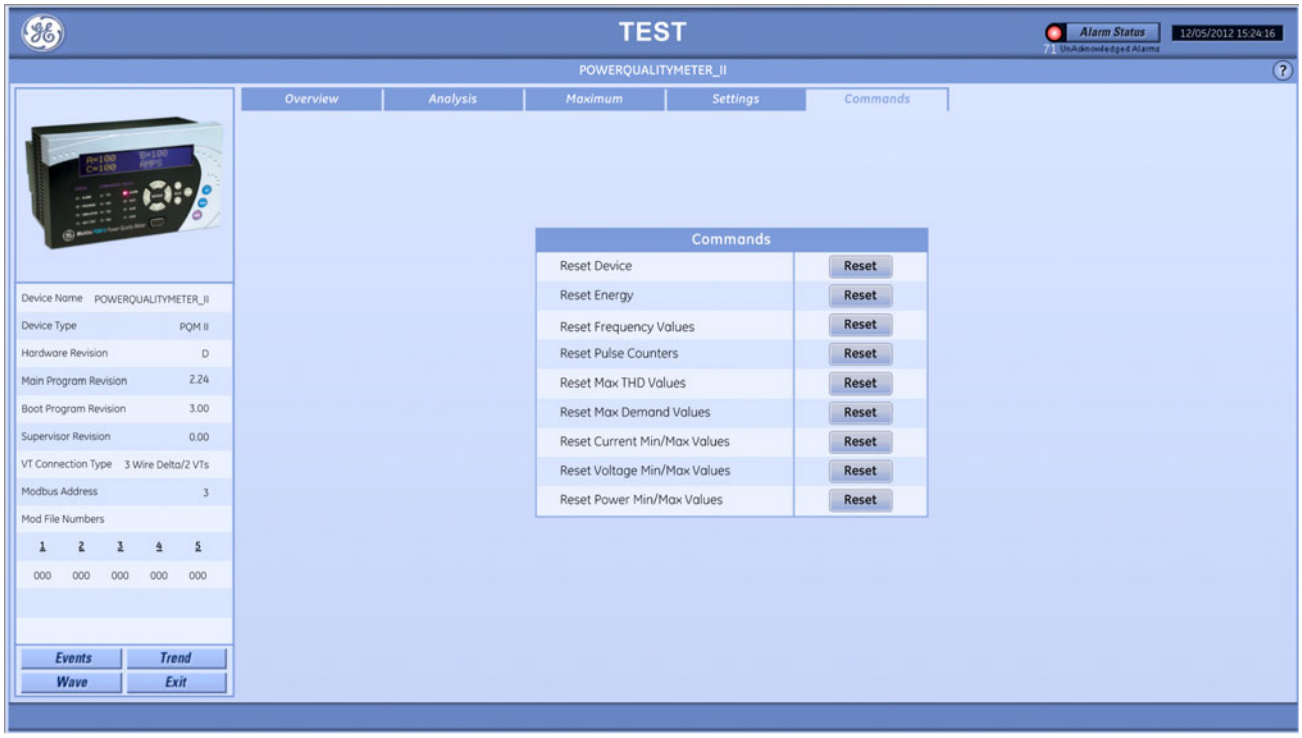
Commands tab

The following functions are available.

Table 16: PQMII commands available

Button	Function
Reset Device	Issues a reset command to the PQM/PQMII
Reset Energy	Clears the PQM/PQMII energy counters
Reset Frequency Values	Clears the PQM/PQMII maximum frequency values from memory
Reset Pulse Counters	Resets the PQM/PQMII pulse counter
Reset Max THD Values	Clears the PQM/PQMII maximum total harmonic distortion values from memory
Reset Max Demand Values	Clears the PQM/PQMII maximum demand values from memory
Reset Current Min/Max Values	Clears the PQM/PQMII current minimum and maximum values from memory
Reset Voltage Min/Max Values	Clears the PQM/PQMII voltage minimum and maximum values from memory
Reset Power Min/Max Values	Clears the PQM/PQMII power minimum and maximum values from memory

