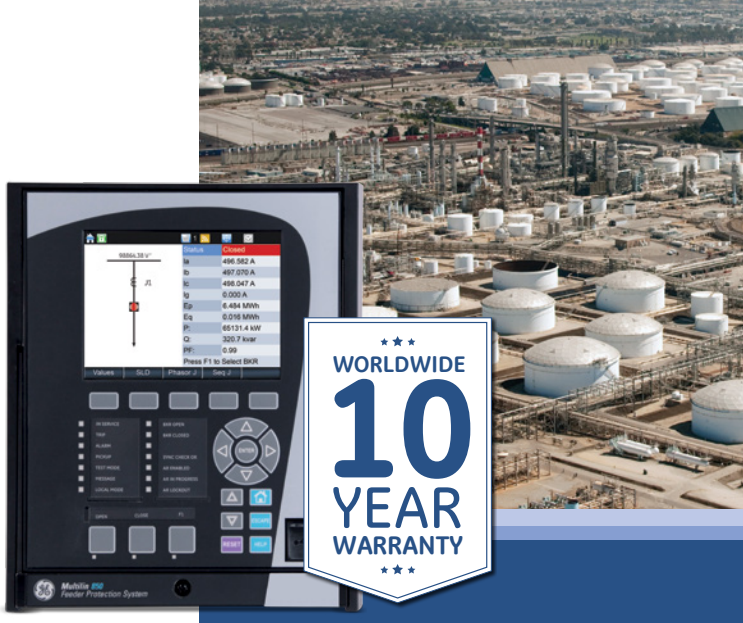
GE
Grid Solutions



Multilin 850

Innovative Feeder, Bay controller / One Box Solution for Industrial and Utility Applications

The Multilin™ 850 relay is a member of the Multilin 8 Series protective relay platform and has been designed for the management, protection and control of feeder applications. The Multilin 850 is used to provide primary (main) or backup protection for underground and overhead feeders for utility and industrial power networks.

With 12 Switchgear control elements, fully configurable Single Line Diagram on a large color graphical display, 36 alarm integrated annunciator panel and 20 push buttons makes this an ideal choice for Bay controller "One Box Solution for electrical systems."

Designed with advanced communications options and detailed asset monitoring capabilities, the Multilin 850 provides advanced functionality, including high-performance protection, extensive programmable logic and flexible configuration capabilities. With support for industry leading communications protocols and technologies, the 850 provides easy integration into new or existing SCADA or DCS for enhanced situational awareness.

Key Benefits

- One Box Solution with advanced logic and configuration flexibility to provide comprehensive primary or backup protection, control and monitoring of electrical power systems.
- User Configurable Single Line Diagram with color display for local control, system status, and metering.
- Advanced breaker diagnostics with high-end fault and disturbance recording
- Integrated arc flash detection using light sensors supervised by overcurrent to reduce incident energy and equipment damage
- High-end cyber security such as AAA, Radius, RBAC, and Syslog enabling NERC® CIP requirements
- Draw-out design simplifies testing, commissioning and maintenance, thereby increasing process uptime
- Optional Wi-Fi connectivity minimizes system configuration and provides safe relay programming and diagnostic retrieval
- Patented environmental monitoring, providing visibility to changes in environmental conditions that can affect relay life

Applications

- Wide range of feeder applications for utility, oil & gas, mining & metals, process industry, commercial, and waste water
- Comprehensive protection and management of incoming and outgoing feeders
- Fast protection pass enables use for load shedding schemes
- Advanced communications and flexlogic for reliable automatic bus transfer & auto-recloser schemes
- Bay controller for wide range of switchgear applications
- High speed fault detection for arc flash mitigation

imagination at work

Innovative Technology & Design

- Advanced feeder One Box Solution for protection, control monitoring and diagnostics of electrical systems
- Patented environmental monitoring and diagnostics
- Advanced, flexible and embedded communications: IEC® 61850 Ed2,
- IEC 62439/PRP, Modbus® RTU & TCP/IP, DNP3.0, IEC 60870-5-104, IEC 60870-5-103
- Single setup and configuration across the platform
- Field swappable power supply
- Enhanced relay draw-out construction
- Elimination of electrolytic capacitors

Exceptional Quality & Reliability

- IPC A-610-E Class 3 manufacturing standards
- Highest reliability standards for electronics testing
- 100% Environmental Stress Screening and full functional testing
- Rated for IP54 (front) applications
- Standard Harsh Conformal Coating

Uncompromising Service & Support

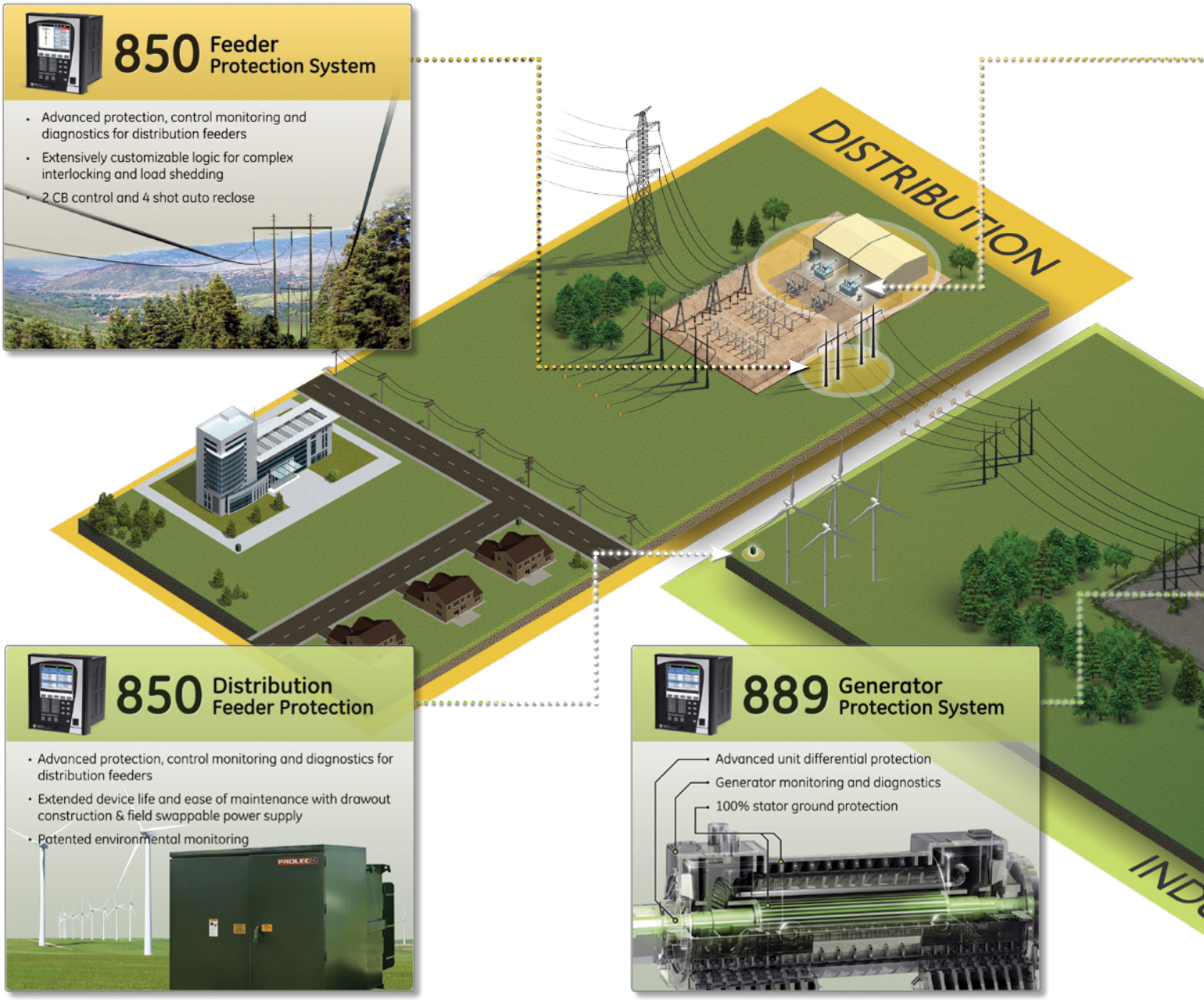
- Covered under GE's 10 year warranty plan
- Designed, tested and assembled by GE

