URC™

UNIVERSAL RECLOSER CONTROL

Reliable reclosing for distribution system

KEY BENEFITS

- Rugged weatherproof enclosure (NEMA4)
- Unique and secure downed conductor detection
- Reliable and secure performance
- High-end fault and disturbance recording, including internal relay operating signals provided without requiring external recording devices
- Voltage and frequency based load shedding and transfer schemes to increase system uptime and improve system stability
- High-accuracy metering, oscillography and digital fault recording
- Advanced automation capabilities for providing customized protection and control solutions
- Simplified system integration with communications supporting serial and Ethernet interfaces and multiple protocols
- Single & multiple recloser control applications available

APPLICATIONS

- Three phase autorecloser applications
- Primary protection and control for feeders on solidly grounded, impedance grounded or resonant (Peterson Coil) grounded systems
- Dynamic network restoration
- Bus blocking/Interlocking schemes
- Distribution load shedding schemes based on voltage and frequency elements

FEATURES

Protection and Control

- Three phase autorecloser with synchronism check
- Directional time, instantaneous phase & ground overcurrent protection
- Load encroachment supervision
- Wattmetric ground fault detection
- High impedance fault detection (Downed Conductor Detection)
- Breaker control and breaker failure
- Abnormal frequency protection (Rate of change, under and over frequency)

Communications

- Networking interfaces - 100Mbit Fiber Optic Ethernet, RS485,
- RS232, RS422, G.703, IEEE C37.94
- Multiple Protocols - IEC61850, DNP 3.0 Level 2, Modbus TCP/IP, IEC60870-5-104
- Direct I/O - secure, high-speed data exchange between URs, for DG, distribution automation applications

Monitoring & Metering

- Metering - current, voltage, power, energy, frequency and harmonics
- Oscillography - analog and digital parameters at 64 samples/cycle
- Event Recorder - 1024 time tagged events with 0.5ms scan of digital inputs
- Data Logger - 16 channels with sampling rate up to 1 sample / cycle
- Breaker monitoring: contact wear, continuous trip coil monitoring
- Advanced relay health diagnostics
- Setting Security Audit Trail for tracking changes to relay configuration

EnerVista™ Software

- State of the art software for configuration and commissioning GE Multilin products
- Graphical Logic Designer and Logic Monitor to simplify designing and testing procedures
- Document and software archiving toolset to ensure reference material and device utilities are up-to-date

GE Digital Energy
Multilin

Protection and Control

The URC is designed to provide distribution feeder protection, control, monitoring and metering in one integrated package. Protection features include:

Three Phase Autoreclosing

The majority of faults in the distribution system are temporary in nature. These faults may be caused by lighting, wind, animals or tree limb contacts to the energized line. Automatic reclosers can be used to clear such faults and then restore the system.

A four-shot three-pole autoreclosing scheme is provided with programmable sequence coordination using FlexLogic™. Coordination can also be accomplished with substation feeders using IEC61850 or hi-speed Direct I/O messaging.

Downed Conductor (HI-Z) Detection

Fires, injuries, and even fatalities may be caused by a live downed conductor. Unfortunately, these high risk incidences often go undetected by conventional protective relays. The Hi-Z element in F60, unique to GE Multilin, provides reliable detection of faults caused by downed conductors. Sophisticated algorithms developed over the past 20 years, detect downed conductors, tree branch contacts,

and insulation fault in underground cables. This unique, field proven algorithm incorporates artificial intelligence ensures performances. Key benefits of Hi-Z detection in F60:

* Reliable detection of faults caused by downed conductors
* Faster response to hazardous situations
* Dependable and secure operation using artificial intelligence
* Easy integration by adding a module to the F60

This protection feature can also be used to detect arcing faults. Based on testing and field data, the F60 has shown a high degree of security.

Directional Overcurrent Protection

The F60 & F35 also have Built-in standard IEEE, IEC, IAC and FlexCurves™ overcurrent curves (TOC), most commonly used for primary and back-up protection in various protective zones. They have phase IOC elements with level detectors for each phase. Each TOC element has the following programmable characteristics:

* Pickup current level for trip, alarm, or control

* Choice of 17 curve shapes (including FlexCurves™) and curve multipliers
* Instantaneous or linear reset time characteristic to coordinate with upstream transformer damage curves and downstream reclosers and fuses.
* Voltage restraint to increase sensitivity applications

