# Multilin™ UR & UR Plus

## Proven, State-of-the-Art Protection & Control Systems

## KEY BENEFITS

- Modular construction: common hardware, reduced stock of spare parts, plug & play modules for maintenance cost savings and simplification
- Proven flexibility and customization capabilities make UR/UR Plus devices suitable to retrofit almost any kind of legacy P&C scheme
- Large HMI and annunciator panels provide local monitoring & control capabilities, and backup the substation HMI
- Phasor Measurement Unit (synchrophasor) according to IIEEE® C37.118 (2011) and IEC® 61850-90-5 directly streamed from your protective device
- Three ethernet ports enable purpose specific LAN support that eliminates latency effect of heavy traffic protocols on mission critical communication services
- Embedded IEEE 1588 time synchronization protocol support eliminates dedicated IRIG-B wiring requirements for P&C devices
- Complete IEC 61850 Process Bus solution provides resource optimization and minimizes total P&C life cycle costs
- Increase network availability by reducing failover time to zero through IEC 62439-3 "PRP" support
- CyberSentry™ provides high-end cyber security aligned to industry standards and services (NERC® CIP, based, AAA, Radius, RBAC, Syslog)
- Enhanced CT/VT module diagnostics verify analog signal integrity using an advanced algorithm, ensuring reliability
- Reduces system event analysis effort with the support of embedded high-end and extended recording functionality

## APPLICATIONS

- Protection, control, monitoring and supervision of power assets across generation, transmission, distribution, substation and industrial systems
- Utility substation and industrial plant automation
- Digital fault recording and Sequence of Event (SOE) recording
- Predictive maintenance through data analysis and trending
- Synchrophasor based monitoring and control systems with specialized PMU devices that support multiple feeders
- Complex protection & control and wide area monitoring solutions with complete diagnostic and automation capabilities (UR Plus)

## FEATURES

### Protection and Control

- Fast and segregated line current differential and distance protection functionality in a single device
- Phase segregated line current differential with adaptive restraint and ground differential, stub bus protection
- Phase distance (five zones) with independent settings for compensation
- Single-pole tripping, breaker-and-half with independent current source support
- Complete generator protection with 100% stator ground fault detection with sub-harmonic injection and field ground protection

### Communications

- Networking interfaces: 10 or 100MB copper or fiber optic Ethernet, RS485, RS232, RS422, G.703, C37.94, up to three independent ethernet ports
- Multiple protocols: IEC 61850, DNP 3.0 and Modbus® serial/TCP, IEEE 1588, IEC 60870-5-104 and 103, PRP, SNTP, HTTP, TFTP, EGD
- Direct I/O: secure, high-speed exchange of data between URs for direct transfer trip and I/O extension applications

### IEC 61850 Process Bus Interface

- Robust communications with up to 8 HardFiber Bricks
- Redundant architecture for dependability and security

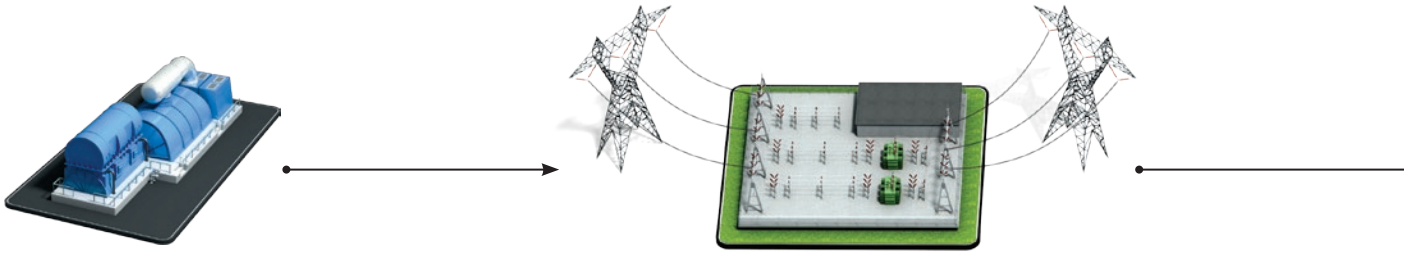
### Monitoring and Metering

- Synchrophasors in select products with IEEE C37.118 (2011) and IEC 61850-90-5 support
- Advanced recording capabilities deliver a 1024 event recorder, configurable and extended waveform capture and data logger
- Fault locator and user-programmable fault reports
- Breaker condition monitoring including breaker arcing current (I2t), breaker re-strike and breaker flashover
- Metering: current, voltage, power, power factor, frequency, voltage & current harmonics, energy, demand, phasors, etc.

### EnerVista™ Software

- Graphical Logic Designer and Logic Monitor to simplify configuration and testing procedures via EnerVista UR Engineer
- Service and update notification toolset ensures device documents and software are up-to-date via EnerVista Launchpad
- EnerVista Integrator providing easy integration of data in the UR Family into new or existing monitoring and control systems

# UR & UR$^{Plus}$ Market Offerings



## Generation

### G60
**Medium to Large Generators**

The G60 provides comprehensive primary and backup protection for medium and large generators, including large steam and combustion turbines, combined-cycle generators and multi-circuit hydro units. The G60 includes advanced automation and communication capabilities, extensive I/O options, and powerful fault recording features that simplify postmortem analysis and minimize generator downtime.

### G30
**Combined Generator & Transformer Protection**

The G30 is a flexible system that can be used on small and medium generators, generator and step-up transformer arrangements or backup protection of large generators. Similar to the G60, the G30 also offers comprehensive protection and monitoring elements.