Multilin 8 Series Platform Overview

From oil pumping and refining facilities, to open pit or underground mining and processing operations, to large or small utilities, customers demand solutions that ensure maximum process uptime, minimum operational and maintenance efforts, and have the durability to withstand harsh environmental conditions.

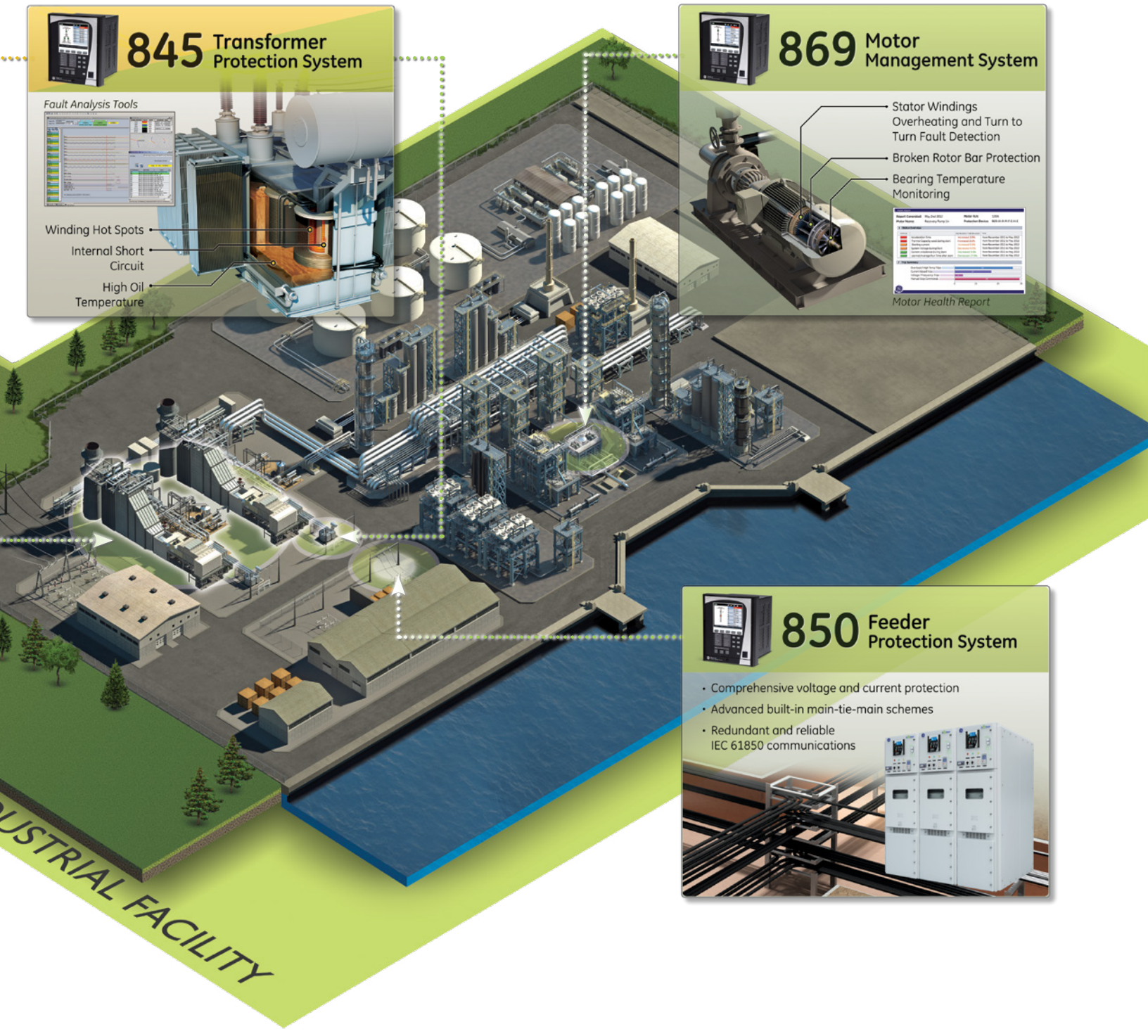
The Multilin 8 Series is GE's next-generation protection and control relay platform that provides comprehensive protection and asset monitoring for critical feeders, motors, generators, and transformers.

Multilin 8 Series Platform - Application Example



The Multilin 8 Series is designed to solve challenges that customers face in running their day-to-day operations including maximizing system and process uptime, simplifying system integration and maintenance, and extending the life of critical assets. GE is raising the bar on system performance and reliability.

With advanced communications the Multilin 8 Series integrates easily and seamlessly into new or existing DCS/SCADA system, along with other Multilin protection devices, providing a comprehensive solution for the end-to-end electrical system within the operations.



Exceptional Quality & Reliability

Industry-leading quality, reliability and design processes are at the core of GE's next generation protective relay platform. With significant investments in state-of-the-art type test facilities that simulate a complete range of operating environments and designed to the IPC A-610 Class 3 standard, adhering to the highest reliability standards and ensuring rugged performance, each device completes one hundred percent Electrical Stress Screening prior to shipping from GE's facility.

The Multilin 8 Series Protection Relays are manufactured in an ISO® 9001:2008 certified manufacturing facility.