Figure 81: PQMII Commands tab



UR

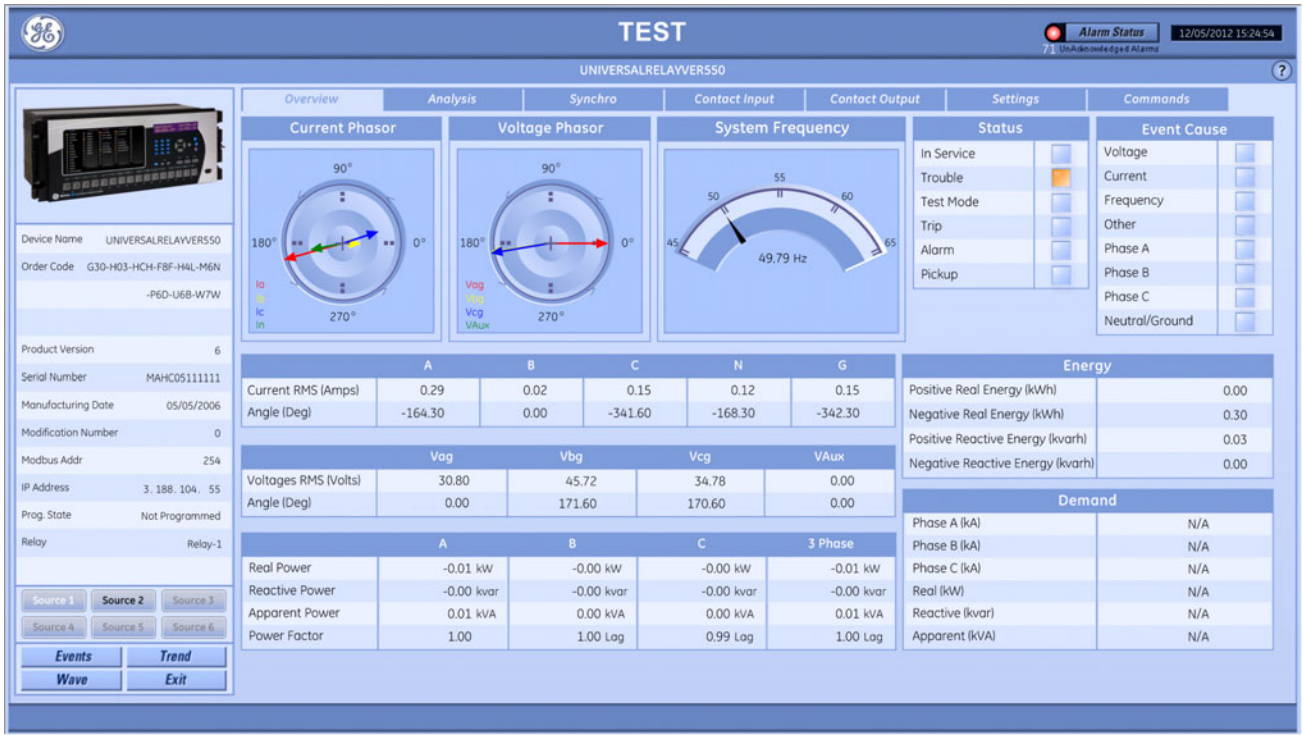
This section explains the information displayed in PMCS for the Universal Relay (UR) series, such as the B30, C30, C60, and D30. Due to the number of products available, a UR wizard can display between one and eight screens of data; the number of screens is determined by the user during wizard configuration. There are 23 tab variations possible in PMCS, depending on the type of UR device connected. For example, the C30 device does not support metering functions, so the metering and source tabs are not available for this device.

Overview tab

This tab displays

- Currents
- Voltages
- Energy
- Demand
- System frequency
- Status
- Event cause