## Transmission & Distribution

### D90$^{Plus}$
**Sub-Cycle Distance Protection**

The D90$^{Plus}$ is ideally suited for application on transmission lines where fast fault detection and small breaker failure margin are required. The D90$^{Plus}$ allows transmission limits to be maintained or even increased while respecting the transient stability limits of the power system.

### D60
**Fully Featured Distance Protection**

The D60 is the ideal solution for providing reliable and secure primary and backup protection of transmission lines supporting: series compensation, teleprotection schemes, five mho or quad distance zones, single or three-pole tripping, breaker-and-half with independent current inputs, phasor measurement units (PMUs), and more.

### D30
**Backup Distance Protection**

The D30 is the cost-effective choice for the primary protection of sub-transmission systems or backup protection of transmission systems. Using FlexLogic™ elements, basic pilot schemes can be programmed. The D30 has complementary protection, control, communication, monitoring and metering functions that meet the toughest requirements of the market.

### L90
**Complete Line Protection**

The L90 is a fast and powerful high-end phase-segregated line current differential and complete distance protection system, suitable for MV cables, two or three terminal transmission lines having breaker-and-half and single or three-pole tripping schemes.

### L60
**Line Phase Comparison Protection**

The L60 is an extremely fast line phase comparison system, suitable for two or three terminal transmission lines. This system is able to operate using power line carrier or fiber optic communications.

### L30
**Sub-Transmission Line Current Differential Protection**

The L30 is a cost-effective phase-segregated line current differential system intended to provide primary protection for MV cables and two/three-terminal sub-transmission lines or backup protection to transmission lines.

### B90
**Low Impedance Busbar Protection**

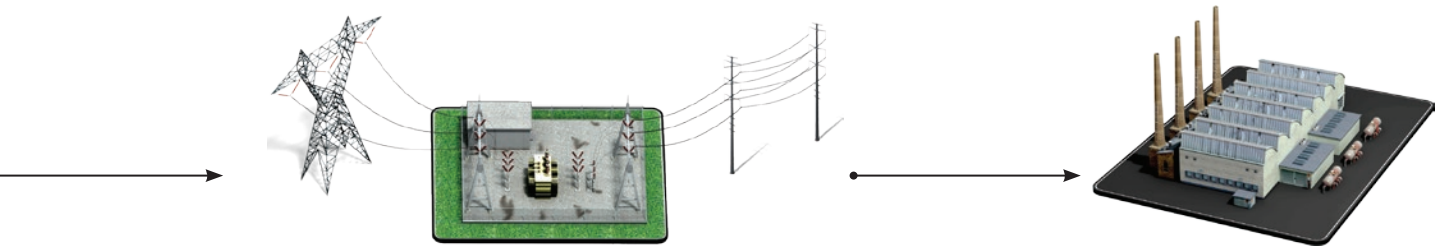
The B90 is an advanced low-impedance differential protection system that is intended to cover applications ranging from small to large substations, having either single or complex-split busbar schemes. It is able to support busbars with up to 24 breakers, and 4 single phase differential zones.

### B30
**Low Impedance Busbar Protection**

The B30 is a cost-effective, advanced protection system that fits busbars with up to 6 circuits and two protection zones. The B30 provides advanced elements like CT trouble, directional and CT saturation, breaker failure and voltage supervision that make the B30 an extremely fast and secure busbar protection system.

### B95$^{Plus}$
**Distributed Busbar Protection System**

The B95$^{Plus}$ is GE's distributed busbar solution that can be applied to any kind of busbar configuration and uses standard IEC 61850 protocol to connect to the bay units. The B95$^{Plus}$ delivers comprehensive and reliable protection for busbar applications with up to 24 feeders.



## Transmission & Distribution (Continued)

### F60
**Feeder Protection with Hi-Z Fault Detection**

The F60 provides comprehensive feeder protection, control, advanced communications, monitoring and metering in an integrated, economical, and compact package and more.

### F35
**Multiple Feeder Protection**

The F35 is a cost-effective device for primary feeder protection. F35's modular design allows customers to protect groups of feeders as follows: independent current and voltage inputs, independent current and common voltage inputs or independent current inputs only.

### C70
**Capacitor Bank Protection**

The C70 is an integrated protection, control, and monitoring device for shunt capacitor banks. The current and voltage-based protection functions are designed to provide sensitive protection for grounded, ungrounded single and parallel capacitor banks and banks with taps.

### T60
**Medium to Large Transformers**

The T60 is a fully featured transformer protection system suitable for power transformers of any size that require current differential function. The T60 provides automatic or user-definable magnitude reference winding selection for CT ratio matching, and performs automatic phase shift compensation for all types of transformer winding connections.

### T35
**Basic Transformer Protection, Multiple CTs**

The T35 is a basic transformer protection system capable of protecting combined main power transformers and up to five feeders downstream. The T35 provides automatic or user-definable magnitude reference winding selection for CT ratio matching, automatic phase shift compensation and allows users to enable removal of the zero-sequence current even for delta connected transformer windings.

### C90$^{Plus}$
**Breaker Automation and Controller**

The C90$^{Plus}$ is a powerful logic controller designed to be used in substation environments and for the unique automation requirements of industrial and utility power systems. The C90$^{Plus}$ provides unmatched logic processing ability combined with a powerful math engine with deterministic execution of logic equations regardless of the configuration of the number of lines of logic.

