GE Multilin

EnerVista Viewpoint Monitoring Version 5.11 Specification

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1 - Product Overview

1.1 Viewpoint Monitoring Scope

Viewpoint Monitoring is an easy to use software package that can provide you with monitoring and control for power systems containing up to 25 electronic devices that can communicate using the standard Modbus TCP/IP or Modbus RTU protocol.

This system is ideal for installations that require:

- 24x7 Monitoring, Control and Data Recording of their small power system
- On-Demand Viewing and Controlling of the status of all devices in their small system

Viewpoint Monitoring is a stand-alone software package that has both the Server and the HMI built into the application and reside on the same computer. This application does not require any additional software or servers for it to function.

Viewpoint Monitoring provides the following functionality:

- Pre-configured monitoring screens for all GE Multilin Devices (Plug-and-Play)
- Single-Line Monitoring of power system devices
- Real-Time control of power system devices (Open/Close Breaker)
- Annunciator Alarming on any Analog or Digital monitored point
- Trending of up to 500 different device parameters with 1 minute resolution
- Automatic Downloading of all Events from GE Multilin Devices
- Sorting and Searching of Device Events in a system wide Sequence of Events Record
- Automatic Downloading of all Waveforms from GE Multilin Devices
- Merging and Overlaying waveforms recorded in different power system devices
- Converting Waveforms stored in CSV format to COMTRADE format files
- Viewing any COMTRADE format waveform in Time Based, Phasor Value and Harmonic Content formats
- Security that limits access and functionality to many different levels of users

1.2 System Project Size

Viewpoint Monitoring can provide Monitoring, Control and Data Recording for power systems that contain up to 25 electronic devices that can communicate using the standard Modbus TCP/IP and Modbus RTU protocol.

Viewpoint Monitoring can monitor and control a maximum of 3000 points (tags) combined between all of the 25 allowable devices.

1.3 Multiple User Terminals

If there is a requirement for multiple users to view the data in Viewpoint Monitoring from different locations on their network, multiple copies of the application may be installed on different PC terminals.
Each application will then have it's own Server and HMI and will perform all of it's own data collecting.

2 - Communications

2.1 Out-of-the-Box Communications

Connect to all GE Multilin devices using RS-232, RS-485, or Ethernet and start monitoring your devices instantly.

The Mnemonics for the following GE devices are preconfigured for use in the Viewpoint Monitoring applications.

PQM	3.3x, 3.4x, 3.5x, 3.6x
PQMII	1.0x, 2.0x
EPM 1000	3.8x
EPM 4000	3.8x
EPM 5000	3.9x
EPM 5200/5300/5350	2.4x
EPM 9450/9650	2.1x
MicroVersa Trip Unit	5.1x,
Enhanced MicroVersa Trip Unit	4.1x
239 Motor Protection Relay	2.3x, 2.4x, 2.5x, 2.6x
269 Plus Motor Management Relay	6.0x
369 Motor Management Relay	1.6x, 1.7x, 1.8x, 1.9x, 2.0x
RRTD Remote RTD Module	1.4x, 1.5x
SR469 Motor Management Relay	2.5x, 2.6x, 2.8x, 2.9x, 4.0x
SR489 Generator Protection Relay	1.3x, 1.4x, 1.5x
SR735/737 Feeder Protection Relay	1.5x
SR750/760 Feeder Protection Relay	3.6x, 3.7x, 4.0x, 5.0x, 6.0x
SR745 Transformer Protection Relay	2.4x, 2.5x, 2.6x, 2.8x
F650 Bay Controller	1.6x
MM2 Motor Controller	4.0x, 4.1x, 5.0x, 5.1x
MM3 Motor Controller	1.0x, 1.1x, 1.2x
SPM Synchronous Motor Controller	2.0x, 2.1x
UR Family: B30, C30, C60, D30, D60, F35, F60, G30, G60, L60, L90, M60, T35, T60, N60	2.6x, 2.8x, 2.9x, 3.0x, 3.1x, 3.2x, 3.3x, 3.4x, 4.0x, 4.2x, 4.4x, 4.6x
PLEPM	1.0x
MX150	5.4x, 6.0x
MX250	5.4x, 6.0x

*Note that this version of the software does not support Dial-Up Modem connections

2.2 Third Party Devices

The memory maps for other non-GE Multilin devices that use the standard Modbus TCP/IP or Modbus RTU protocol can be added to Viewpoint Monitoring and used in the Single-Line Diagrams, Annunciator Alarms, and the Trending Reports.