Pioneering Technology & Design

The Multilin 850 is part of the 8 Series platform that provides comprehensive, high performance protection, control, monitoring and diagnostics for critical assets in Industrial and utility environment.

Utilizing decades of experience, GE has implemented ease-of-use features, such as single screen set-ups delivering faster feeder configuration, configurable scheme logic that eliminates the need for complex end-user programming, driving quicker setup times, decreased implementation costs and reduced points of failure.

The Multilin 8 Series products have an integrated protection integrity engine that utilizes customized algorithms, providing advanced diagnostics to ensure asset protection is not compromised.

Maintaining and safeguarding the electrical supply of an operation is critical to ensuring maximum process availability and performance.

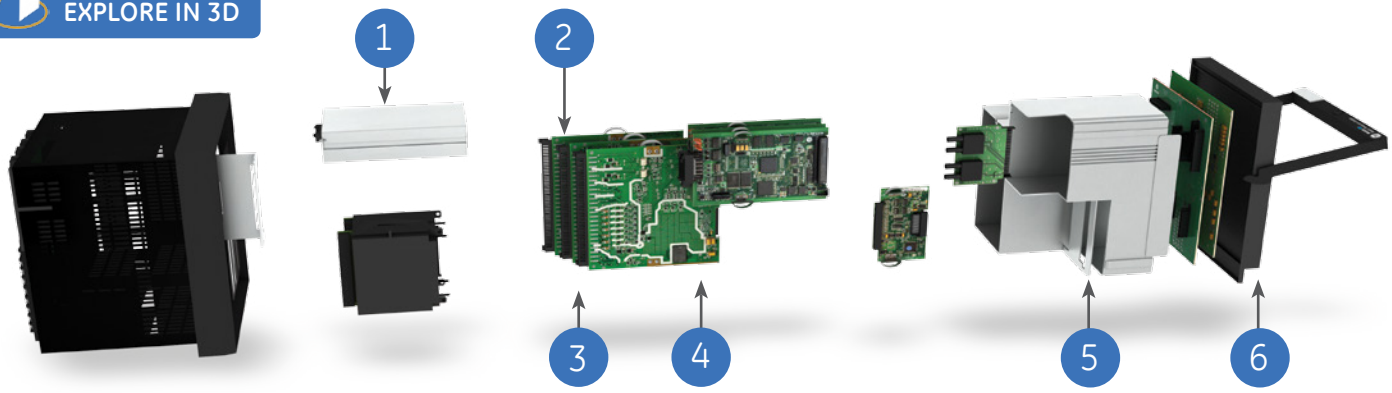
The 8 Series incorporates the latest cyber security features, including password complexity, RADIUS authentication, role-based access control (RBAC), customers to comply with NERC CIP and NISTIR 7628 requirements.

Understanding that customers need protection and control devices that must reliably operate in extremely harsh and challenging environments, GE delivers the Multilin 850 with harsh conformal coating on all printed circuit boards and a patented environmental awareness module that provides real-time detection of environmental factors that affect product life, as part of its standard offering, delivering higher reliability and extended relay life.

Uncompromised Service and Support

In addition to the superior technology and innovative design advancements that enable delivery of uncompromised performance and reliability, the Multilin 8 Series is also backed by GE's 10-year warranty plan.

WANT TO LEARN MORE?
EXPLORE IN 3D



1 Field Swappable Power Supply
Extends the usable life of the protection relay and minimizes costly, time consuming replacement and re-configuration

2 Harsh Environment Conformal Coating
Standard on all printed circuit boards delivering higher reliability and extended relay life

3 No Electrolytic Capacitors
Increasing quality and reliability for continuous plant operations by removing high failure components (excluding low voltage power supply)

4 IPC A-610 Class 3 Manufacturing
Drives to the highest level of reliability standards delivering rugged performance

5 Robust Extruded Aluminum Chassis
Custom-designed extruded aluminum chassis delivering optimal operating performance with optimal heat dissipation

6 Draw-Out
Providing simplified device fleet management

Multilin 850 Overview

The Multilin 850 is an advanced feeder protection device designed for high performance, protection, control and monitoring of incoming and outgoing feeders.

With 21 digital inputs and 15 digital outputs in a compact box, the 850 provides a versatile and cost effective control, protection, measurement & monitoring solution. The Flexlements and Flexlogic enables users to customize various schemes to meet variety of applications.

For main-tie-main and main-standby configurations, the Multilin 850 delivers a more economical and reliable solution, enabling customers to reduce hardware requirements and simplify device integration, including safe and secure Wi-Fi communications for system configuration and diagnostics.

Bay Controller/One Box Solution

The 850 offers comprehensive switchgear control aided by a Single Line Diagram & breaker control. A total of 10 switchgear elements can be displayed and 8 elements controlled. The integrated solution for protection, control, monitoring and diagnostics eliminates the need for other external devices thus offering an integrated solution for switchgear systems. The device supports 6 user programmable pages.

Switchgear Control and Configurable SLD

The Multilin 850 provides a configurable dynamic SLD up to six (6) pages for comprehensive switchgear control of up to 3 breakers and 9 disconnect switches; including interlocks. Up to 15 digital and metering status elements can be configured per SLD page. These can be configured to show breakers, switches, metering, and status items.

Individual SLD pages can be selected for the default home screen pages. Automatic cycling through these pages can also be achieved through default screen settings.

The provision of such powerful control and display capability within the relay ("One Box concept) eliminates the need for external controls, switches and annunciation on the panel reducing equipment and engineering cost.

Annunciator panel and virtual PBs

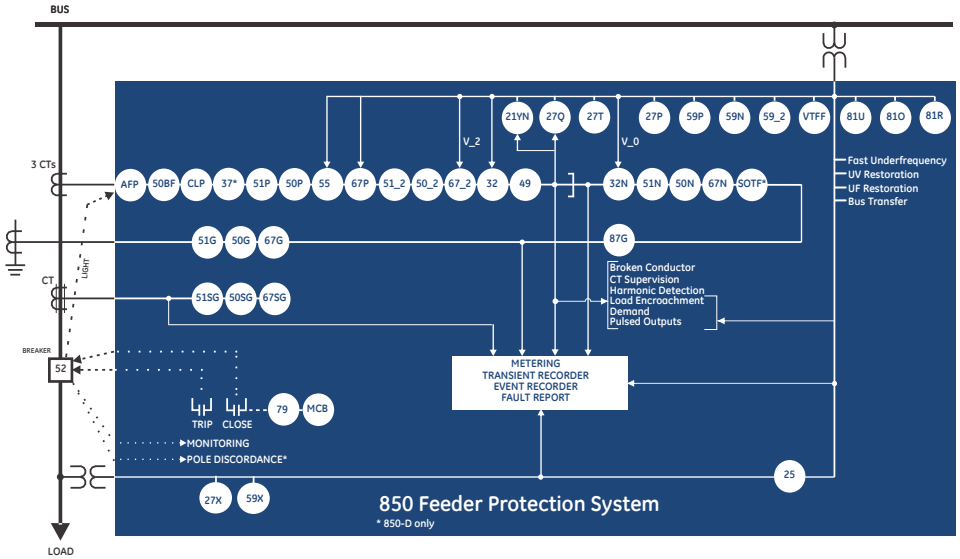
The Multilin 850 offers a configurable annunciator panel that can be constructed to show up to 36 alarms in either self-reset mode or latched mode per ISA 18.1 standard similar to a physical annunciator panel; eliminating the need for physical one. The alarms can be displayed on the front panel in a configurable grid layout of 2x2 or 3x3.