### C60
**Breaker Controller**

The C60 is a substation hardened controller that provides a complete integrated package for the protection, control, and monitoring of circuit breakers, supporting dual-breaker busbar configurations, such as breaker-and-half or ring bus schemes.

### C30
**I/O Logic Controller**

The C30 is designed to perform substation control logic that can also expand the I/O capability of protection devices and replace existing Sequence of Events (SOE) recorders.

## Industrial & Network

### M60
**Motor Protection**

The M60 offers comprehensive protection and control solutions for large-sized three-phase motors. The M60 provides superior protection, control, and diagnostics that includes thermal model with RTD and current unbalance biasing, stator differential, reverse and low forward power, external RRTD module, two-speed motors, reduced voltage starting, broken rotor bar detection, and more.

### N60
**Network Stability and Synchrophasor Measurement**

The N60 is intended to be used on load shedding, remedial action, special protection and wide area monitoring and control schemes. Like no one device before, the N60 shares real-time operational data to remote N60s so the system can generate intelligent decisions to maintain power system operation.

## Overview

The Universal Relay (UR) is a family of leading edge protection and control products built on a common modular platform. All UR products feature high-performance protection, expandable I/O options, integrated monitoring and metering, high-speed communications, and extensive programming and configuration capabilities. The UR forms the basis of simplified power management for the protection of critical assets, either as a stand-alone device or within an overall power automation system.

The UR is managed and programmed through EnerVista Launchpad. This powerful software package, which is included with each relay, not only allows the setpoints of the relay to be programmed, but also provides the capability to manage setpoint files, automatically access the latest versions of firmware/ documentation and provide a window into the substation automation system.

The UR can be supplied in a variety of configurations and is available as a 19-inch rack horizontal mount unit or a reduced size (¾) vertical mount unit. The UR consists of the following modules: power supply, CPU, CT/VT input, digital input/output, transducer input/output, inter-relay communications, communication switch and IEC Process Bus. All hardware modules and software options can be specified at the time of ordering.

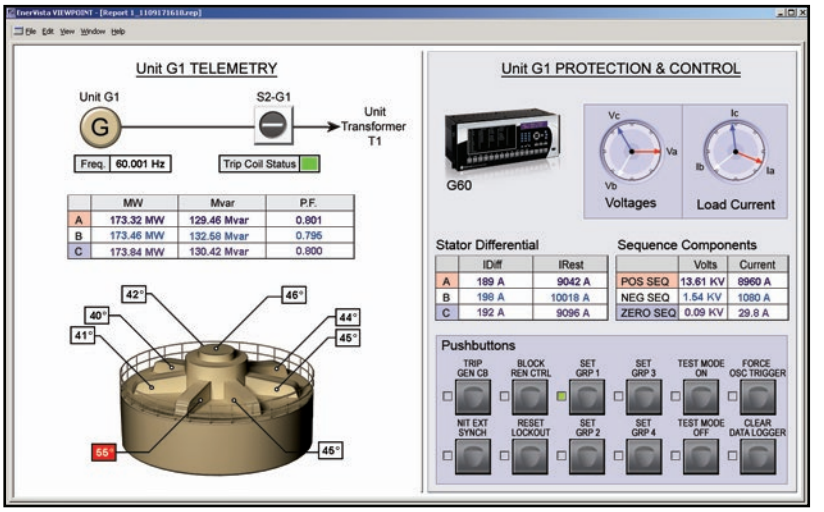
## Protection and Control

The UR incorporates the most complete and unique protection algorithms to provide unparalleled security and system uptime. The UR selector guide (in the following pages) lists all the protection elements found in each relay. To support the protection and control functions of the UR, various types and forms of I/O are available (specific capabilities are model dependent). Supported I/Os include:

### CTs and VTs

Up to 24 analog current transformer (CT) and voltage transformer (VT) signals can be configured to monitor AC power lines. Both 1 A and 5 A CTs are supported. Special function modules are available including: a CT module with sensitive ground input to provide ground fault protection on high-impedance grounded systems, and a high-impedance fault detection module that provides fast and reliable detection of faults caused by downed conductors.

### UR - Protection, Metering, Monitoring and Control




*The UR is the single point for protection, control, metering, and monitoring in one integrated device that can easily be connected directly into DCS or SCADA monitoring and control systems like Viewpoint Monitoring as shown.*

### Digital I/O

Up to 96 contact inputs (with utility voltage rating up to 250V), and up to 64 contact outputs, are available and can be used to monitor and control a wide range of auxiliary equipment found within a substation or other protection application. Types of digital I/O cards include trip-rated Form-A, Form-C, Fast Form-C, latching and Solid State Relay (SSR), with or without DC voltage, current monitoring and isolated inputs (with auto burnish feature). Mechanically latching outputs can be used to develop secure interlocking applications and replace mechanical switches and lockout relays. Form-A digital outputs have activation speeds of less than 4ms and both wet and dry contacts are supported.

Solid state output modules with high current breaking capability, fast tripping and reset time are ideal for direct tripping applications.

### Transducer I/O

RTDs and DCmA cards are available to monitor system parameters, such as temperature, vibration, pressure, wind speed, and flow. Analog outputs can be used for hardwired connections from the controller to a SCADA system, to a programmable logic controller (PLC), or to other user interface devices (eg. panel display).

## Advanced Automation

The UR incorporates advanced automation features including powerful FlexLogic programmable logic, communication, and SCADA capabilities that far surpass what is found in the average protection relay. Each UR can be seamlessly integrated with other UR relays for complete system protection and control.