Figure 82: UR Overview tab

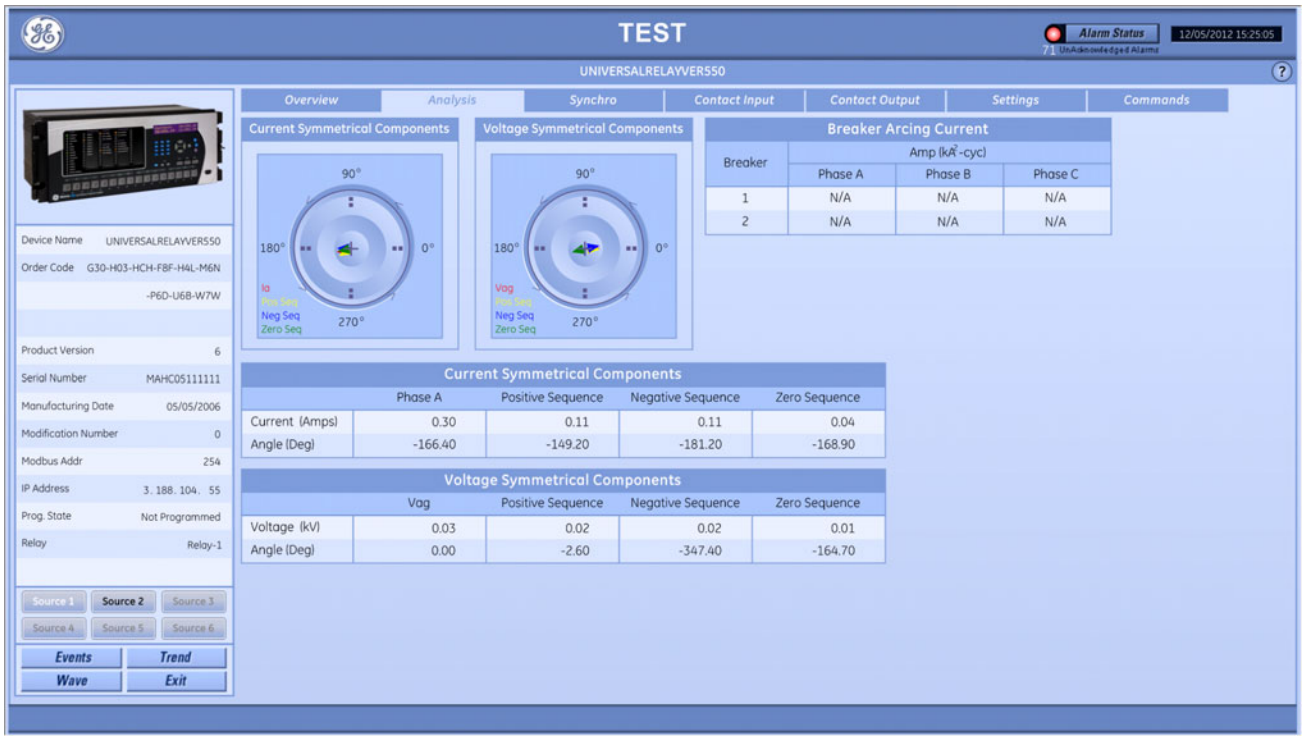


Analysis tab

This tab displays

- Current symmetrical components
- Voltage symmetrical components
- Breaker arcing current