The Multilin 850 extends the local control functionalities with 20 virtual pushbuttons that can be assigned for various functions. Each programmable pushbutton has its own programmable LED which can be used to acknowledge the action taken by the tab pushbutton.

With a fast protection pass, running every 2 msec, the 850 relay provides faster response to current, voltage, power, and frequency protection elements; helping reduce stress on assets. The Multilin 850 supports the latest communication protocols, including DNP, ModBus, IEC 60870-5-103, IEC 62439/PRP and IEC 61850; facilitating easy integration into new or existing SCADA/DCS networks, integrates into new or existing networks.

Functional Block Diagram

ANSI DEVICE	DESCRIPTION
21 YN	YN Neutral Admittance
25	Synchrocheck
27P	Phase Undervoltage
27Q	UV Reactive Power
27T	Timed Undervoltage Protection
27X	Auxiliary Undervoltage
32	Directional Power
32N	Wattmetric Ground Fault (Wattmetric zero sequence directional)
37*	Undercurrent
49	Thermal Overload
50BF	Breaker Failure
50G	Ground Instantaneous Overcurrent
50SG	Sensitive Ground Instantaneous Overcurrent
50N	Neutral Instantaneous Overcurrent
50P	Phase Instantaneous Overcurrent
50_2	Negative Sequence Instantaneous Overcurrent
51G	Ground Time Overcurrent
51SG	Sensitive Ground Time Overcurrent
51N	Neutral Time Overcurrent
51P	Phase Time Overcurrent
51_2	Negative Sequence Time Overcurrent
52	AC Circuit Breaker Pole Discordance
55	Power Factor
59N	Neutral Overvoltage
59P	Phase Overvoltage
59X	Auxiliary Overvoltage
59_2	Negative Sequence Overvoltage



ANSI DEVICE	DESCRIPTION
67G	Ground Directional Element
67SG	Sensitive Ground Directional Element
67N	Neutral Directional Element
67P	Phase Directional Element
67_2	Negative Sequence Directional Element
79	Automatic Recloser
81O	Overfrequency
81U	Underfrequency

ANSI DEVICE	DESCRIPTION
81R	Frequency Rate of Change
87G	Restricted Ground Fault (RGF)
AFP	Arc Flash Protection
CLP	Cold Load Pickup
I1/I2	Broken Conductor
MCB	Manual Close Blocking
SOTF*	Switch Onto Fault
VTFF	Voltage Transformer Fuse Failure

Protection & Control

As part of the 8 Series family, the Multilin 850 provides superior protection and control. The 850 offers comprehensive protection and control solutions for incoming, outgoing bus-tie/bus-coupler feeders. It contains a full range of selectively enabled, self-contained protection and control elements.

The voltage and frequency protection functions detect abnormal system conditions, potentially hazardous to the system. Some of these conditions may consist of over and undervoltage, over and underfrequency, and phase reversal.

Fast Underfrequency

The 850 has an 8 stage Fast Underfrequency element that measures frequency by detecting the consecutive voltage zero crossings and measuring the time between them. The measured frequency has the range between 20 to 70 Hz. This is useful for performing fast load shedding when frequency variations from unbalance conditions arise due to:

- Inadequate load forecast or deficient generation capacity programming.
- Busbars, generator group or interconnection feeders trip.
- System splits into islands.

FlexCurves™

For applications that require greater flexibility, FlexCurves can be used to define custom curve shapes. These curves can be used to coordinate with other feeders to achieve fault selectivity.

RTD Protection

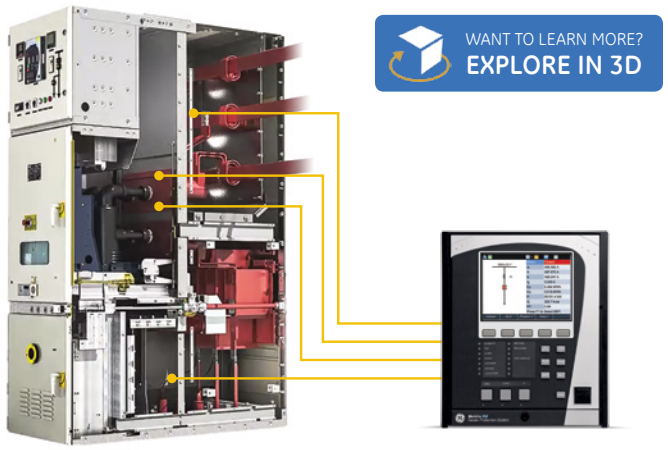
The Multilin 850 supports up to 13 programmable RTD inputs that can be configured for an Alarm or Trip.

The RTDs can be assigned to a group for monitoring ambient temperatures or any other desired temperature. The RTD voting option gives additional reliability to ignore any RTD failures.

Integrated Arc Flash Protection

The Multilin 8 Series supports an integrated arc flash module providing constant monitoring of an arc flash condition within the switchgear, motor control centers, or panelboards. With a 2ms protection pass, the 8 Series is able to detect light and overcurrent using 4 arc sensors connected to the 8 Series relay. In situations where an arc flash/fault does occur, the relay is able to quickly identify the fault and issue a trip command to the associated breaker thereby reducing the total incident energy and minimizing resulting equipment damage.

Self-monitoring and diagnostics of the sensors ensures the health of the sensors as well as the full length fiber cables. LEDs on the front panel display of the 850 can be configured to indicate the health of the sensors and its connections to the relay.



MV Switchgear or Motor Control Center **Multilin 8 Series**

Fast, reliable arc flash protection with light-based arc flash sensors integrated within the Multilin 8 Series of protection & control devices. With arc flash detection in as fast as 2msec, the costs associated with equipment damage and unplanned downtime is significantly reduced.

Inputs and Outputs

The 850 provides a max of 21 Digital inputs and 15 Digital outputs with an option for 7 Analog Outputs (dc mA), 4 Analog Inputs (dc mA), 1 RTD input. The configurable analog inputs can be used to measure quantities fed to the relay from standard transducers. Each input can be individually set to measure 4-20 mA, 0-20 mA or 0-1 mA transducer signals.