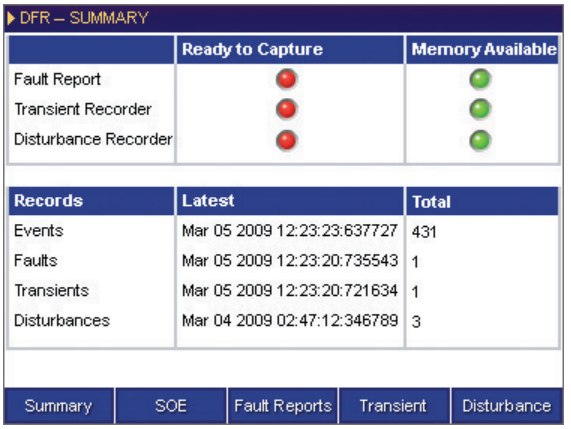
### FlexLogic

FlexLogic is the powerful UR-platform programming logic engine that provides the ability to create customized protection and control schemes, minimizing the need and associated costs of, auxiliary components and wiring. Using FlexLogic, the UR can be programmed to provide the required tripping logic along with custom scheme logic for breaker control (including interlocking with external synchronizers), transfer tripping schemes for remote breakers and dynamic setting group changes.

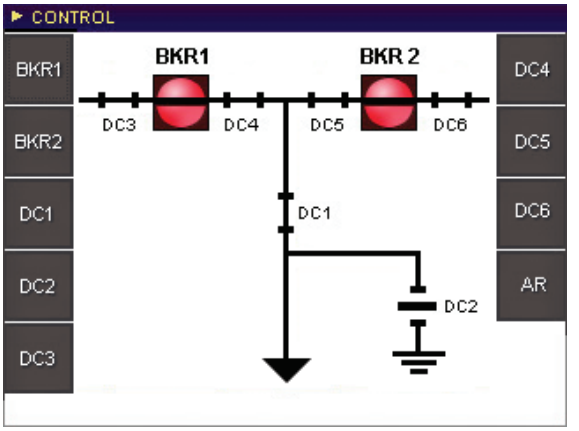
### Scalable Hardware

The UR is available with a multitude of I/O configurations to suit the most demanding application needs. The expandable modular design allows for easy configuration and future upgrades.

- Multiple CT/VT configurations allow for the implementation of many different schemes, including concurrent split-phase and differential protection
- Flexible, modular I/O covering a broad range of input signals and tripping schemes with trip rated Form-A, SSR, Form-C and mechanically latched relays




*Digital fault recorder summary with the latest information on the events, faults, transients and disturbances.*




*Control screen for the preconfigured bay with breaker & disconnect control in multiple pages using dedicated pushbuttons in the front panel.*

- Inter-relay communications module that enables the sharing of digital status and analog values between UR relays for control, fast tripping or teleprotection applications
- Types of digital outputs include trip-rated Form-A and SSR mechanically latching, and Form-C outputs
- Form-A and SSR outputs available with optional circuit continuity monitoring and current detection to verify continuity and health of the associated circuitry
- IEC 61850 Process Bus delivering advanced protection and control capabilities while providing significant savings on the total life cost of electrical substations
- RTDs and DCmA inputs are available to monitor equipment parameters such as temperature and pressure

## Monitoring and Metering

The UR includes high accuracy metering and recording for all AC signals. Voltage, current, and power metering are built into the relay as a standard feature. Current and voltage parameters are available as total RMS magnitude, and as fundamental frequency magnitude and angle.

### Fault and Disturbance Recording

The advanced disturbance and event recording features within the UR can significantly reduce the time needed for postmortem analysis of power system events and the creation of regulatory reports. Recording functions include:

- Sequence of Event (SOE)
  - 1024 time stamped events (UR Relays)
  - 8192 time stamped events (UR$^{Plus}$)
- Oscillography
  - 64 digital & up to 40 analog channels
  - Events with up to 45s length
- Data Logger and Disturbance Recording
  - 16 channels up to 1 sample/cycle/ channel
- Fault Reports
  - Powerful summary report of pre-fault and fault values

The very high sampling rate and large amounts of storage space available for data recording in the UR allows for the capture of complex events and can eliminate the need for installing costly stand-alone recording equipment.

### Advanced Device Health Diagnostics

The UR performs comprehensive device health diagnostic tests at startup and continuously during run-time to test its own major functions and critical hardware. These diagnostic tests monitor for conditions that could impact security and availability of protection, and present device status via SCADA communications and front panel display. Providing continuous monitoring and early detection of possible issues help improve system uptime.

- Comprehensive device health diagnostic performed at startup
- Monitors the CT/VT input circuitry to validate the integrity of all signals
- Monitors internal DC voltage levels that allows for proactive maintenance and increased uptime

## PMU - Synchrophasors

With the ability of having up to 6 PMU elements in one device, UR devices provide simultaneous data streams of up to four different clients.

UR devices exceed the IEEE C37.118 (2011) requirements for Total Vector Error (TVE) less than 1% over a range of 40Hz to 70Hz, and are able to measure and report synchrophasors over a frequency range from 30Hz to 90Hz with little effect on TVE.

A special feature of the synchrophasor implementation is the ability to apply magnitude and phase angle correction on a per-phase basis for known CT and PT magnitude and phase errors. Selected UR devices can apply a phase correction on each phase of up to ±5° in increments of 0.05°. They also provide the ability to adjust for delta-wye phase angle shifts or polarity reversal in the synchrophasor reporting of the voltage and current sequence components.