Figure 83: UR Analysis tab

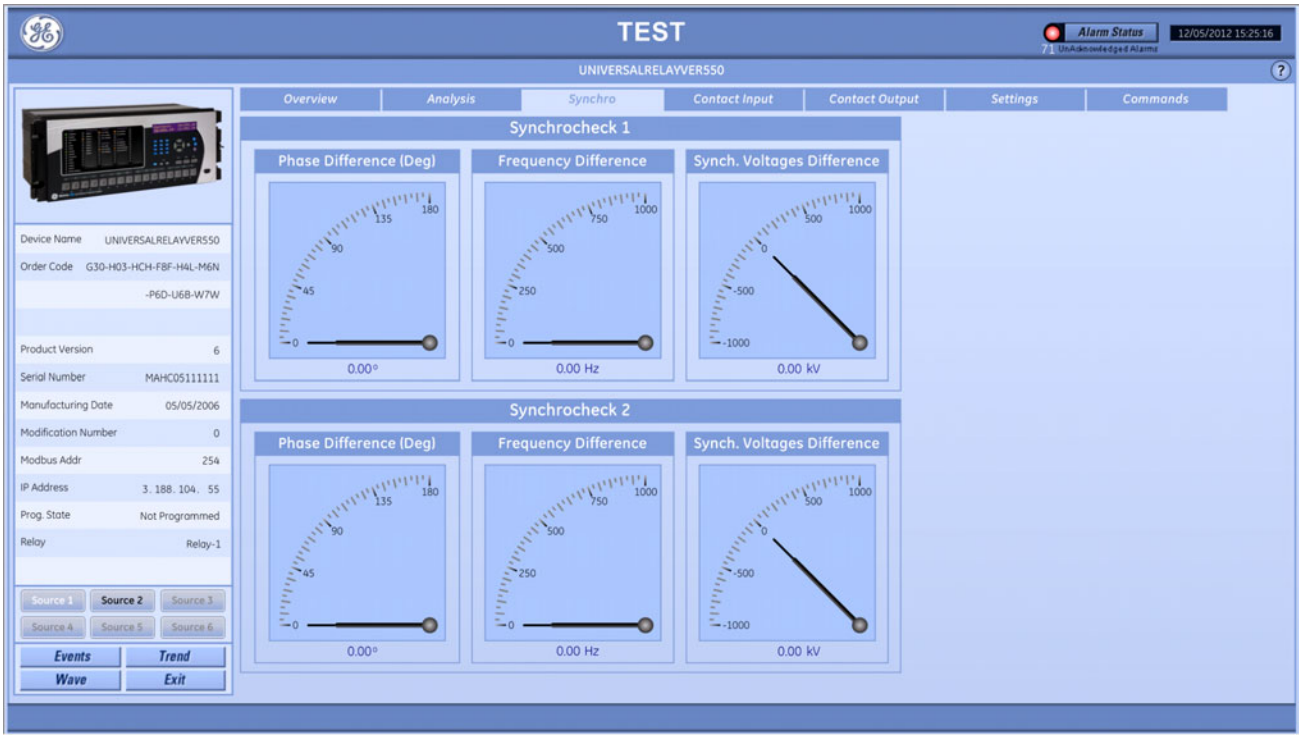


Synchro tab

This tab displays

- Synchrocheck 1
- Synchrocheck 2

Figure 84: UR Synchro tab

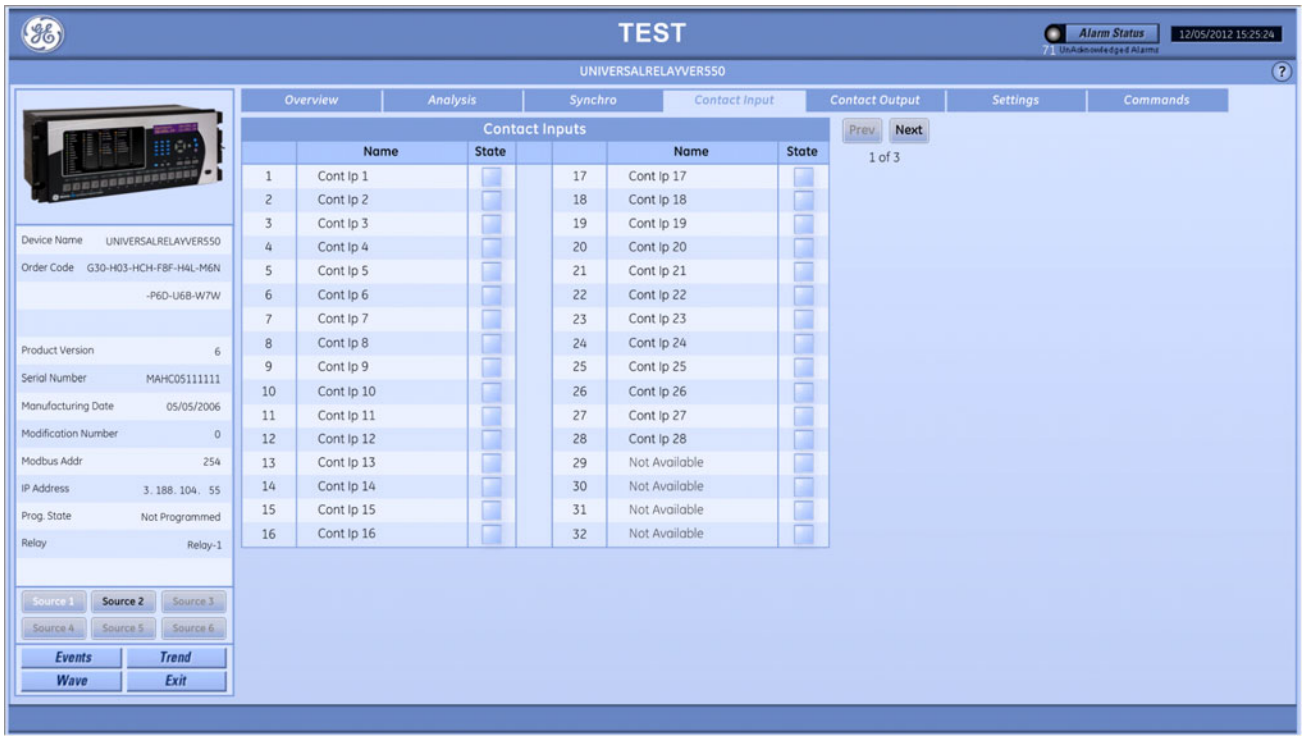