The majority of distribution systems are either solidly grounded or grounded through a low impedance. Fast fault clearance is required due to the ground fault impact. The following functions are incorporated in F60 and F35 to provide secure ground protection:

* Neutral IOC and TOC
* Ground IOC and TOC

The F60 allows directional elements to be used to supervise the ground overcurrent protection elements to provide sensitive tripping for faults in one direction. Typical application for directional overcurrent includes:

* Isolate faulted feeders in ring bus or parallel feeder arrangement
* Detection of back feed of fault current from feeders with motors or generators

Example: Distribution Automation

URC Controller

Recloser

URC Recloser Control
Wireless up to 4 miles
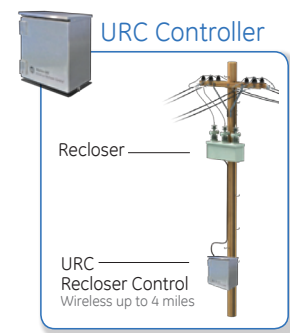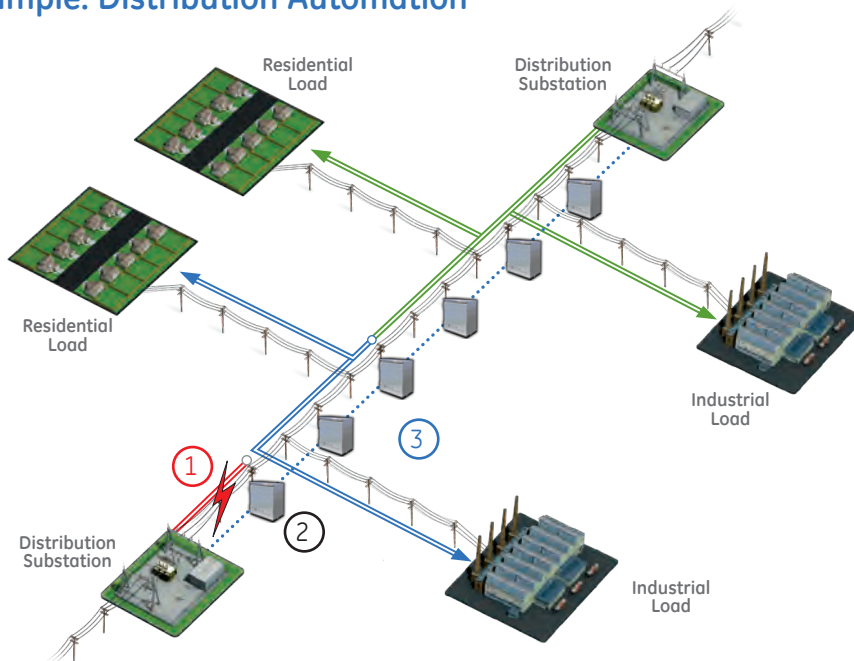
① **Fault occurs on the line**

② **Local URC Recloser System detects the fault, and isolates the faulted section from the grid**

③ **URCs provide fast system re-configuration to restore power to effected area, via wireless communications**

For neutral directional sensing, the residual current of the phase CTs is used as the operating current. For current polarization, a residual CT is used to measure zero-sequence current. For voltage polarization, the calculated or measured zero sequence voltage can be used. The maximum torque angle is programmable.

Load Encroachment

The Load Encroachment function in the F60 provides the capability to manage load growth in feeders. The load encroachment element can be set for the feeder's expected maximum load, reducing the likelihood of false tripping for load conditions while maintaining dependability to trip for legitimate faults. The load encroachment supervision in the F60 based on positive-sequence voltage and current and applies a characteristic shown in the figure. It allows the phase

overcurrent elements to be set to see end-of-line phase faults in heavily loaded feeder applications.
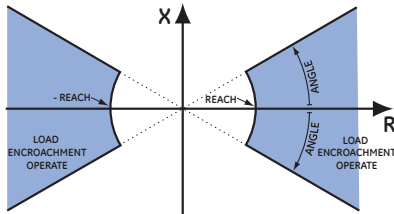
Flexible Load Encroachment characteristic in F60 can be set by adjusting the load angle and the reach.

Over/Under Voltage Protection

The F60 includes the following voltage elements:

- Up to 2 phase undervoltage and 1 overvoltage elements
- 1 auxiliary undervoltage/overvoltage element
- 1 neutral overvoltage element

The following are some of the key applications where voltage elements can be used:

- Load shedding schemes
- Back up capacitor bank protection and control

Multiple Recloser Support in One Box:

Using the F35R models, 2 or 3feeders can be protected using one F35R control cabinet. Multiple three phase currents and voltages can be wired to the URC. Multiple (up to 6) phase, ground and neutral time overcurrent elements are included to perform "fast" and "slow" tripping functions for each connected recloser.