UR devices can stream PMU data through any of its three Ethernet ports using either IEEE C37.118 or IEC 61850-90-5 data formats. When streaming PMU data through a single port, a failover function can automatically switch the transmission over another Ethernet port.

Selected UR devices also support up to 16 user-definable command outputs via the command frame defined in the IEEE C37.118 standard.

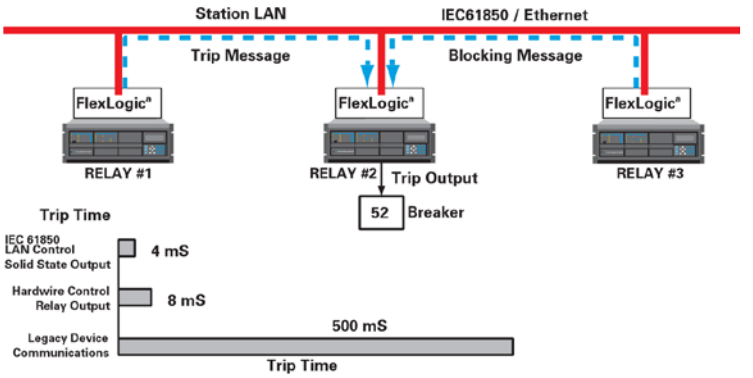
### PMU recording

UR devices include high accuracy metering

and recording for all AC signals. Voltage, current, frequency, power and energy and demand metering are built into the relay as a standard feature. Current and voltage parameters are available as total RMS magnitude, and as fundamental frequency magnitude and angle. UR devices have 12MB of synchrophasor recording memory with multiple recording and triggering options. The PMU recorder can be triggered by an over/under frequency, over/under voltage, overcurrent, overpower, rate of change of frequency condition, or by a user-specified condition, freely configured through FlexLogic. The PMU status flag shows which of those functions triggered the PMU recorder.

### Monitor Multiple Power Circuits

Selected UR devices can monitor from one up to six three-phase power circuits and can be configured to simultaneously provide as many as 6 PMUs. Other configurations are: three power circuits with independent currents and voltages, four power circuits with independent currents and two common voltages, five power circuits with independent current and one common voltage. UR devices provide metering of many power system quantities including active, reactive and apparent power on a per-phase, and three-phase basis, true RMS value, phasors and symmetrical components of currents, and voltages, power factor, and frequency.Frequency can be measured independently and simultaneously from up to six different signals including currents if needed. UR devices allow for the creation and processing of virtual sums of currents through its user configuration mechanism of "signal sources", and can also sum analog values through its FlexMath elements.




*IEC 61850 protocol enables high-speed trip and control via the substation LAN without complex fixed wiring to many auxiliary devices.*

## Communications

The UR provides advanced communications technologies for remote data and engineering access, making it easy and flexible to use and integrate into new and existing infrastructures. Direct support for fiber optic Ethernet provides high-bandwidth communications allowing for low-latency controls and high-speed file transfers of relay fault and event record information. The available redundant Ethernet option provides the means to create fault tolerant communication architectures in an easy, cost-effective manner without the need for intermediary communication hardware.

The UR supports the most popular industry standard protocols enabling easy, direct integration into DCS and SCADA systems.

- IEC 61850 with 61850-90-5 support
- DNP 3.0 (serial & TCP/IP)
- Ethernet Global Data (EGD)
- IEC 60870-5-103 and IEC 60870-5-104
- Modbus RTU, Modbus TCP/IP
- HTTP, TFTP
- SNTP and IEEE 1588 for time synchronization
- PRP as per IEC 62439-3

### Purpose Specific LAN

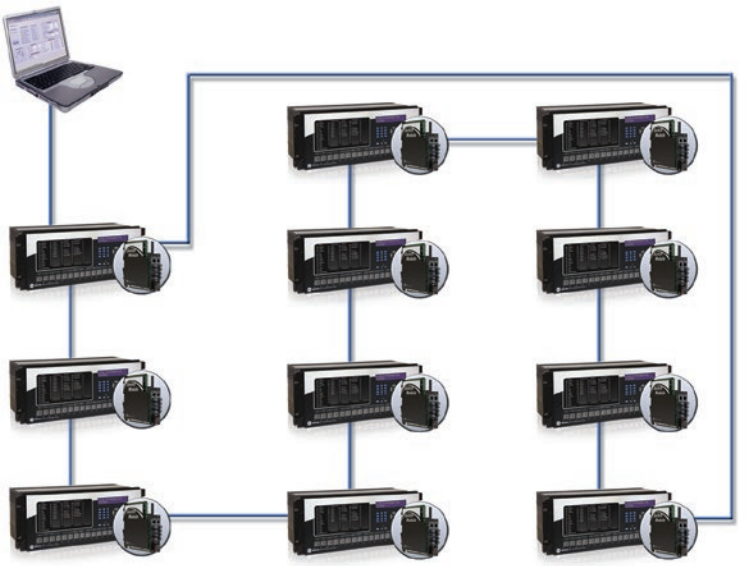
The available three independent Ethernet ports enable users to segregate heavy traffic (eg. synchrophasors) from mission critical services (eg. GOOSE), as a way to eliminate potential latency effects.