Contact Input tab

This tab displays

- Contact inputs

Figure 85: UR Contact Input tab

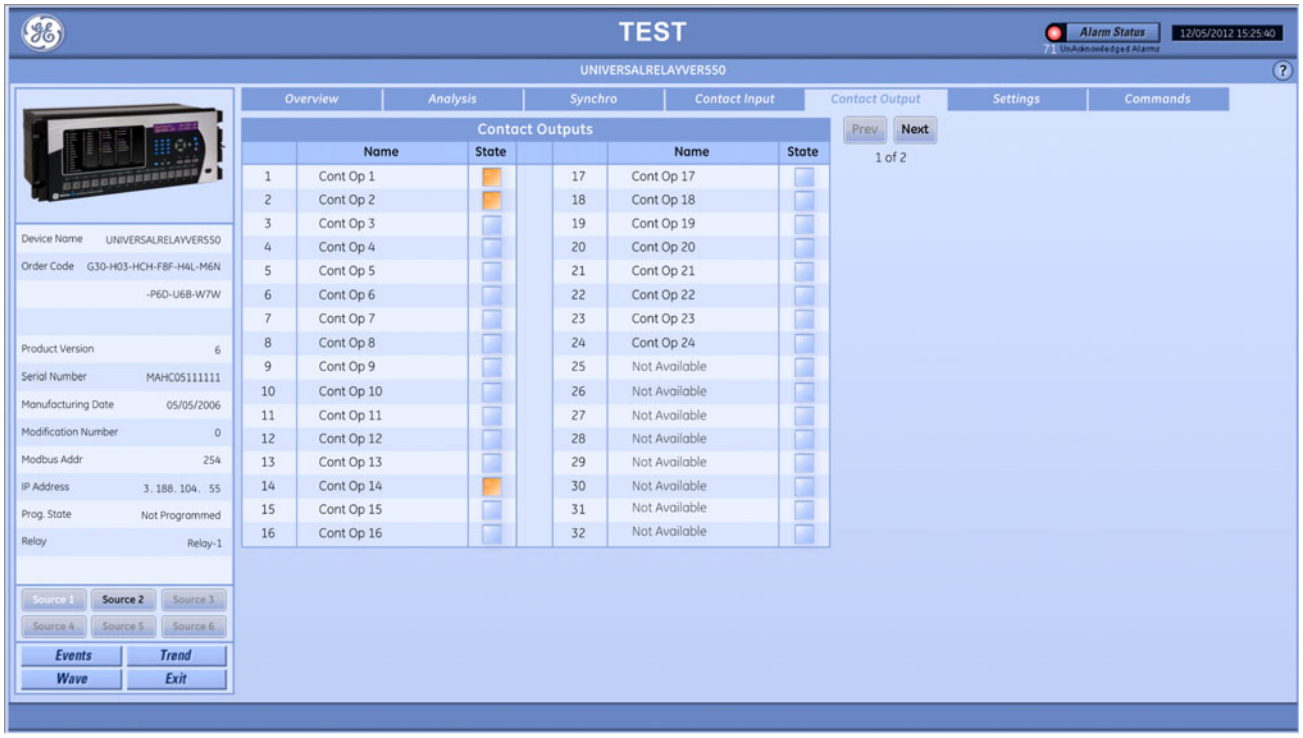


Contact Output tab

This tab displays

- Contact outputs