The 850 can also be set to issue trip or alarm commands based on signal thresholds. The configurable analog outputs can be used to provide standard transducer signals to local monitoring equipment. The analog outputs can be configured to provide outputs based on measured analog values, or calculated quantities.

An optional general purpose transducer input allows a user-defined quantity to be monitored and used as part of the protection as defined by FlexLogic™.

Advanced Automation

The Multilin 850 incorporates advanced automation capabilities that exceeds what is found in most feeder protection relay. This reduces the need for additional programmable controllers or discrete control relays including programmable logic, communication, and SCADA devices. Advanced automation also enables seamless integration of the 850 into other protection or process systems (SCADA or DCS).

FlexElements™

FlexElement is a universal comparator, that can be used to monitor any (analog) actual value measured or calculated by the relay, or a net difference of any two analog (actual) values of the same type.

The element can be programmed to respond either to a signal level or to a rate-of-change (delta) over a pre-defined period of time.

This can be used to generate special protection or monitoring functions that can enable the user to flag user defined abnormality that gives better visibility to a certain condition.

FlexLogic™

FlexLogic is the powerful 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 850 can be programmed to provide the required tripping logic along with custom scheme logic for feeder control interlocking schemes with adjacent protections (for example, preventing sympathetic tripping of healthy feeders), and dynamic setting group changes.

Monitoring & Diagnostics

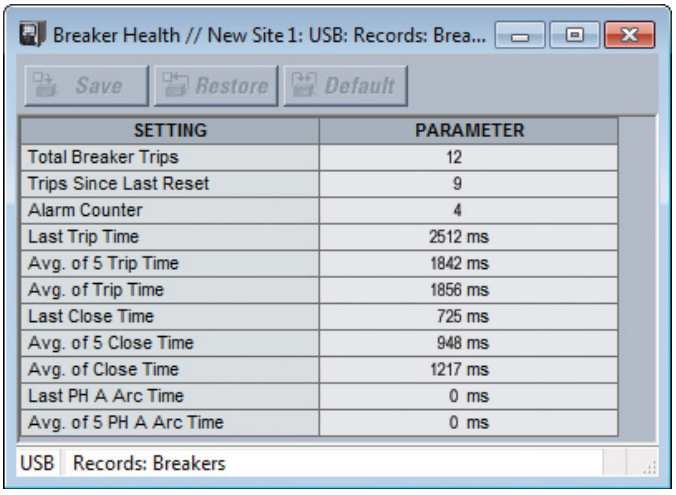
The Multilin 850 includes high accuracy metering and recording for all AC signals. Voltage, current, and power metering are built into the relay as a standard feature. Current and voltage parameters are available as total RMS magnitude, and as fundamental frequency magnitude and angle.

Breaker Health Monitoring

The breaker is monitored by the relay not only for detection of breaker failure, but also for the overall "breaker health" which includes:

- Breaker close and breaker open times
- Trip circuit monitoring
- Spring charging time
- Per-phase arcing current
- Trip counters

All algorithms provide the user with the flexibility to set up initial breaker trip counter conditions and define the criteria for breaker wear throughout a number of set points.

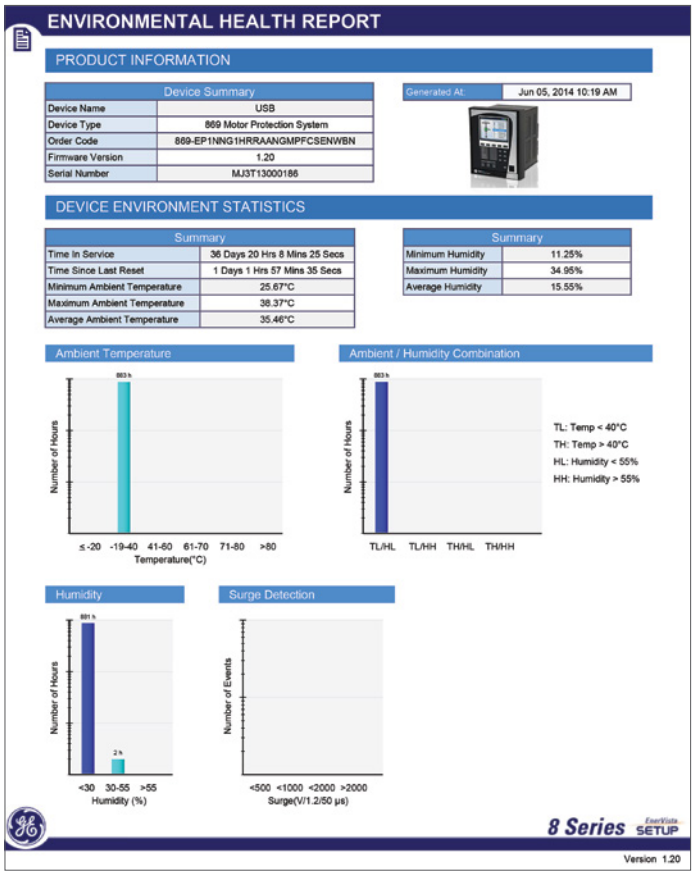


SETTING	PARAMETER
Total Breaker Trips	12
Trips Since Last Reset	9
Alarm Counter	4
Last Trip Time	2512 ms
Avg. of 5 Trip Time	1842 ms
Avg. of Trip Time	1856 ms
Last Close Time	725 ms
Avg. of 5 Close Time	948 ms
Avg. of Close Time	1217 ms
Last PH A Arc Time	0 ms
Avg. of 5 PH A Arc Time	0 ms

Multilin 8 Series Breaker Health Report available on display or via the setup software

Environmental Monitoring

The Multilin 8 Series implements a patented environmental monitoring system that measures and provides operating condition information. Reliable and secure operation of the 850 relay and other electronic devices in the vicinity may be affected by environmental factors. The 850 relay has been designed to meet or exceed all required industry standards, however some operating conditions may be beyond those standards and reduce total lifespan of the device.



