



GE Multilin

**EnerVista Integrator
Version 6.16 Specification**

September 12, 2007

1 - Product Overview

1.1 EnerVista Integrator Scope

EnerVista™ Integrator enables you to seamlessly integrate data from your GE or third party Modbus compliant device into a new or existing monitoring or automation system. With EnerVista™ Integrator, you receive pre-configured memory maps and mnemonics for all GE Multilin devices, reducing the time and effort required to import essential data into your applications

This system is ideal for installations that require:

- 24x7 Monitoring, Control and Data Recording of the power system including user access security
- On-Demand Viewing and Controlling of the status of devices in their small system
- Automatic power system event and waveform retrieval and local storage

The server connects and manages multiple devices using one or more communication channels. Each read and write command to the devices is optimized for maximize throughput. This approach allows multiple clients to connect and effectively use the resources of the server

EnerVista Integrator provides the following functionality:

- Retrieving data from any Modbus compatible device (Current, Volts, Energy, Demand, etc.)
- Sending real time commands to any device in your system (Open/Close breaker)
- Automatically download all events and waveforms from any GE Multilin device
- Ability to communicate with up to 400 devices simultaneously
- Capability of adding customized memory maps of other Modbus compliant devices

ENERVISTA™ INTEGRATOR CAN BRIDGE DEVICE DATA INTO THE FOLLOWING APPLICATIONS:

HMI/SCADA

Cimplicity
WonderWare
PanelMate - Cutler
Hammer
RSView – Rockwell etc.

DCS System

PlantScape
DeltaV
Symphony

Database Historians Reporting Software

Aspen
MS Office Tools
PI Historian

1.2 System Project Size

EnerVista Integrator can be ordered with one of three options for project size, supporting projects from 1000 to 30,000 data points.

EVI1000	1000 Data Points
EVI5000	5000 Data Points
EVI30000	30,000 Data Points

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 its own Server and HMI and will perform all of its own data collection.

1.3 OLE for Process Control (OPC) Communications

Viewpoint Monitoring may be optionally ordered with OPC server functionality. This allows points monitored in Viewpoint Monitoring to be accessible to separate third-party OPC clients such as process control systems and data historians. The OPC option allows for communication of up to 3000 OPC tags (Base package) or up to 9000 OPC tags (Extended package).

2 – Device Support

2.1 Out-of-the-Box Communications

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

The following devices are preconfigured for use in the Viewpoint Monitoring Single-Line Diagrams, Annunciator Alarms and Trending Reports. Additional functionality within Viewpoint Monitoring is supported as shown below.

Device	Supported Versions	Plug & Play Screens	Automated Waveform Download	Automated Events Download
PQM	3.3x, 3.4x, 3.5x, 3.6x	X	X	X
PQMII	1.0x, 2.0x, 2.1x, 2.2x	X	X	X
EPM 1000	3.8x			
EPM 2000	1.0x	X		
EPM 4000	3.8x			
EPM 5000	3.9x	X		
EPM 5200/5300/5350	2.4x	X		
EPM 6000	1.0x	X		
EPM 9450	2.1x	X	X	X
EPM 9650	6.1x	X	X	X
PLEPM	1.0x	X		X
239	2.3x, 2.4x, 2.5x, 2.6x, 2.7x	X	X	X
269 Plus	6.0x	X	X	X
369	1.6x, 1.7x, 1.8x, 1.9x, 2.0x, 2.1x, 2.2x, 2.3x, 2.4x, 2.5x, 3.1x	X	X	X
RRTD	1.4x, 1.5x	X		
SR469	2.5x, 2.6x, 2.8x, 2.9x, 4.0x, 5.0x	X	X	X
SR489	1.3x, 1.4x, 1.5x, 3.0x, 4.0x	X	X	X
SR735/737	1.5x	X	X	X
SR750/760	3.6x, 3.7x, 4.0x, 5.0x, 6.0x, 7.0x	X	X	X
SR745	2.4x, 2.5x, 2.6x, 2.8x, 4.0x, 5.0x	X	X	X
F650	1.6x, 1.7x, 1.8x, 2.0x, 2.2x, 3.0x, 3.2x, 3.4x, 3.6x, 3.7x	X	X	X
FM2	1.0x, 1.1x			
MM2	4.0x, 4.1x, 5.0x, 5.1x	X	X	X
MM3	1.0x, 1.1x, 1.2x	X	X	X
MIFII	4.0x	X	X	X
SPM	2.0x, 2.1x	X		
UR Family*	2.6x, 2.8x, 2.9x, 3.0x, 3.1x, 3.2x, 3.3x, 3.4x, 4.0x, 4.2x, 4.4x, 4.6x, 4.8x, 5.0x, 5.2x, 5.4x	X	X	X
MM300	1.0x			X
ML2400	1.0x	X		
MX150	5.4x, 6.0x	X		
MX250	5.4x, 6.0x	X		
MicroVersa Trip Unit	5.1x	X		X
Enhanced MicroVersa Trip Unit	4.1x	X		
SG-Series UPS	1.0x	X		X
Lan Pro UPS	1.0x	X		X
FireTracer	1.0x	X		X
VersaMax PLC	1.0x	X		
MPRO 40	1.0x	X		