Advanced Automation

The F60 incorporates advanced automation features including powerful FlexLogic™ programmable logic, communication, and SCADA capabilities that far surpass what is found in the average feeder relay. The F60 integrates seamlessly with other UR relays for complete system protection, including the unit and auxiliary transformers, and Balance of Plant protection.

FlexLogic™

FlexLogic™ is the powerful UR-platform programming logic engine that provides the ability of creating customized protection and control schemes thereby minimizing the need, and the associated costs, of auxiliary components and wiring. Using FlexLogic™, the F60 can be programmed to provide required tripping logic, loadshedding based on frequency, voltage and communication, loop restoration schemes, other remedial action schemes and dynamic setting group changes.

Scalable Hardware

The F60 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.
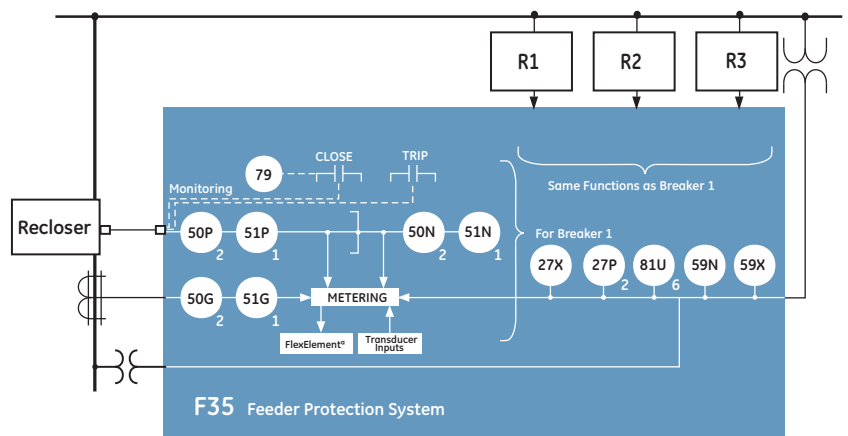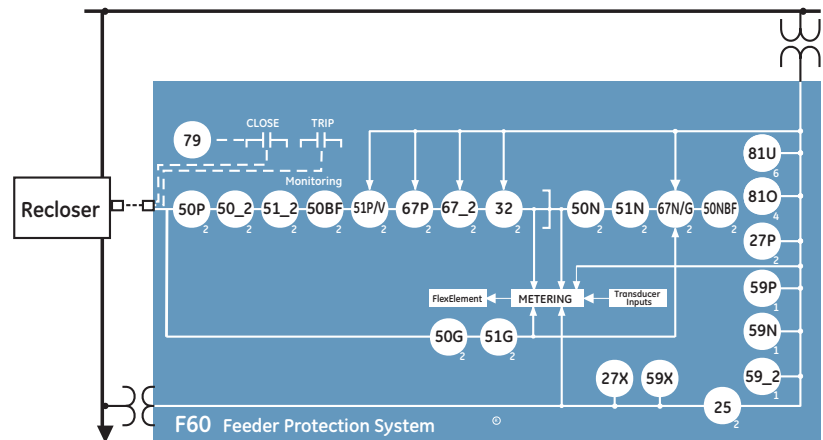
- Flexible, modular I/O covering a broad range of input signals and tripping schemes

- Types of digital outputs include trip-rated Form-A and Solid State Relay (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

- RTDs and DCmA inputs are available to monitor equipment parameters such as temperature & pressure

Monitoring and Metering

The F60 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. Also, harmonic measurements for voltage and current up to 25th for power quality applications.

Fault and Disturbance Recording

The advanced disturbance and event recording features within the F60 can significantly reduce the time needed for postmortem analysis of power system events and creation of regulatory reports. Recording functions include:

- Sequence of Event (SOE) - 1024 time stamped events

- Oscillography,

- - 64 digital & up to 40 Analog channels

- Data Logger, disturbance recording – 16 channels up to 1 sample / cycle / channel

- Fault Reports - Powerful summary report of pre-fault and fault values

- Extensive breaker info (continuous coil monitor, arcing current, operating time, operation counter for asset management)

The very high sampling rates and large amount of storage space available for data recording in the F60 can eliminate the need for installing costly standalone recording equipment.