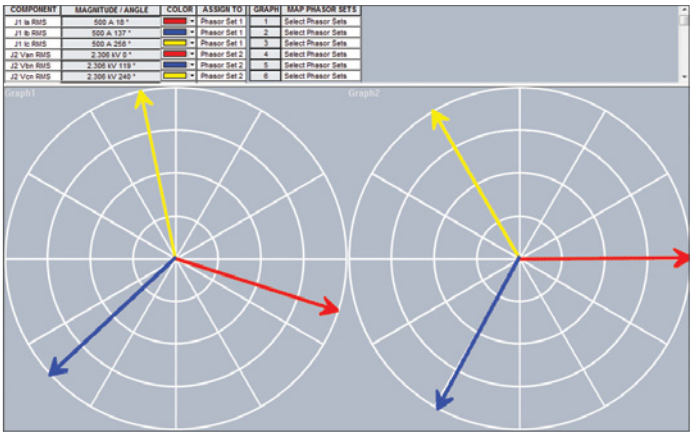
Environmental health report is available via Multilin PC Software

Typical environmental conditions that may affect electronic device reliability include voltage, current density, temperature, humidity, gas, dust, contamination, mechanical stress, shock, radiation, and intensity of electrical and magnetic fields. These environmental factors are different from natural weather conditions at particular installation conditions and are beneficial to monitor. The 8 Series built-in environmental awareness feature (patent "Systems and methods for predicting maintenance of intelligent electronic devices") collects the histograms of each operating condition from the point the device is put into service. Monitored environmental conditions include temperature, humidity and transient voltage. The histogram of each environmental factor may be retrieved from the diagnostic page accessed through a PC running the EnerVista Multilin 8 Series Setup program

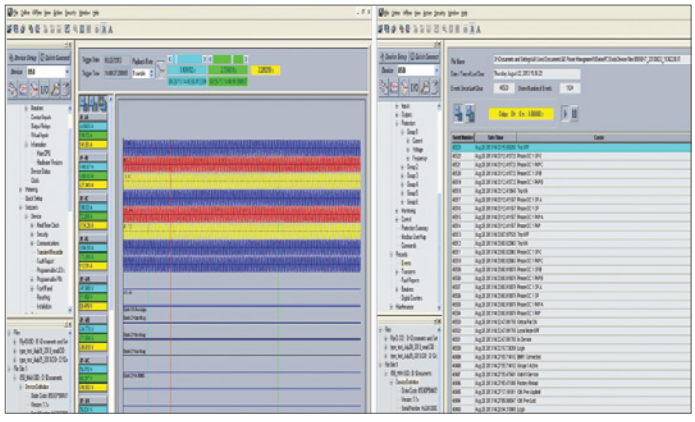
Metering

The Multilin 850 offers high accuracy power quality monitoring for fault and system disturbance analysis. The Multilin 8 Series delivers unmatched power system analytics through the following advanced features and monitoring and recording tools:

- Harmonics measurement up to 25th harmonic for both currents and voltages including THD.
- The length of the transient recorder record ranges from 31 cycles to 1549 cycles, depending on the user specified configuration. This gives the user ability to capture long disturbance records which is critical for some applications.
- 32 digital points and 16 analog values, assigned by the user, can be captured in the COMTRADE format by the transient recorder.
- Comprehensive data logger provides the recording of 16 analog values selected from any analog values calculated by the relay. Capture rates range from 16 ms, 20ms, 1 second, 30 seconds, 1 minute, 30 minutes, or 1 hour rate. This data capture flexibility allows the operator to measure power factor or reactive power flow (for example), for several hours or even days, enabling detailed analysis and corrective action to be taken, if required.
- Detailed Fault Report allows the user to identify the fault location, fault type and element(s) that triggered the 850 to trip. It carries other useful information, such as pre-fault and fault phasors, relay name and model, firmware revision and other details. The 850 stores fault reports for the last 16 events. 1024 Event Recorder chronologically lists all triggered elements with an accurate time stamp over a long period of time. The 850 stores the last 1024 events locally in the relay.



Multilin 850 Phasor viewer



The 850 monitoring system performance with oscillography and event records

Communications

The Multilin 8 Series 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 850 also supports two independent IP addresses, providing high flexibility for the most challenging of communication networks.

Providing several Ethernet and serial port options and supporting a wide range of industry standard protocols, the 8 Series enables easy, direct integration into DCS and SCADA systems. The 8 Series supports the following protocols:

- IEC 61850 (8 Clients, 4 Logical Devices, Tx & Rx expansion, Analog GOOSE), IEC 62439 / PRP
- DNP 3.0 serial, DNP 3.0 TCP/IP, IEC 60870-5-103, IEC 60870-5-104
- Modbus RTU, Modbus TCP/IP

The 850 has two interfaces as USB front port and Wi-Fi for ease of access to the relay.

Wi-Fi Connectivity:

- Simplify set-up and configuration
- Simplify diagnostic retrieval
- Eliminate personnel in front of switchgear
- WPA-2 security

Cyber Security

The 8 Series delivers a host of cyber security features that help operators to comply with NERC CIP guidelines and regulations.

AAA Server Support (Radius/LDAP)

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 8 Series. The new and advanced access functions allow users to configure up to three 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 will enable integration with established SEM (Security Event Management) systems.

Cyber Security with Radius Authentication

Software & Configuration

The EnerVista™ suite is an industry-leading set of software programs that simplifies every aspect of using the Multilin 850. EnerVista provides all the tools to monitor the status of the protected asset, maintain the device and integrate the information measured by the Multilin 8 Series, into SCADA or DCS process control systems. The ability to easily view sequence of events is an integral part of the setup software, as postmortem event analysis is critical to proper system management.

EnerVista Launchpad

EnerVista Launchpad is a powerful software package that provides users with all the setup and support tools needed for configuring and maintaining Multilin products. The setup tools within Launchpad allow for the configuration of devices in real-time, by communicating via serial, Ethernet or modem connections, or offline by creating device 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.

8 Series Setup Software

8 Series Setup Software is single setup and configuration across the platform and can reduce device setup and configuration time.

Simulation

The 8Series can simulate current and voltage inputs when this feature is enabled. Other test operations are also possible such as LED lamp test of each color and testing of output relays. The simulation feature is provided for testing the functionality of the relay in response to program conditions, without the need of external AC voltage and current inputs. First time users will find this to be a valuable training tool. System parameters such as currents and voltages, phase angles are entered as set points. When placed in simulation mode, the relay suspends reading actual AC inputs, generates samples to represent the programmed phasors, and loads these samples into the memory to be processed by the relay. Both normal and fault conditions can be simulated to exercise a variety of relay features.

1 Easy to Use - Draw-out case

2 Easy to Configure - 1 simple step

3 Detailed Diagnostics

Simplified Setup and On-Going Maintenance

The robust 850 streamlines user workflow processes and simplifies engineering tasks, such as configuration, wiring, testing, commissioning, and maintenance. Building on the history of simplified setup and configuration, the 850 Feeder Protection Relay has implemented simplified setup screens to minimize relay setup time. In addition, for local programming, the 850 comes with a fully functional GCP, which allows users to locally monitor the asset.

Ease-of-Use

Continuing its legacy in providing easy-to-use protective relay solutions, the 850 is designed to minimize product and system configurability requirements, for quicker physical installations, easier and simplified setup and configuration.

Full Color Graphical HMI Front Display

A large, full color Graphic Control Panel (GCP) ensures clear representation of critical status and measurements. When the keypad and display are not being used, the GCP will automatically revert to screen saver mode, which will turn off the display until one of the local pushbuttons is pushed.