*B30, C30, C60, C70, D30, D60, F35, F60, G30, G60, L60, L90, M60, N60, T35, T60

2.2 Third Party Devices

The memory maps for other non-GE Multilin devices that use the standard Modbus/TCP or Modbus RTU protocols 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

2.3 Modbus Time Synchronization

Viewpoint Monitoring supports the ability to time-synchronize IED clocks within the system to the computer clock for installations that do not have any other synchronization means. Depending on system architecture (number of devices, network topology, communication media), time synchronization on the order of approximately 1 second may be achieved. This may be adequate for certain applications, however if greater synchronism and timing accuracy is required, a dedicated time synchronizing system should be used (i.e. IRIG-B).

3 - Monitoring

3.1 Plug-and-Play Monitoring

EnerVista Viewpoint Monitoring makes critical device data available through pre-configured graphical screens, allowing you to spend more time managing systems - not creating monitoring screens.

Pre-configured Screens - Instant monitoring for GE Multilin devices 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 may include the following data:

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

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/monitoring.htm>

3.2 Simple Powerful One-Line Viewer and Editor

View the power system status and the magnitude of all power levels on a single screen. Embedding links into the one line diagram allows you to quickly navigate between different one line diagrams, alarms, and plug and play screens with ease.

Customize plug-and-play screens or create system diagrams showing analog and digital information from multiple devices on a single screen 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 50 devices with up to 3000 concurrent points with the Viewpoint Monitoring Base package. Use the Viewpoint Monitoring Extended package to monitor up to 150 devices with 9000 concurrent points.
- Create links to multiple screens to allow viewing of additional information on different parts of the power system or launch external applications.
- Create alarms on any metered analog or digital point.
- Insert images or icons to tailor the screens to your the specific 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 commands can be configured to require a 2-step process that must be completed before the command is sent to the device for extra security and eliminate the opportunity 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. Active alarms can be configured to provide visual, audio, and 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 events 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 notification sounds can be chosen for each notification 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 monitored point can automatically generate an email to notify users of the alarm. Up to five email address can be entered for each point that is being monitored by Viewpoint Monitoring, allowing different personnel to be notified of different system events.

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 or digital point for easy recording of long-term data. When stored to your computer, archived data for any specific period of time can be viewed.

5.2 Records

Up to 10 customized records for logging of data can be created. Each record can store up to 50 separate points from supported devices in the system, giving a total of 500 logged data points in total.

5.3 Charts (Viewing Data)

Multiple charts can be created, allowing users to specify which data points are displayed in each chart. This enables users to group 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 allows for viewing the data in one of several 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 GB 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 MB/year)

5.6 Format

The data collected in each record is stored in Viewpoint Monitoring's own format with the file extension `.rep`. This file is not compatible 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 on network drives, minimizing 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 Chart can be printed in both graphical and tabular formats.

6 - Automatic Event/Waveform Archiving

6.1 Event Logging

The Event Records from supported 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 supported 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. If a new event is 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 the events recorded in the 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 (e.g. F60, SR469, etc.)
Event:	Indicates the cause of the Event

Data can be sorted by any of the fields indicated above.

6.3 Waveform Archiving

The Waveform (Oscillography) files from supported GE Multilin Devices can be automatically downloaded from each device and stored onto the local hard drive.

Viewpoint Monitoring will continually poll each supported 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. If a new Waveform file has been detected, the file will be downloaded and stored on the local hard drive.

6.4 Viewpoint Monitoring 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

7 - Security

7.1 Login Security

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

7.2 Role-Based Access Control

Multiple security levels are available to provide multiple user groups with different access to the various functions of Viewpoint Monitoring.

Guest

A default Guest account exists to allow users to log into Viewpoint Monitoring and view single line diagrams, Plug and Play screens, event records, trending reports and alarm annunciations. The Guest account does not allow changing Viewpoint Monitoring configuration, executing controls or editing single line diagrams.

Operators

The members of the Operators user group can be configured to do any of the following:

- Execute control of power system equipment, like circuit breakers
- Edit single line diagrams
- Edit alarm annunciator pages
- Configure trending reports

Administrators

The Administrator account allows for full control of all functions and settings within Viewpoint Monitoring. The Administrator account is used to assign individual permissions to the Operators user group and individual Operator user accounts.

8 - System Requirements

Minimum Computer Requirements:

- Pentium III - 750 MHz Processor
- 256 Mb RAM
- Microsoft Windows 2000, Windows XP, Windows Vista
- 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 2000, Windows XP, Windows Vista
- 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