The following Modbus data formats for reading memory map locations are supported:

Data Type	Description
Enumeration	Unsigned 16 Bit Integer (must configure enumeration list)
Floating Point	Floating Point (32 bits)
SINT16	Signed 16 Bit Integer
SINT32	Signed 32 Bit Integer (2 registers)
UINT16	Unsigned 16 Bit Integer
UINT32	Unsigned 32 Bit Integer (2 registers)
BIT	Signed 16 Bit Integer (Must define bit location)
HEX2	Hex 2 Bytes - 4 ASCII Digits
COIL_BIT	Read Coil Status
INPUT_BIT	Read Discrete Input Status

The following Modbus data formats for forcing Coils are supported:

Data Type	Description
Force Coil	Function Code 5 – Only writing value of “1” is supported

3 - Monitoring

3.1 Plug-and-Play Monitoring

EnerVista Viewpoint Monitoring instantly puts critical real-time device data on your PC through pre-configured graphical screens. Now you can spend your time managing your GE Multilin devices - not creating monitoring screens.

Pre-configured Screens - Instant monitoring for virtually any GE Multilin device with *no programming required*. All data is displayed in easy to understand gauges, dials, phasor diagrams, bar graphs and LED's to put the information you need at your fingertips.

Device Monitoring Screens include the following data:

- Volts
- Amps
- Frequency
- Watts
- VARs
- VA
- Power Factor (PF)
- Demand
- Motor Temperature
- Thermal Capacity
- Symmetrical Components
- Trip Data

Plug-and-Play monitoring screens available for:

PQM	3.3x, 3.4x, 3.5x, 3.6x
PQMII	1.0x, 2.0x
EPM 5000	3.9x
EPM 5200/5300/5350	2.4x
EPM 9450/9650	2.1x
MicroVersa Trip Unit	5.1x
Enhanced MicroVersa Trip Unit	4.1x
239 Motor Protection Relay	2.3x, 2.4x, 2.5x, 2.6x
269 Plus Motor Management Relay	6.0x
369 Motor Management Relay	1.6x, 1.7x, 1.8x, 1.9x, 2.0x
RRTD Remote RTD Module	1.4x, 1.5x
SR469 Motor Management Relay	2.5x, 2.6x, 2.8x, 2.9x, 4.0x
SR489 Generator Protection Relay	1.3x, 1.4x, 1.5x
SR735/737 Feeder Protection Relay	1.5x

SR750/760 Feeder Protection Relay	3.6x, 3.7x, 4.0x, 5.0x, 6.0x
SR745 Transformer Protection Relay	2.4x, 2.5x, 2.6x, 2.8x
F650 Bay Controller	1.6x
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MX150	5.4x, 6.0x
MX250	5.4x, 6.0x

To view the Plug-and-Play Monitoring Screens available for each product, please refer to the following link.

http://www.geindustrial.com/multilin/enervista/viewpoint/present.htm

3.2 Simple Powerful One-Line Viewer and Editor

View the status of your entire power system and the magnitude of all power levels on one handy screen.
You also have the ability to click on links in your monitoring screens to navigate through more single line monitoring screens that will display more specific information about your network.

Customize your plug-and-play screens or create system diagrams showing analog or digital information from multiple devices on a screen at one time with drag and drop ease. The screen editor contains many preconfigured gauges, dials bar graphs and symbols to make creating system diagrams fast and easy.

3.2.1 Monitoring Capability:

Monitor up to a total of 25 devices
Monitor up to cumulative 3000 points between your 25 devices
Create links to multiple screens to allow viewing of additional information on different parts of your power system.
Create alarms on any metered analog or digital point.
Drop in images or icons to tailor the view of your screens to your application.

3.2.2 Control Capability

Commands may be sent to any device that can accept a Modbus Force Coil command. GE Multilin products accept these commands by changing the state of Virtual Inputs where applicable.

