**

EnerVistaTM Viewpoint Monitoring v8.15



**Guideform Specifications**June 2025

# 1 - Product Overview

##  Software Scope

1. The software shall be GE Vernova EnerVista Viewpoint Monitoring
2. The software is an easy to setup application that enables data retrieval and centralized data collection; visualization and monitoring data from GE Vernova Multilin via preconfigured and Modbus memory maps and Modbus TCP/IP and/or Modbus RTU communications protocol.
3. The software will have the capability data retrieval/visualization (of values (not event, waveforms, files) by manually adding customized Modbus memory maps of other non-GE Vernova Multilin Modbus devices.
4. With minimal configuration required to communicate with field devices directly, the software can be configured to provide an overall view of the in scope power system collecting critical values and historical disturbance data to assist with analyzing past or impending power system events.
5. The software is a stand-alone software package that can be installed on a single workstation that has both the communications server and the HMI built into the application.
6. The software will provide the following functionality:
* Pre-configured device monitoring screens for GEV Multilin Devices (Plug-and-Play) as specified in Appendix A
* Single-Line Monitoring screen of configured power system devices
* Control of power system devices (Open/Close Breaker)
* Annunciator Alarming (visual/email) on monitored Analog or Digital points
* Trending of device parameters with 1 minute resolution
* Automatic download of events from GE Vernova Multilin Devices
* Visualization for a system wide Sequence of Events Record with functionality to sort/search events
* Automatic download and visualization of waveforms from GE Vernova Multilin Devices
* Conversion of waveforms stored in Comma Separated Values (.CSV) format to COMTRADE format files
* Viewing of COMTRADE format waveform files in Time Based, Phasor Value and Harmonic Content formats
* Configurable security functionality that limits access and functionality to various user levels

## 1.2 System Project Size

1. The software can provide communications for Monitoring, Control and data retrieval for power systems that contain up to 1000 Devices that communicate using the standard Modbus TCP/IP and Modbus RTU protocol.
2. The software can handle communications with up to 1000 Devices/20000 Points or 500 Devices/65000 respectively.
3. The software can be ordered with four options for project size, supporting projects as follows:

• 100 Devices / 5,000 Points

• 300 Devices / 30,000 Points

• 500 Devices / 65,000 Points

• 1000 Devices / 20,000 Points

## 1.3 Multiple User Terminals

1. The software supports multiple installations from different network locations.
2. Separate installations of the software that link to common or different devices for communications are supported.
3. Each software installation will have its respective communication, event and waveform server performing data collection.
4. The software shall support multiple users via the following methods:

**Separate Individual Installations**

The software shall support individual installation instances on Supported Operating Systems listed in Section 10 – System Requirements that have their respective communication server performing respective data collection and visualization HMI.

**Microsoft Windows Server 2022/2019**

The software shall support an installation on Microsoft Windows Server 2022/2019 that supports up to four remote access clients that can view data using Remote Terminal Services.

**EnerVista Viewpoint Monitoring ViewNodes**

The software shall support a client (EnerVista Viewpoint Monitoring ViewNodes) that will connect to an EnerVista Viewpoint Monitoring installation to remotely access Enervista Viewpoint Monitoring. EnerVista ViewNodes provides the following functionality:

* Connect remotely to an Enervista Viewpoint Monitoring installation over a network
* Implement security access levels through user accounts with configurable permissions
* Provide access to:
	+ Plug-and-Play screens
	+ One Line diagrams
	+ Annunciator Panels / Trending Reports
	+ Events
	+ Waveforms
* Support connectivity of up to 10 ViewNodes to a single Enervista Viewpoint Monitoring installation

# 2 - Communications

## 2.1 Preconfigured Communications for GE Vernova Multilin Devices

1. The software shall connect to devices using Modbus Serial (RS-232, RS-485) and/or Modbus Ethernet.
2. The software supports communications using the standard Modbus TCP/IP and Modbus RTU protocol and specific GE Vernova device firmware versions are preconfigured for installation.
A list of devices that are preconfigured and their firmware versions is provided in Appendix A – Supported Devices.
3. The software shall allow the addition of user specified Modbus memory maps of third-party, non-GE devices and connect using Modbus Serial (RS-232, RS-485) and/or Ethernet.