### Precision Time Protocol - IEEE 1588

UR devices support the IEEE 1588 v2 (2012) time synchronization protocol that enables time synchronization via the substation LAN with no sacrifice on time accuracy (1µs). IEEE 1588 removes the dedicated IRIG-B wiring and repeaters used for time synchronization that are traditionally used in substations.

### UR Switch Module

In addition to providing high-speed connectivity directly to the UR, the UR Switch Module provides an additional 4 fiber Ethernet ports, for connection to other relays in the system as well as upstream connectivity. It also provides 2 RJ45 copper Ethernet ports which can be used to connect local devices such as PCs, meters, or virtually anything else in the system.



*The UR Switch Module is a fully-managed Ethernet switch with a modular form factor. It can be placed directly into a GE Multilin UR to provide Ethernet connectivity to the relay as well as other Ethernet-enabled devices.*

The UR Switch Module provides a simple way

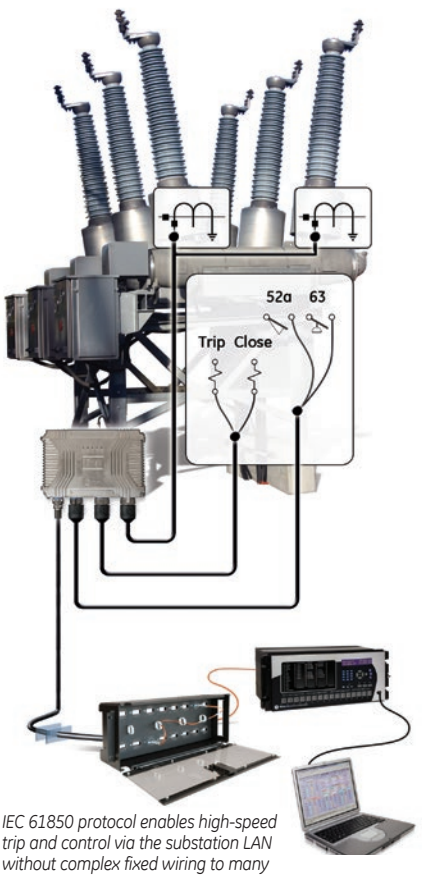
to add fully-managed Ethernet networking to your relays and devices without the need for additional hardware or a dedicated communications cabinet.

The UR Switch Module includes all the management and features that come with all MultiLink managed switches, and can be easily integrated into a network that has other Ethernet switches.

When used in a ring topology with other UR switch modules or MultiLink switches, the UR Switch Module can be configured to use MultiLink's Smart RSTP feature to provide industry-leading network recovery for ring topologies, at a speed of less than 5ms per switch.

### Interoperability with Embedded IEC 61850

Use the UR with integrated IEC 61850 to lower costs associated with system protection, control and automation. GE Digital Energy's leadership in IEC 61850 comes from thousands of installed devices and follows on extensive development experience with UCA 2.0.




*IEC 61850 protocol enables high-speed trip and control via the substation LAN without complex fixed wiring to many auxiliary devices.*

- Backup wired signals or replace expensive copper wiring between devices with direct transfer of data using GOOSE messaging
- Configure GE systems based on IEC 61850 and also monitor and troubleshoot them in real-time with EnerVista Viewpoint Engineer
- Multicast IEEE C37.118 synchrophasor data between PMU and PDC devices using IEC 61850-90-5

### LAN Redundancy

Substation LAN redundancy has been traditionally accomplished by reconfiguring the active network topology in case of failure. Regardless of the type of LAN architecture (tree, mesh, etc), reconfiguring the active LAN requires time to switchover, during which the LAN is unavailable. UR devices deliver redundancy as specified by PRP-IEC 62439-3, which eliminates the dependency on LAN reconfiguration and the associated switchover time. The UR becomes a dual attached node that transmits data packets over both main and redundant networks simultaneously, so in case of failure, one of the data packets will reach the receiving device with no time delay.

### Direct I/O Messaging

Direct I/O allows for the sharing of analog or high-speed digital information between multiple UR relays via direct back-to-back connections or multiplexed through a standard DS0 multiplexer channel bank. Regardless of the connection method, direct I/O provides continuous real-time channel monitoring that supplies diagnostics information on channel health. Direct I/O provides superior relay-to-relay communications that can be used in advanced interlocking, generation rejection and other special protection schemes.

- Communication with up to 16 UR relays in single or redundant rings rather than strictly limited to simplistic point-to-point configurations between two devices
- Connect to standard DS0 channel banks through standard RS422, G.703 or IEEE C37.94 interfaces or via direct fiber optic connections
- No external or handheld tester required to provide channel diagnostic information

### Multi-Language

UR devices support multiple languages: English, French, Russian, Chinese, Turkish and German. These language options are available on the front panel, in the EnerVista setup software, and in the product manuals. Easily switch between English and an additional language on the local displays without uploading new firmware.

## HardFiber IEC 61850 Process Bus

The HardFiber Process Bus System represents a true breakthrough in the installation and ownership of protection and control systems, by reducing the overall labor required for substation design, construction, and testing. This innovative solution addresses the three key issues driving the labor required for protection and control design, construction and testing:

- Every substation is unique, making design and drafting a one-off solution for every station
- Miles of copper wires need to be pulled, spliced and terminated
- Time-consuming testing and troubleshooting of thousands of connections must be performed by skilled personnel

The HardFiber Process Bus System was designed to address these challenges and reduce the overall labor associated with the tasks of designing, documenting, installing and testing protection and control systems. By specifically targeting copper wiring and all of the labor it requires, the HardFiber Process Bus System allows for greater utilization and optimization of resources with the ultimate goal of reducing the total life cost (TLC) for protection and control.