Figure 86: UR Contact Output tab

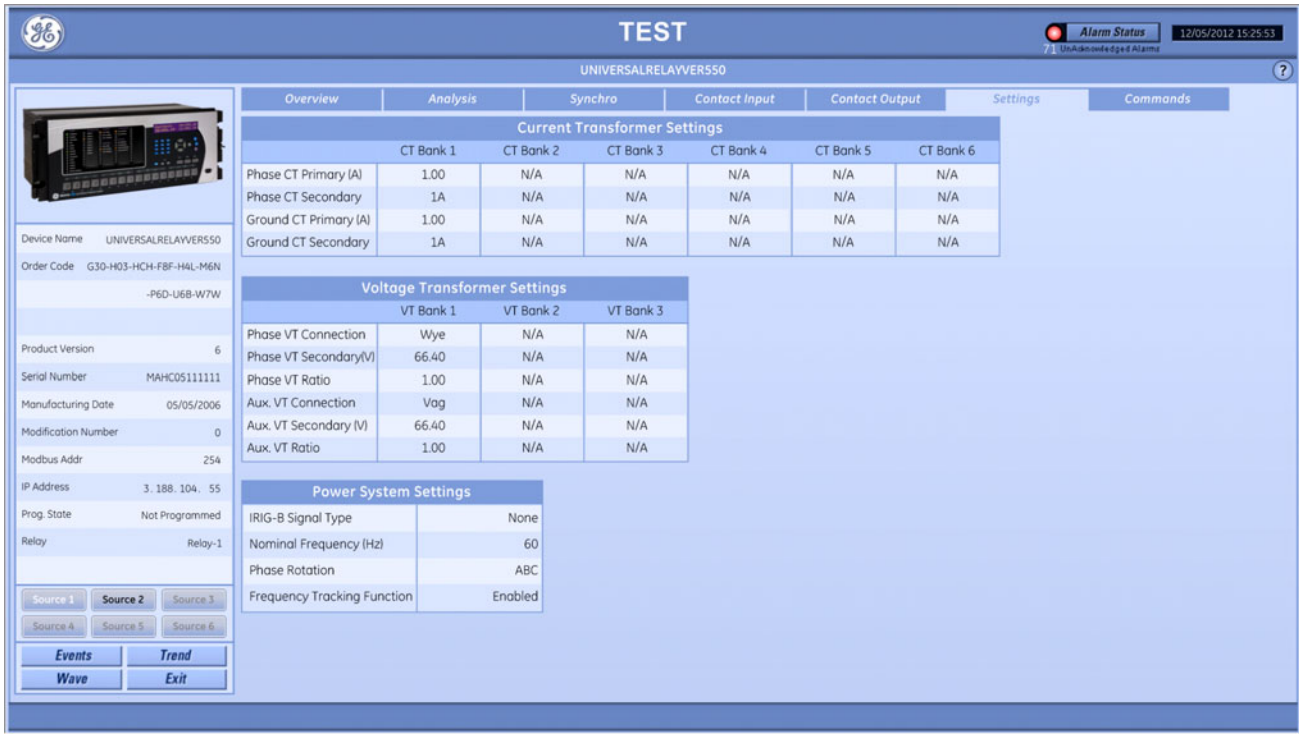


Settings tab

This tab displays

- Current transformer settings
- Voltage transformer settings
- Power system settings