## 2.2 Third Party Devices

1. The software will support the addition of memory maps for other non-GE Vernova Multilin devices that use the Modbus TCP/IP or Modbus RTU protocol. The addition of the memory maps will allow retrieval of Modbus device values only.
2. The software shall support the following Modbus data formats for reading memory map locations:

|  |  |
| --- | --- |
| 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

##  Monitoring Capability

1. The software will support:
	* Monitoring of up to 1000 devices (20000 data points) or 500 devices (65000 data points).
	* Links to multiple screens to allow viewing of additional information on different parts of your power system
	* Creation of alarms on a metered analog or digital points
	* Upload of images/icons to customize one-line screens

## 3.2 Control Capability

* + - 1. The software shall support commands sent to a device that can accept a Modbus Force Coil command. GE Vernova Multilin products accept these commands by changing the state of Virtual Inputs where applicable.
			2. The software shall support the sending of commands with a required 2-step process that must be completed before the command is sent to the device to add extra security and reduce the chance for mistakes

## 3.3 Plug-and-Play Monitoring

1. The software shall provide pre-configured device and system monitoring Plug and Play Device screens for analyzing the health and status of GE Vernova Multilin power system devices. An overview of the various devices shall be shown on the IED Dashboard.
2. Auto-Discovery of UR Devices

The software shall reduce integration time and decreases errors when configuring devices by automatically detecting and configuring UR devices.

It will detect the devices via communications and automatically generate pre-configured monitoring screens specific to devices as well as wiring configurations.



1. Pre-configured Device Screens – The software provides pre-configured device screens for GE Vernova Multilin devices that display monitoring data without the need for additional programming.

The data displayed on the screens includes graphical components such as gauges, dials, phasor diagrams, bar graphs and device front plate simulations for easy understanding.

Pre-configured 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

## 3.4 One-Line Viewer and Editor

The software provides a perspective on the status of the entire power system and the magnitude of power levels on a configurable One-Line Viewer screen.
The One-Line Screen supports navigational links to navigate through more one-line and device monitoring screens that will display more detailed specific information.

The software shall allow device plug-and-play screens and one-line ****screens to be customizable to show analog or digital information from multiple devices on a screen at one time in a drag and drop interface in the one-line editor.

The software one-line editor supports importation of templates contains many preconfigured gauges, dials bar graphs and symbols to support fast and easy configuration of plug and play device and one-line system screens.

## 3.5 Formula Editor

1. The software supports the creation of customized formulas for 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.
2. Similarly the software supports creation of custom formulas for digital points within a device or between multiple devices using the following Boolean Logic operands: OR, AND, XOR, NOT.

**4 - Annunciator Alarming**

## 4.1 Alarming Capability

1. The software supports Annunciator Alarming to actively monitor configured measured values and generates alarms.

Alarms can be configured to be activated whenever:

* a digital status changes state,
* an analog value changes beyond a programmed threshold

2. The software will provide alarms through multiple through visual, audio, or e-mail notification channels. Furthermore, the Monitoring and Alarm Sentry ensures annunciators and alarms are always active.

## 4.2 Visual Notification

1. The software supports the visualization (notification) of monitored points 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

1. The software provides the capability of an audio notification with two levels of notification - Alert Status and Alarm Status. Separate audio notifcation 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

1. The software supports generation of an email when an email client is installed on the monitoring workstation.
2. The alarm of a monitored point can generate an email notification.
3. The software supports different email addresses for alarms monitored by Viewpoint Monitoring allowing notification to different personel for different system scenarios.

## 4.5 Resetting Alarms

1. The software supports clearing of alarms in two stages:
2. Acknowledging 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.

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

1. Resetting of Alarms

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

1. The software provides the ability to log and trend the value of a monitored analog and/or digital point for easy recording of long-term data.

2. Once this data is retrieved and stored on the software workstation data repository, the software provides the ability to view the data for a specific recorded time period.

## 5.2 Records

1. The software shall support the capability of creating 100 customized records for data logging.

2. Each record can store up 50 separate points from a monitored device in your system giving a total of 5000 logged data points in total.

## 5.3 Charts (Viewing Data)

1. The software provides to capability to configure charts and specify which data from each record will be viewed in each individual chart. This gives the user the ability to group data points that have similar scaling factors.

### View Mode

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

### View Date

3. The software gives you the ability to view 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

1. The software shall sample configured data points for records once every 10 seconds. After 1 minute, the software will take these 6 samples and calculate the 1-minute average and store this average in the database. The sampling rate is fixed and not configurable.