## Cyber Security - CyberSentry UR

CyberSentry enables UR devices to deliver full cyber security features that help customers to comply with NERC CIP and NIST® IR 7628 cyber security requirements through supporting the following core features:

### Password Complexity

Supporting up to 20 alpha- numeric or special characters, UR passwords exceed NERC CIP requirements for password complexity. Individual passwords per role are available.

### AAA Server Support (Radius)

Enables integration with centrally managed authentication and accounting of all user activities and uses modern industry best practices and standards that meet and exceed

NERC CIP requirements for authentication and password management.

### Role Based Access Control (RBAC)

Efficiently administrate users and roles within UR devices. The new and advanced access functions allow users to configure up to eight roles for up to eight configurable users with independent passwords. The standard "Remote Authentication Dial In User Service" (Radius) is used for authentication.

### Event Recorder (Syslog for SEM)

Capture all cyber security related events within a SOE element (login, logout, invalid password attempts, remote/local access, user in session, settings change, FW update, etc), and then serve and classify data by security level using standard Syslog data format. This enables UR devices to integrate with established SEM (Security Event Management) systems.

## EnerVista Software

The EnerVista suite is an industry-leading set of software programs that simplifies every aspect of using the UR. The EnerVista suite provides all the tools to monitor the status of the protected asset, maintain the relay, and integrate information measured by the UR into DCS or SCADA monitoring systems. Convenient COMTRADE and SOE viewers are an integral part of the UR setup software included with every UR relay, to carry out postmortem event analysis and ensure proper protection system operation.

### EnerVista Launchpad

EnerVista Launchpad is a powerful software package that provides users with all of the setup and support tools needed for configuring and maintaining GE Multilin products. The setup software within Launchpad allows for the configuration of devices in real-time by communicating using serial, Ethernet, or modem connections, or offline by creating setting files to be sent to devices at a later time.

Included in Launchpad is a document archiving and management system that ensures critical documentation is up-to-date and available when needed. Documents made available include:

- Manuals
- Application Notes and Support Documents
- Guideform Specifications
- Brochures
- Wiring Diagrams
- FAQ's
- Service Bulletins

### Viewpoint Monitoring

Viewpoint Monitoring is a simple-to-use and full-featured monitoring and data recording software package for small systems. Similar to small SCADA systems, Viewpoint Monitoring provides a complete HMI package with the following functionality:

- Plug-&-Play Device Monitoring
- System Single-Line Monitoring & Control
- Annunciator Alarm Screens
- Trending Reports
- Automatic Event Retrieval
- Automatic Waveform Retrieval

### Viewpoint UR Engineer

Viewpoint UR Engineer is a set of powerful tools that allows the configuration and testing of GE relays at a system level in an easy-to-use graphical drag-and-drop environment. Viewpoint UR Engineer provides the following configuration and commissioning utilities:

- Graphical Logic Designer (Substation)
- Graphical System Designer
- Graphical Logic Monitor
- Graphical System Monitor (Substation)
- IEC 61850 Configurator

### Viewpoint Maintenance

Viewpoint Maintenance provides tools that will create reports on the operating status of the relay, simplify the steps to download fault and event data, and reduce the work required for cyber security compliance audits. Tools available in Viewpoint Maintenance include:

- Settings Security Audit Report
- Device Health Report
- Single-Click Fault Data Retreival

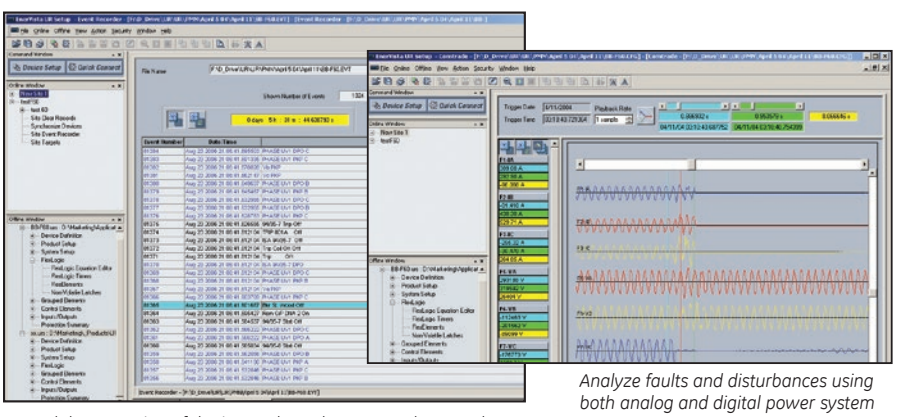
### EnerVista Integrator

EnerVista Integrator is a toolkit that allows seamless integration of Multilin devices into new or existing automation systems. Included in EnerVista Integrator is:

- OPC/DDE Server
- GE Multilin Drivers
- Automatic Event Retrieval
- Automatic Waveform Retrieval

## Power System Troubleshooting

The UR contains many tools and reports that simplify and reduce the amount of time required for troubleshooting power system events, increase uptime and reduce loss of production.



*Record the operation of the internal UR elements and external connected devices with 1ms time-stamped accuracy to identify the Sequence of Operation of station devices during faults and disturbances.*

*Analyze faults and disturbances using both analog and digital power system quantities.*

## User Interface

The UR front panel provides extensive local HMI capabilities. The local display is used for monitoring, status messaging, fault diagnosis, and device configuration. User-configurable messages that combine text with live data can be displayed when user-defined conditions are met. Configurable LEDs allows status and alarm signaling (50 LEDs).