The 850 front panel provides 14 LED indicators and 3 LED pushbutton indicators. 10 LED's are user- programmable, while "In service" and "Pickup" LED's are non-programmable. "Trip" and "Alarm" LED's are not color programmable but can be assigned with selected operands.

The GCP can be used to view device and system status, alarms and event logs, and metering information. The GCP and navigation keys simplify relay configuration and setup, allowing users to make setting changes directly through the front panel. Up to six user-defined pages are available in the home menu.

LED Indicators for Quick Status Indication

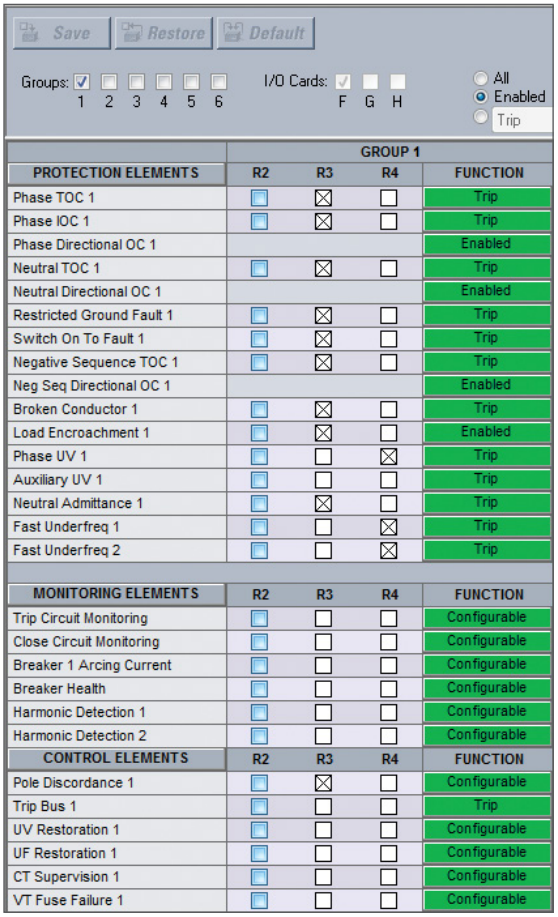
The front panel includes user configurable LED's. Each LED can be completely configured and named based on the application and user requirements. The color of each indicator conveys its importance.

G = Green: General Condition

A = Amber: Alert Condition

R = Red: Serious Alarm or Important Status

User-programmable LED's can be turned on by a selection of FlexLogic operands representing protection, control or monitoring elements. Each LED can be configured to be self-reset or latched and labeled based on the application and user requirements. User-programmable LED's can be selected to be either Red, Green or Orange to give the distinctive indication of selected operations.

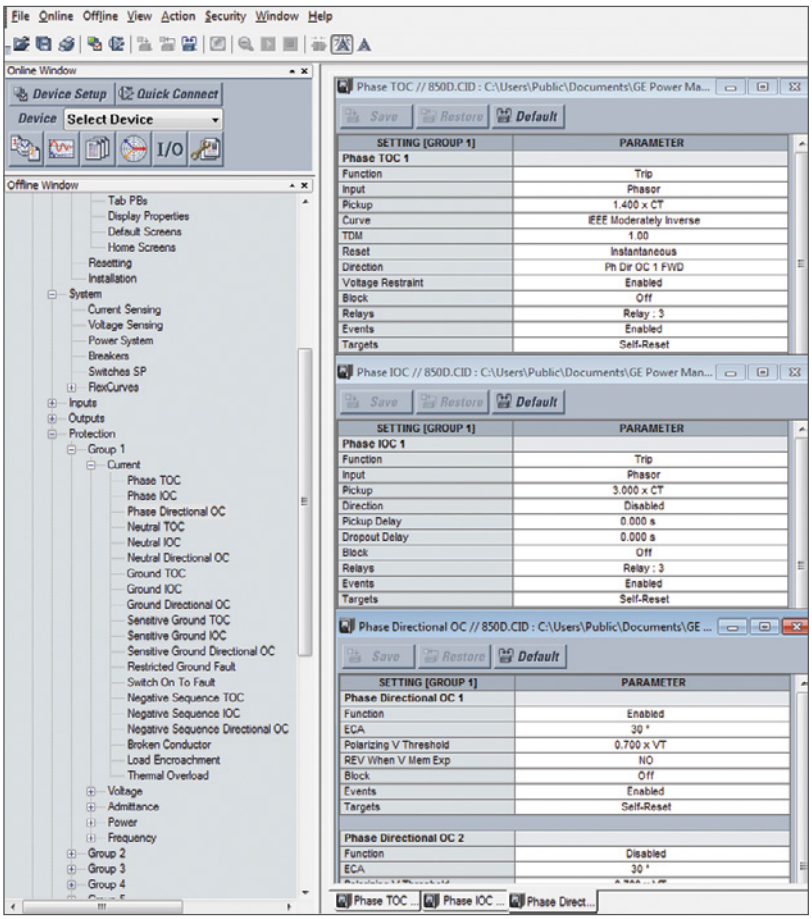


Save | Restore | Default

Groups: 1 2 3 4 5 6 I/O Cards: F G H All Enabled Trip

	GROUP 1			
PROTECTION ELEMENTS	R2	R3	R4	FUNCTION
Phase TOC 1	☐	☒	☐	Trip
Phase IOC 1	☐	☒	☐	Trip
Phase Directional OC 1				Enabled
Neutral TOC 1	☐	☒	☐	Trip
Neutral Directional OC 1				Enabled
Restricted Ground Fault 1	☐	☒	☐	Trip
Switch On To Fault 1	☐	☒	☐	Trip
Negative Sequence TOC 1	☐	☒	☐	Trip
Neg Seq Directional OC 1				Enabled
Broken Conductor 1	☐	☒	☐	Trip
Load Encroachment 1	☐	☒	☐	Enabled
Phase UV 1	☐	☐	☒	Trip
Auxiliary UV 1	☐	☐	☐	Trip
Neutral Admittance 1	☐	☒	☐	Trip
Fast Underfreq 1	☐	☐	☒	Trip
Fast Underfreq 2	☐	☐	☒	Trip
MONITORING ELEMENTS	R2	R3	R4	FUNCTION
Trip Circuit Monitoring	☐	☐	☐	Configurable
Close Circuit Monitoring	☐	☐	☐	Configurable
Breaker 1 Arcing Current	☐	☐	☐	Configurable
Breaker Health	☐	☐	☐	Configurable
Harmonic Detection 1	☐	☐	☐	Configurable
Harmonic Detection 2	☐	☐	☐	Configurable
CONTROL ELEMENTS	R2	R3	R4	FUNCTION
Pole Discordance 1	☐	☒	☐	Configurable
Trip Bus 1	☐	☐	☐	Trip
UV Restoration 1	☐	☐	☐	Configurable
UF Restoration 1	☐	☐	☐	Configurable
CT Supervision 1	☐	☐	☐	Configurable
VT Fuse Failure 1	☐	☐	☐	Configurable