## 5.5 Database Size

1. The software shall have a database size created by Viewpoint Monitoring for recording data is dependent on the number of data points logged.

As an example, if the maximum number of records is used (100) with each containing the maximum number data points (50), for a total of 5000 points, Viewpoint Monitoring will take up to 15 GB/year of repository space.

If fewer points are configured, the amount of space used up will decrease proportionally. (i.e. 50 Points = 150MB/year)

## 5.6 Exporting Data

1. The software shall store data in (.rep) format which can be exported into a Comma Separated Values (Excel compatible) format file (.CSV) for easy data manipulation and analysis.

## 5.7 Archiving Data

1. The software provides the capability to manually archive recorded data for storage onto network drives and to minimize the amount of data stored on the installation workstation.

## 5.8 Printing

1. The software allows for printing of data that is logged in the trending reports.

2. The software will provide 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 be shown for the chart that is currently open. The chart can be printed in both graphical and tabular formats.

6 – Consumption Reports

## 6.1 Data Logging

1. The software will log the value of a monitored analog point, representing energy or power for easy recording of long-term data. Once this data is stored on the software workstation data repository, the software provides the ability to export the data for a specific recorded time period.

## 6.2 Records

1. The software will limit the number of monitored points based on the license limits

## 6.3 Resolution

1. The software samples data for consumption reports in 15 min intervals.

The sampling rate is fixed and not configurable.

## 6.4 Exporting Data

1. The software will store data in the database format and can be exported into a Comma Separated Values (Excel compatible) format file (.CSV) for easy data analysis.

7 - Automatic Event/Waveform Archiving

## 7.1 Automatic Event Retrieval



1. The software shall automatically download the Event Records from supporting GEV Multilin Devices through an Event Server and store it in a centralized, system-wide Sequence of Event Record.
2. The software will continually poll each GEV Multilin Device to see if a new Event has been added to that device’s Event Record. Event and Waveform polling is given the lowest priority for all communications going through the communication server.
3. Once a new Event has been detected, the Event Record will be downloaded by the software and stored in the centralized, system-wide Sequence of Events Record database on the installation workstation.

The following information is captured for each event:

|  |  |
| --- | --- |
| **Event Information** | **Description** |
| **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** | Name of the device that recorded the event |
| **Source Type** | Type of device that recorded the event (e.g. F60, 369) |
| **Event Cause** | Indicates the cause of the event |

## 7.2 Event Viewing

1. The Event Viewer retrieves, stores and displays information about the events recorded from GEV Multilin devices in the system.
2. The event data can be sorted in the event viewer by any of the fields indicated above.

## 7.3 Waveform Archiving

1. The software shall automatically download the waveform (Oscillography) Files from GEV Multilin Devices and store on the installation workstation repository.
2. The software will continually poll each GEV Multilin Device to see if any new Waveform Files have been created. (Event and Waveform 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 on the installation workstation repository.

## 7.4 Waveform Viewing

1. The software shall provide visualization of waveform fault data from devices in a Time-based, Phasor Quality or Tabular view.
2. The software shall have the ability to convert Comma Separated Value (.csv) file formats into COMTRADE compatible files.
3. The software shall be able to merge and overlay waveforms downloaded from multiple devices.
4. The software shall be able to identify harmonic content in monitored parameters.

## 8 - Security

## 8.1 Access

1. The software provides optional configuration to require users to login with a username and password for access.

## 8.2 Security Levels

1. The software provides multiple security levels for multiple users to specify different access to the various functions. Users with Administrator access have the ability to limit the access to the software functions that each individual user has.

2. The software shall support 3 default levels of Security that allow for different access for the various users:

Administrator – Highest level and provides additional access levels by individuals that have Administrator Access.

Guest – Provides access to the software to view data without having the ability to modify screens or Acknowledge Alarms.

Operators - in addition to view capabilities, an operator may be granted rights for editing One-Line Diagrams, Annunciators and Reports or issuing Commands.

# 9 - History Report

## 9.1 Event Log

1. The software automatically creates a report containing application events. All application events are time-stamped and record who was logged into the system at the time that the event occurred.