Figure 87: UR Settings tab



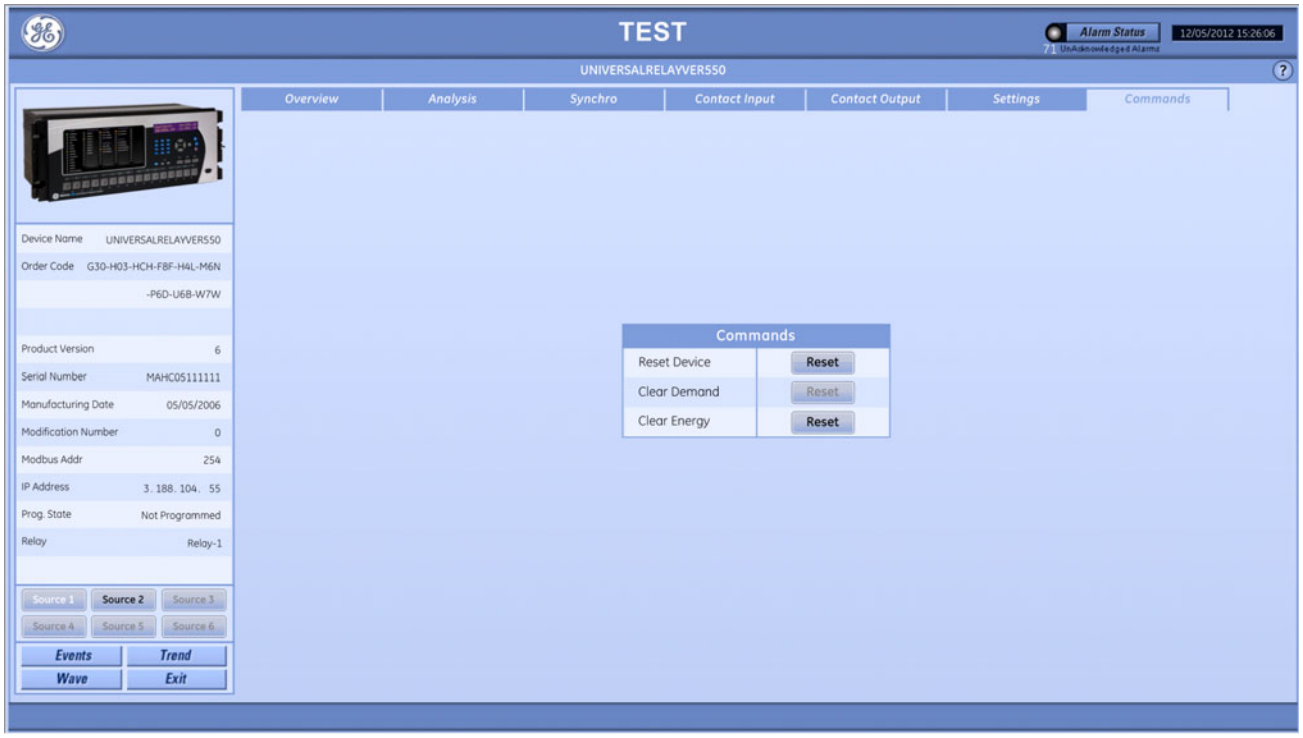
Commands tab

The following functions are available.

Table 17: UR commands available

Button	Function
Reset Device	Issues a reset command to the UR device
Clear Demand	Clears Demand data from the device
Clear Energy	Clears Energy data from the device

Figure 88: UR Commands tab



PMCS

Chapter 5: Software and license management

The following actions can be performed by the Administrator for software and license management:

- Manage activation code
- Transfer software license
- Update software
- Uninstall software

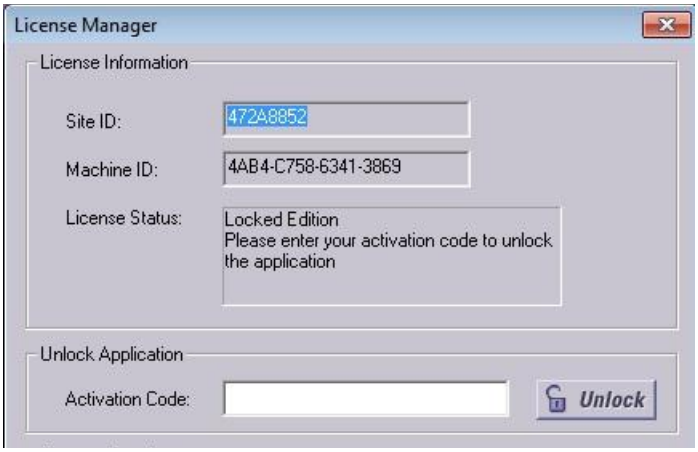
Manage activation code

The software license allows for installation on one computer. After installing PMCS on a computer, use the procedure here to generate an activation code and enter it. There is no prompt to do so; the software does not work unless the code is entered.

