

# Multilin™ UR & UR<sup>Plus</sup>

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

From the power plant to the power consumer, the Multilin UR & UR<sup>Plus</sup> family of advanced protection and control relays provides one integrated platform that delivers leading edge protection, control, monitoring & metering solutions for critical power system applications. Featuring proven protection algorithms, expandable I/O, integrated monitoring & high accuracy metering capabilities with the latest in communications technologies, the Multilin UR & UR<sup>Plus</sup> family of devices provides the situational awareness needed for a reliable, secure and efficient modern grid.

### Key Benefits

- Modular construction: common hardware, reduced stock of spare parts, plug & play modules for maintenance cost savings and simplification (Multilin UR)
- Proven flexibility and customization capabilities make the Multilin UR/UR<sup>Plus</sup> 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 (Multilin UR<sup>Plus</sup>)
- Phase measurement Unit (synchrophasors) according to IEEE® C37.118 (2011) and IEC® 61850-90-5 directly streamed from your protective device
- Embedded IEEE 1588 Time Synchronization Protocol support eliminates dedicated IRIG-B wiring requirements for P&C devices (Multilin UR)
- Advanced IEC 61850 Ed. 2 implementation, complete settings via SCL files and IEC 61850-9-2 process bus solution enable resource and platform managing optimization and reduce cost of ownership (Multilin UR)
- Increased network availability via failover time reduced to zero through IEC® 62439-3 "PRP" support
- CyberSentry™ provides high-end cyber security aligned to industry standards and services including NERC® CIP, AAA, Radius, RBAC and Syslog (Multilin UR)
- Advanced fault and disturbance recording, including internal relay operating signals, eliminating the need for external recording devices

### 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
- Synchrophasors based monitoring and control system with specialized PMU devices that support multiple feeders providing P&M class synchrophasors of voltage, current, and sequence components
- Complex protection & control and wide area monitoring solutions with complete diagnostic and automation capabilities (Multilin UR<sup>Plus</sup>)



imagination at work



## Protection and Control

- Fast, segregated line current differential & distance protection functionality in one device
- Phase distance (5 zones) with independent settings for compensation
- Single-pole tripping, breaker-and-a-half with independent current source support
- Comprehensive generator protection with 100% stator and field ground fault detection

## Communications

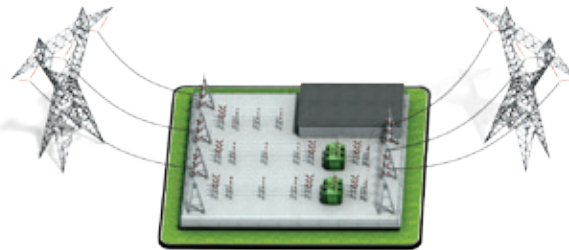
- 3 independent Ethernet ports for simultaneous & dedicated network connections with IEEE 1588 support
- Supported industry protocols: IEC 61850 Ed. 2, SFTP, MMS File Transfer Service, DNP 3.0, Modbus Serial/TCP, IEEE 1588, IEC 60870-5-104 and 103, PRP, SNTP, HTTP, TFTP

## Cyber Security

- CyberSentry™ provides high-end cyber security aligned to industry standards and services (NERC® CIP, AAA, Radius, RBAC, Syslog)
- Setting for security audit trails, tracking changes to device configurations

## Monitoring & Metering

- Advanced recording capabilities, configurable & extended waveform capture and data logger
- Fault locator fault reports & programmable
- Breaker condition monitoring including breaker arcing current (I<sub>2t</sub>), breaker re-strike and breaker flashover
- Metering: current, voltage, power factor, frequency, voltage & current harmonics, energy, demand, phasors, etc.

UR & UR<sup>Plus</sup> 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 &amp; Distribution

**D90<sup>Plus</sup>**

Sub-Cycle Distance Protection

The D90<sup>Plus</sup> is ideally suited for application on transmission lines where fast fault detection and small breaker failure margin are required. The D90<sup>Plus</sup> 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**

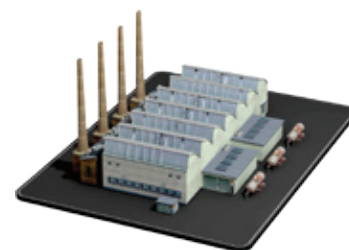
Low Impedance Busbar Protection

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<sup>Plus</sup>**

Distributed Busbar Protection System

The B95<sup>Plus</sup> 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<sup>Plus</sup> 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<sup>Plus</sup>

#### Breaker Automation and Controller

The C90<sup>Plus</sup> 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<sup>Plus</sup> 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

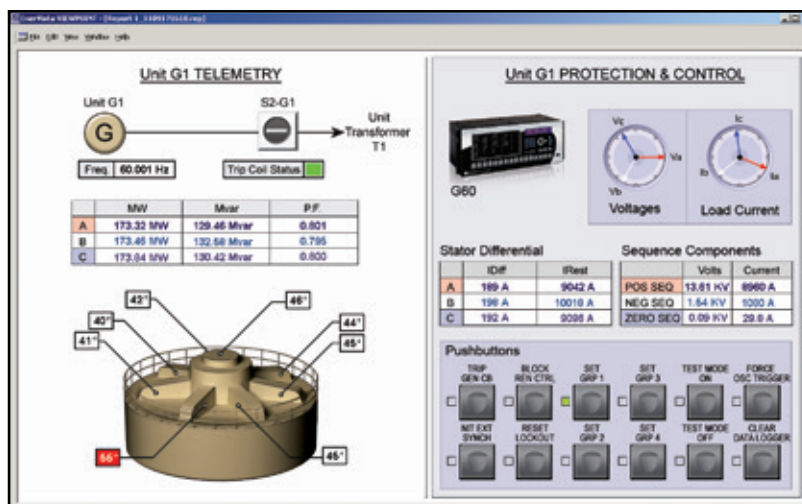
The UR incorporates the most complete and unique protection algorithms to provide unparalleled security and system uptime. The UR selector guide (in the following pages) lists all the protection elements found in each relay.

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
- Inter-relay communications module that enables the sharing of digital status and