The following application event types 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

2. The software will only allow Administrator access to view or to clear the application event report.

# 10 – System Requirements

1. The software shall have the following system requirements:

|  |  |
| --- | --- |
| COMPONENT | REQUIREMENT |
| Supported Operating Systems | • Windows® 10 – 64 bit• Windows® 11 – 64 bit• Windows® Server 2022• Windows® Server 2019 |
| Supported Databases | • SQL Server Express 2022• SQL Server 2022• SQL Server Express 2019• SQL Server 2019 |
| Computer and Processor | Recommended workstation• Intel® Core™ i3 CPU or higher• Speakers (to support audible alarms) |
| Memory | 4 GB of RAM (minimum) |

# 11 – Supported Devices

The software shall support the following devices and their respective firmware versions

| Device Family | Device | Firmware |
| --- | --- | --- |
| ATS | MX150 | 5.4x, 6.0x |
| MX250 | 5.4x, 6.0x |
| MX350 | Up to 1.20 |
| UPS | UPS, UPS LP, UPS SG | 1.0 |
| Trip Units/Switchgear | Spectra MicroVersa Trip 5.1x | 5.1x |
| Enhanced MicroVersa Trip C 4.2x | 4.2x |
| Enhanced MicroVersa Trip D 4.2x | 4.2x |
| GTU (EntelliGuard TU Trip Unit) | 7.0x |
| ELVS (Entellisys) | 5.0x |
| MET | 12.02.02 |
| Meters/Switches | PQM  | 3.3x to 3.6x |
| PQMII  | 1.0x to 2.2x |
| EPM 1000  |
| EPM 2000 |
| EPM 2200  |
| EPM 4000  |
| EPM 4600S  |
| EPM 4600T  |
| EPM 5000P  |
| EPM 5300P  |
| EPM 5350P  |
| EPM 6000  |
| EPM 6000T  |
| EPM 6010  |
| EPM 6100  |
| EPM 7000  |
| EPM 7000T  |
| EPM 7000P |
| EPM 7000PT |
| EPM 7100  |
| EPM 9450Q  |
| EPM 9650Q  |
| EPM 9700  |
| EPM 9800 |
| EPM 9900 |
| EPM 9900P |
| ML2400  | 3.0x |
| Distribution Feeder | 3 Series 350  | 1.2x to 2.5x |
| DGCM Field RTU  | 4.0x |
| F35  | 2.6x to v8.6 |
| F60  | 2.6x to v8.6 |
| F650  | 1.6x to 7.7x |
| MIF 2  | 2.40 |
| 735/737  | 1.5x |
| 750/760  | 3.6x to 7.4x |
| G30  | 4.4x to v8.6 |
| G60  | 2.6x to v8.6 |
| 8 Series 850  | 1.1x to 4.2x  |
| Multilin Agile | 08 |
| Generator | 489 | 1.3x to 4.03x |
| 8 Series 889  | 1.1x to 4.2x  |
| D30  | 3.0x to v8.6 |
| D60  | 2.6x to v8.6 |
| D90Plus  | 1.8x |
| Line Current Differential Protection | L30  | 5.6x to v8.6 |
| L60  | 2.6x to v8.6 |
| L90  | 2.6x to v8.6 |
| Transformer | 745  | 2.4x to 5.2x |
| T35  | 2.6x to v8.6 |
| T60  | 2.6x to v8.6 |
| 3 Series 345  | 1.3x to 2.5x |
| 8 Series 845  | 1.4x to 4.2x |
| Motor | 239  | 2.3x to 2.7x |
| 269+  | 6.0x |
| 3 Series 339  | 1.3x to 2.5x |
| 369  | 1.6x to 3.6x |
| 469  | 2.5x to 5.2x |
| 8 Series 869  | 1.3x to 4.2x |
| MM200  | 1.0x to 1.2x |
| MM300  | 1.2x to 1.70 |
| MM300E | 2.20 |
| 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 v8.6 |
| Network | N60  | 3.4x to v8.6 |
| Bus | B30  | 2.6x to v8.6 |
| B90  | 4.8x to v8.6 |
| Specialized | C30  | 2.6x to v8.6 |
| C60  | 2.6x to v8.6 |
| C90Plus  | 1.6x to 1.8x |
| U90Plus  | 1.1 |
| Miscellaneous | MRPO  | 1.0 |
| FIRETRACER  | 1.0 |
| VERSAMAX  | 1.0 |