The sending of all commands requires a 2-step process that must be completed before the command is sent to the device to add extra security and eliminate the chance for mistakes.

3.2.3 Alarming Capability

All individual monitored points in your single line diagram can be programmed to give an alarm whenever:

- A digital point changes state (i.e. breaker opens)
- An analog value rises above or drops below a set threshold.

Upon meeting the alarm criteria, these alarmed points will indicate the alarm by:

- Triggering an audio alarm to sound
- Flashing red if the parameter is an analog point
- Turning a red LED ON and OFF if the parameter is a digital point

The alarm can be silenced and the parameter can be made to stop flashing by having the user pressing the Acknowledge button. The monitored point will remain red until the monitored parameter is no longer in the alarmed state.

3.2.4 Formula Editor

Customized Formulas may be created to create specific logic within a device or multiple devices using the Formula Editor. Analog points can be used to create customized mathematical formulas using parameters within a device or between multiple devices. Mathematical operations available include addition, subtraction, multiplication, division, *sin, cos, tan, arcsin, arccos, arctan,* exponents and absolute value.

Similarly, Digital points can be used to create custom formulas within a device or between multiple devices using the following Boolean Logic operands: OR, AND, XOR, NOT.

4 - Annunciator Alarming

4.1 System Alarming

Create an Alarm on the changing of state of any monitored digital point, or when an analog point changes beyond any programmed thresholds from all devices in your system. The announcing of alarms can be performed through visual, audio, or e-mail notification.

4.2 Visual Notification

All monitored points can be displayed on an easy to identify screen that shows the current status of the monitored point. As Alarm states occur, the alarmed point will flash in a color chosen by the user until the Alarm is Acknowledged by the Operator. When analog monitored points are in the alarm state, the Annunciator will show the maximum/minimum value that the monitored point reached.

4.3 Audio Notification

Two levels of Audio notification are available, Alert Status and Alarm Status. Separate audio noticifation sounds can be chosen for each noticification level. The audio notification of Alarms and Alerts will continue until the Alarm state is Acknowledged by the Operator.

4.4 Email Notification

If an email client is installed on the monitoring computer, the alarming of any monitoried point can automatically generate an email to notify users of the alarm. A different email address can be entered for each point that is being monitored by Viewpoint Monitoring to allow for notifying different personel for different system scenarios.

4.5 Resetting Alarms

Clearing of alarms is performed in two stages, Acknowledging of Alarms and Resetting of Alarms. Acknowledging the Alarms will silence the audio notification and stop the Visual notification of that monitored point from flashing and have it remain ON. Resetting of the Alarm can be performed once the monitored point is no longer in the Alarming state. Resetting of the Alarm will turn the Visual Alarm to OFF.

5 - Reports (Trending)

5.1 Data Logging

Log and Trend the value of any monitored analog and digital point for easy recording of long-term data. Once this data is stored on the hard drive of your computer, you then have the ability of viewing the data for any recorded time period you desire.

5.2 Records

You have the ability of creating 10 customized records for logging all of your data. Each record can store up 50 separate points from any supported device in your system giving a total of 500 logged data points in total.

5.3 Charts (Viewing Data)

Viewpoint Monitoring gives you the ability of configuring which data from each record will be viewed in each individual chart. This gives the user the ability of grouping data points that have similar scaling factors.

5.3.1 View Mode

The data recorded in each report can be viewed in both chart and tabular format.

5.3.2 View Date

Viewpoint Monitoring gives you the ability of viewing the data in one of many preconfigured date ranges (Current Hour, Current Day, Last 7 Days, Last Year, etc.) or by customizing the date and time range of the data to be displayed.

5.4 Resolution

Viewpoint Monitoring samples all configured data points in all records once every 10 seconds. After 1 minute, Viewpoint Monitoring will take these six samples and calculate the 1-minute average and store this average in the database. This sampling rate is not programmable.

5.5 File Size

The size of the file created by Viewpoint Monitoring for recording data is dependant on the number of data points logged. If the maximum number of records are used (10) with each containing the maximum number data points (50), for a total of 500 points, Viewpoint Monitoring will take up 1.5 Giga-Bytes of hard drive space per year. If fewer points are configured, the amount of space used up will decrease proportionally. (i.e. 50 Points = 150 Mega-Bytes/year)

5.6 Format

The data collected in each record is stored in Viewpoint Monitoring's own format that has the extension **.rep**. This file is not compatible to be opened with other database programs.