Advanced Device Health Diagnostics

The F60 performs comprehensive device health diagnostic tests during startup and continuously at runtime 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 helps improve system uptime.

- Comprehensive device health diagnostic performed during startup

- Monitors the CT/VT input circuitry to validate the integrity of all signals

Communications

The F60 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 of

creating fault tolerant communication architectures in an easy, cost-effective manner without the need for intermediary communication hardware.

The F60 supports the most popular industry standard protocols enabling easy, direct integration into DCS and SCADA systems.

- Modbus RTU, Modbus TCP/IP
- IEC61850
- DNP3.0
- Ethernet Global Data (EGD)
- IEC60870-5-104

Interoperability with Embedded IEC61850

Use the F60 with integrated IEC61850 to lower costs associated with feeders protection, control and automation. GE Multilin's leadership in IEC61850 comes from thousands of installed devices and follows on seven years of development experience with UCA 2.0.

- Replace expensive copper wiring between devices with direct transfer of data using GOOSE messaging for transfer tripping, interlocking schemes, loop restoration, and loadshedding schemes.

- Configure systems based on IEC61850 and also monitor and troubleshoot them in real-time with EnerVista™ Viewpoint Engineer
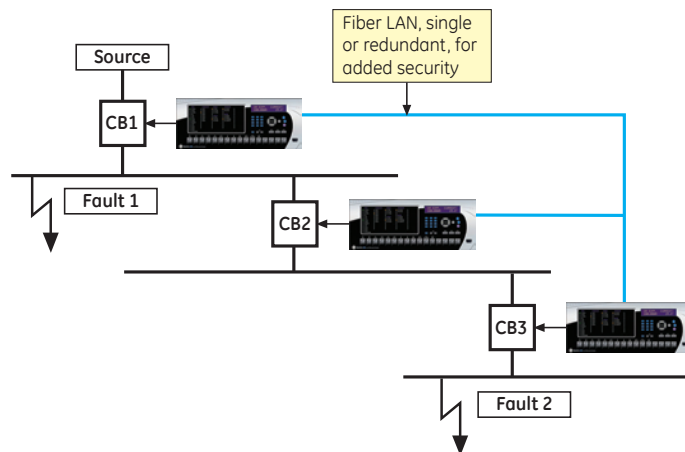
Reverse zone interlocking protection - By using the IEC61850/GOOSE or hi-speed Direct I/O capability blocking signals can be transferred upstream, allowing minimal coordination delays. Fast clearance can be provided for Fault 1 and still maintain coordination for Fault 2.

- Integrate GE Multilin IEDs and generic IEC61850-compliant devices seamlessly in EnerVista™ Viewpoint Monitoring

Direct I/O Messaging

Direct I/O allows for sharing of 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

The F60 supports English, French, Russian, and Chinese languages on the front panel, EnerVista™ setup software, and product manual. Easily switch between English and an additional language on the local displays without uploading new firmware.

EnerVista™ Software

The EnerVista™ Suite is an industry-leading set of software programs that simplifies every aspect of using the F60 relay. The EnerVista™ suite provides all the tools to monitor the status of your the protected asset, maintain the relay, and integrate information measured by the F60 into DCS or SCADA monitoring systems. Convenient COMTRADE and Sequence of Events viewers are an integral part of the UR Setup software included with every UR relay, to carry out postmortem event analysis to 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 configuring 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
- 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. Viewpoint Monitoring provides a complete HMI package with the following functionality:

- Plug-&-Play Device Monitoring
- System Single-Line Monitoring & Control
- Annunciator Alarm Screens