To unlock an installation:

1. Launch the Configurator application by clicking **Start > All Programs > EnerVista Integrator > EnerVista Configurator**.
2. Click **Help > License Manager**. The License Manager window opens, shown as follows.

Figure 89: Activating a PMCS software license



3. Obtain the **Site ID** and **Machine ID** from the window.
4. Generate an activation code as follows. Log in to http://apps.gedigitalenergy.com/swmgr using the following credentials:

   Order number: nnnnnnnn

   Password: nnnnnnnn

   Enter the **Site ID** and **Machine ID**, and generate the CD activation code. Record the number.
5. Enter the code in the **Activation Code** field, and click the **Unlock** button. This unlocks both PMCS and EnerVista Integrator.

Transfer software license

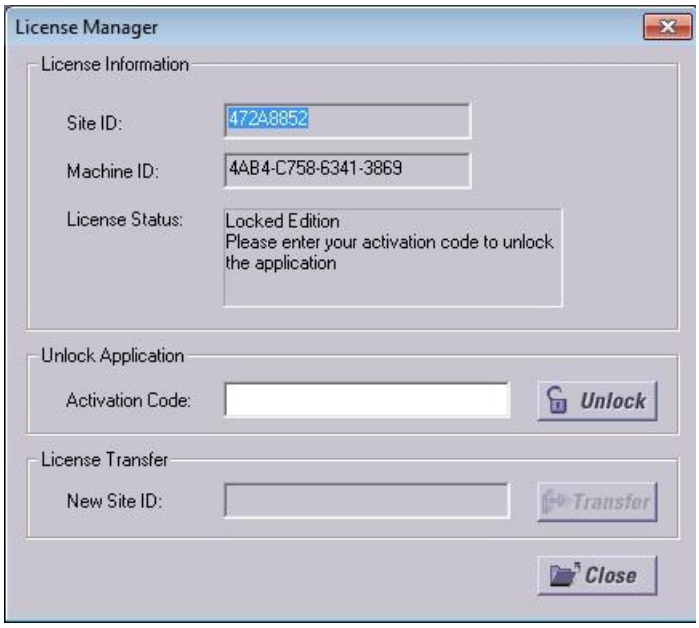
The license does not allow installation on more than one computer, but you can move the software license from one PMCS installation to another. You cannot move a complete installation with its database to another computer.

You look up the **Site ID** of the license being moved, then transfer it.

To view a Site ID:

1. At the computer on which the license is installed, launch the Configurator application.
2. Click **Help > License Manager**. The License Manager window opens, shown as follows.

Figure 90: Transferring a PMCS software license



3. Obtain the **Site ID** from the window.

To transfer the license:

1. At the computer on which you want to install the license, log in as Administrator.
2. Launch the Configurator application.
3. Click **Help > License Manager**. The License Manager window opens.
4. Enter the Site ID in the **New Site ID** field.
5. Click the **Transfer** button.

Update software

After initial activation, if PMCS license manager detects any license options still available for upgrade, the license upgrade section is enabled in the license management window.

Updates are free for a year after purchase. Download them from the GE Multilin website at http://gedigitalenergy.com/multilin or ask for a new CD using the contact information contained in the **For further assistance** section.

Based on the license purchased, PMCS limits the number of installations. The license can be upgraded by entering a new activation code. See the **Manage activation code** section.

Uninstall software

If required, the PMCS software can be uninstalled.

Uninstalling the PMCS software deletes configuration information too. It does not delete some files, such as error logs, system logs, and configuration records, which are created after the PMCS installation is complete. Since these files are not part of the initial installation, they are not removed by the uninstaller, and must be deleted manually. The SQL Express database remains.

To uninstall PMCS software:

1. Click **Start > Control Panel**.
2. Click **Programs and Features**.
3. Click the PMCS application.
4. Click **Uninstall**, and confirm the deletion. The PMCS software is deleted as outlined.

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