5.7 Exporting Data

Data stored in Viewpoint Monitoring's .rep format can be exported into an Excel format file (.csv) for easy data manipulation and analysis.

5.8 Archiving Data

Viewpoint Monitoring gives the tools to manually archive recorded data for storage onto network drives and to minimize the amount of data stored on the local computer.

5.8 Printing

Viewpoint Monitoring allows for printing of all data that is logged in the trending reports.
A print button is provided on the Chart viewing screen to facilitate this function.
The printed chart will only display the recorded data that is selected to shown for the Chart that is currently open.
The Chart can be printed in both graphical and tabular formats.

6 - Automatic Event/Waveform Archiving

6.1 Event Logging

The Event Records from all GE Multilin Devices can be automatically downloaded from each device and stored in a system wide Sequence of Event Record.

Viewpoint Monitoring will continually poll each GE Multilin Device to see if any new Events have been added to that device's Event Record. (This polling is given the lowest priority for all communications going through the communication server.) Once a new Event has been detected, the Event Record will be downloaded and the new Events will be stored in the system wide Sequence of Events Record.

6.2 Event Viewing

The Event Viewer stores and displays information about all of the events recorded in your system.

Each event in the record has the following information stored about it:

Event Time:	Time that the event occurred
Event Type:	If the new event was recorded due to the operation of an element or feature within the relay, it will be given the classification Event. If the new event was recorded due to a possible problem with any of the devices in the system such as the detection of a faulty connection, it will be given the classification ALARM.
Source Name:	Indicates the name of the device that the event originated in
Source Type:	Indicates the type of device that the event originated in i.e. F60
Event:	Indicates the cause of the Event

You also have the ability of sorting this data by any of the fields indicated above.

6.3 Waveform Archiving

The Waveform (Oscillography) Files from all GE Multilin Devices can be automatically downloaded from each device and stored onto your hard drive.

Viewpoint Monitoring will continually poll each GE Multilin Device to see if any new Waveform Files have been created. (This polling is given the lowest priority for all communications going through the communication server.) Once a new Waveform has been detected, the file will be downloaded and stored onto your PC.

7 - Security

7.1 Access

Viewpoint Monitoring can be configured to require users to login with a username and password before getting access to the program.

7.2 Security Levels

Multiple Security levels are available to provide multiple users with different access to the various functions of Viewpoint Monitoring. Users with Administrator access have the ability to limit the access to the Viewpoint Monitoring functions that each individual user has.

There are 3 default level of Security that allow for different access for the various users. Additional access levels can be added by individuals that have Administrator Access.

A default user-name called **Guest** allows anyone to log into Viewpoint Monitoring without having the ability to modify any screens or Acknowledge any Alarms.

8 - Viewpoint History Report

8.1 Event Log

Viewpoint Monitoring automatically creates a report containing all events that occurred in the Viewpoint Monitoring System. Only those logged in with Administrator Access are allowed to View or to Clear the Event Report. All Events are time-stamped and record who was logged into the system at the time that the event occurred.

The following type of Events are recorded in the Event Log:

- Viewpoint Monitoring session started
- Viewpoint Monitoring session ended
- New User logging in
- Annunciator Alarm Active
- Annunciator Alarm Acknowledged
- Annunciator Alarm Cleared
- Annunciator Alarm Reset

9 - System Requirements

Minimum Computer Requirements:

- Pentium III - 750 MHz Processor
- 256 Mb RAM
- Microsoft Windows NT (Service Pack 6a), Windows 2000, Windows XP
- Video capable of displaying 16-bit, 800x600 resolution
- 5 Gigabytes of available space required on system drive, 750 Mb of available space required on installation drive

Recommended Computer Requirements:

- Pentium IV – 2.0GHz Processor
- 512 Mb RAM
- Microsoft Windows NT (Service Pack 6a), Windows 2000, Windows XP
- Video capable of displaying 16-bit, 1280x1024 resolution
- 20 Gigabit Hard drive space on the system drive, 750 Mb of available space required on installation drive