The UR$^{Plus}$ has a colorful, graphical HMI that allows users to have local monitoring of status, values and control functionality.

The alarm annunciator panel provides the configuration of up to 256 signals (alarms and status) with full text description.

# UR[Plus] Front Panel with Large Color Display and Annunciator Panel

**Digital Alarm Annunciator**

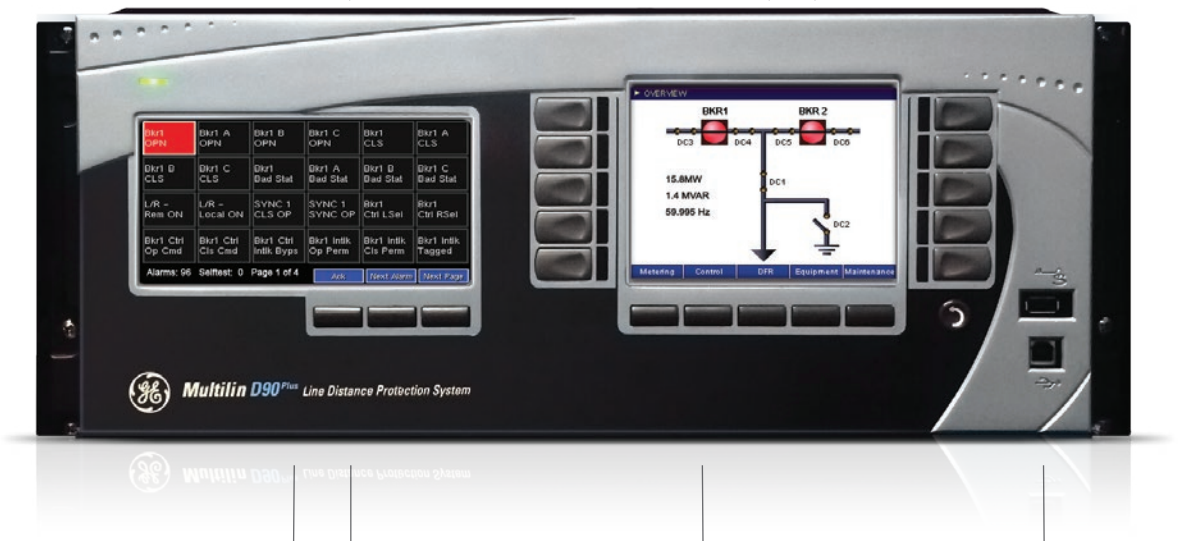
- 256 customizable alarms in multiple pages
- Eliminates the need for separate annunciator

**Intuitive HMI**

- Customizable bay diagrams for various applications
- Local control and status indication of breakers & disconnect switches
- Local/remote control (20 programmable buttons)
- Fault, event, disturbance and transient reports

**Advanced Control**

- Customizable bay diagrams for various applications
- Local control and status indication of breakers & disconnect switches
- Local/remote control
- Fault, event, disturbance and transient reports




**Advanced Automation Controller**

- Built-in programmable logic engine
- Advanced math, Boolean and control operations

**Advanced Communications Capabilities**

- Up to three Ethernet ports
- IEC 61850, DNP 3.0, Modbus TCP/IP, IEC 60870-5-104 protocols
- IEEE C37.118 synchrophasors over Ethernet

**Advanced Recorders**

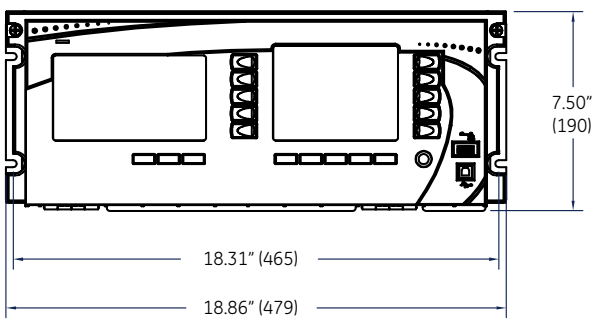
- Eliminate the need for stand-alone disturbance recorders
- 128 samples/cycle, 1 min duration transient recorder
- Seperate dynamic disturbance recorder for recording long term events
- Synchrophasors PMU recording

**Front USB Port**

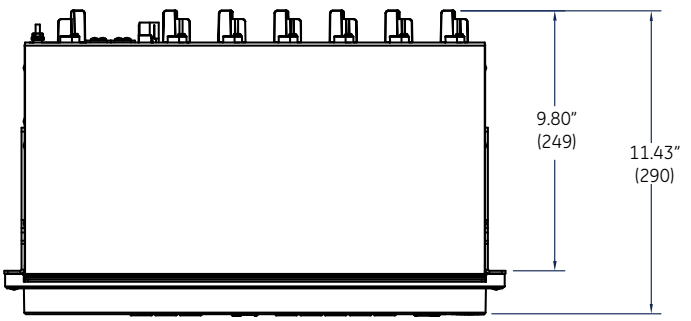
- High-speed local data transfer

# UR[Plus] Dimensions

HORIZONTAL FRONT VIEW




HORIZONTAL TOP VIEW



## UR Enhanced Front Panel with Large Display, Customizable LED Annunicator, and User-Programmable Pushbuttons


## UR Horizontal Dimensions