URC Major components

Universal Relay

Ethernet

AC Power

Battery

Wireless Radio
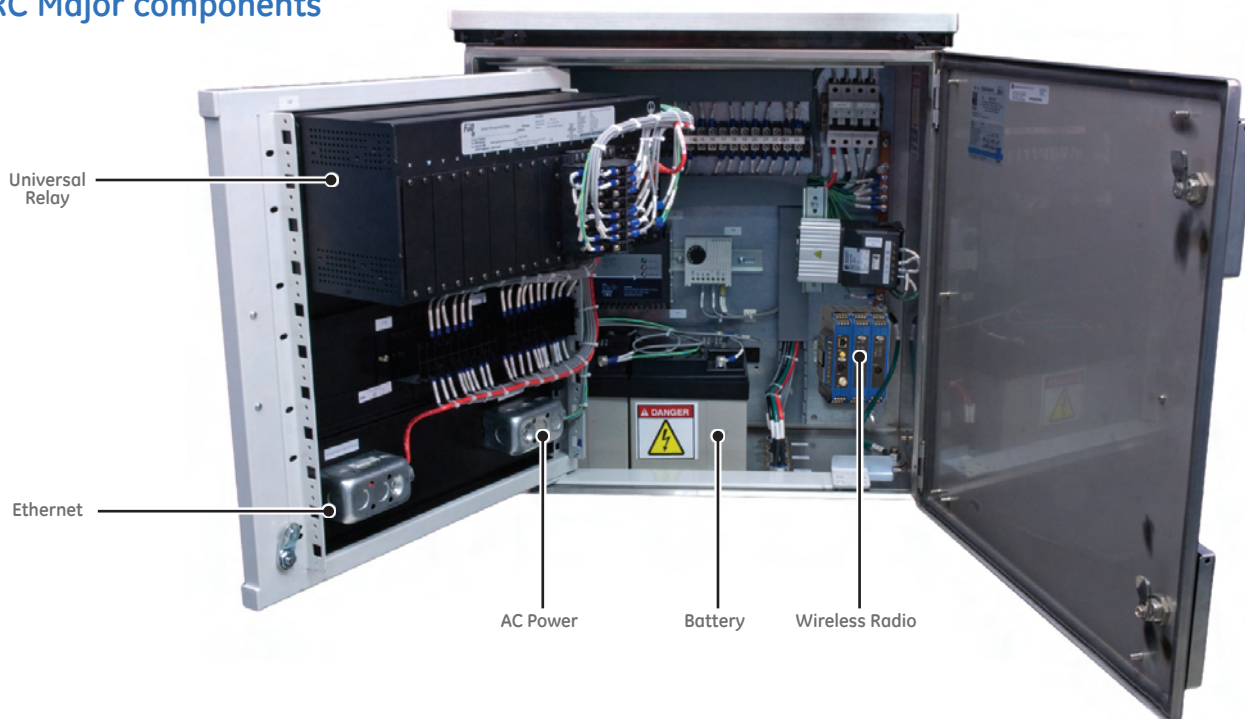
- Trending Reports
- Automatic Event Retrieval
- Automatic Waveform Retrieval

Viewpoint Engineer

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

- Graphical Logic Designer
- Graphical System Designer
- Graphical Logic Monitor
- Graphical System Monitor

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 GE 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

Physical Features

Rugged Enclosure:

The URC is packaged in a rugged steel NEMA4 weatherproof enclosure, which includes as standard:

- (2) 12 VDC lead acid batteries with 24 VDC charger
- 110 VAC receptacle
- Terminal blocks & wiring trays
- Nameplates & wiring diagram
- Receptacle

Options include test switches, wired voltage, HiZ detection, heating/cooling, Ethernet communications (10BaseT/10BaseF), aluminum or stainless steel enclosure, user specified cable lengths and connectors, or other user requirements. GE Multilin will also customize the URC to meet your requirements.

Specifications:

- Dimensions: H=600mm (23.6") x W=600mm (23.6") x D=350mm (13.8")
- Weight: 28.4kg (62.6lbs) w/batteries approx. 36kg (80 lbs)
- NEMA 4 Enclosure
- Relay Operating Temperature: -40 to +85 C (For 16 hours)
- Relay Approvals: UL & CSA Certified, CE Compliant

Accessories:

- Pole Mounting Kit - provides reliable, convenient fastening to round or square poles
- Rital Standard off the shelf
- Custom Welded solution

Ordering

	N*	N*	N*	R*	N*	N*	N*	1*	B*	
F60R										Single recloser control with F60
F35R1										Single recloser control with F35
F35R2										Double recloser control with F35
F35R3										Triple recloser control with F35
	N									No voltage function
	V									Voltage functions
		N								No test switches
		T								Test switch GE 515
			N							No climate control
			H							Heater with thermostat
				R						Steel enclosure
					N					No ethernet port
					1					Ethernet port
					2					Redundant Ethernet port
						N				No Hi-Z
						Z				Hi-Z (F60 only)
							N			No Amphenol Plug
							A			Amphenol Plug
								1		1A Current Input
								5		5A Current Input
									L	24-48 Vdc OC Input (no internal battery or charger)
									M	125-250 Vdc Input (no internal battery or charger)
									B	24 VDC Battery and charger

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