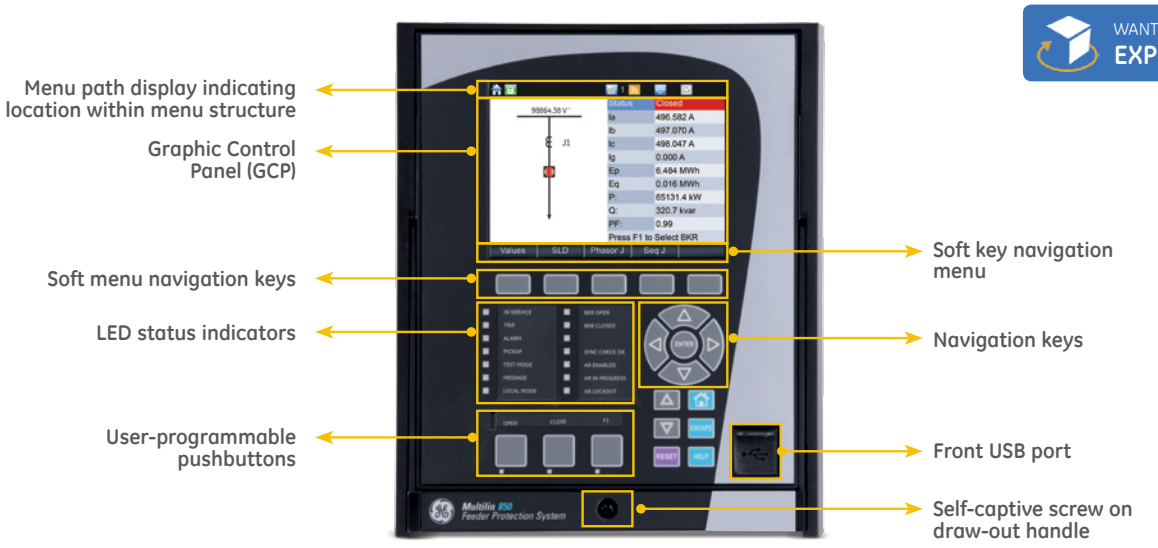
Multilin 850 Protection Summary



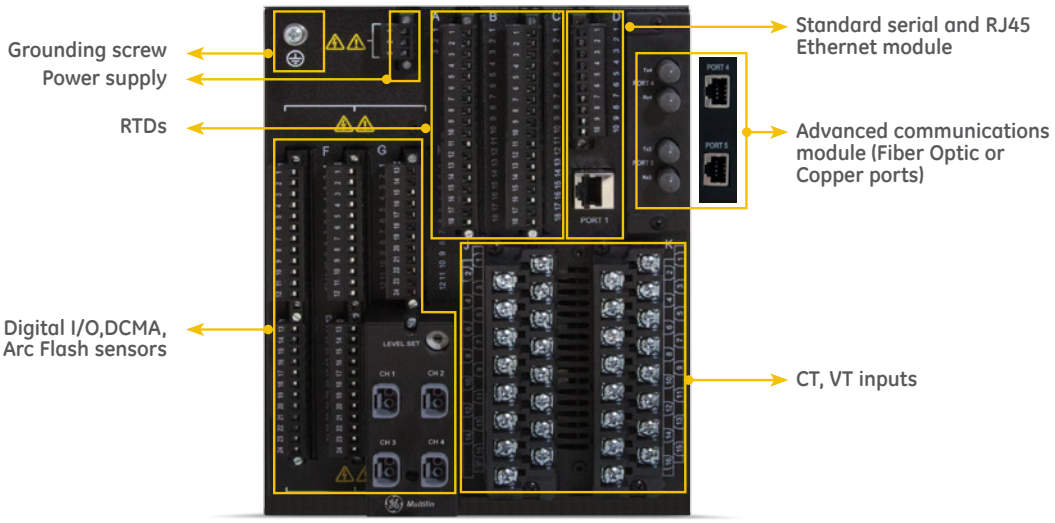
Multilin 850 Settings

Front View

WANT TO LEARN MORE?
EXPLORE IN 3D



Rear View



Optional IP20 cover available

Dimensions & Mounting

Retrofit Existing Multilin SR Devices in Minutes

Traditionally, retrofitting or upgrading an existing relay has been a challenging and time consuming task often requiring re-engineering, panel modifications, and re-wiring. The Multilin 8 Series Retrofit Kit provides a quick, 3-step solution to upgrade previously installed Multilin SR 735 or 750/760 protection relays, reducing upgrade costs.

With the new 8 Series Retrofit Kit, users are able to install a new 850 Feeder Management System without modifying existing panel or switchgear cutouts, re-wiring, or need for drawing changes and re-engineering time and cost.

With this three-step process, operators are able to upgrade existing SR relays in as fast as 21 minutes, simplifying maintenance procedures and reducing system downtime. The Compatibility mode enables the user to changes the Modbus actual value registers to emulate the SR 735 or 750/760 relay. This eliminate the downtime required to change the Modbus address in SCADA/DCS.

1 Update **Settings File**

EnerVista 8 Series Setup Software provides automated setting file conversion with graphical report to quickly and easily verify settings and identify any specific settings that may need attention.

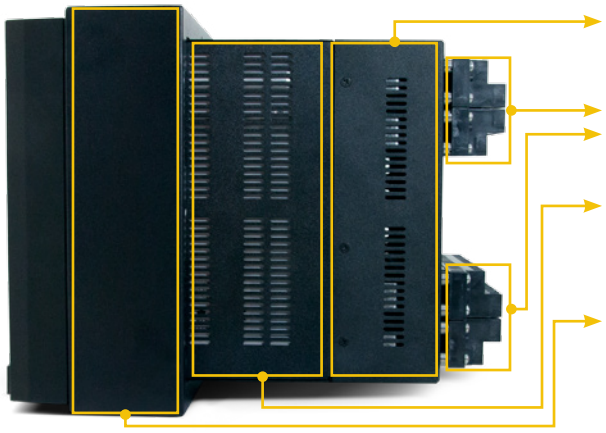
2 Replace **Relay**

Simply remove the terminal blocks and then remove the SR chassis from the panel. No need to disconnect any of the field wiring.

3 Plug & Play **Reconnection**

Insert the new 8 Series Retrofit chassis into the switchgear and simply plug-in the old terminal blocks - there is need to make any cut-out modifications or push and pull cables.

The 8 Series Retrofit Kit comes factory assembled and tested as a complete unit with the 8 Series protection device and includes replacement hardware (terminal blocks and screws) if the existing hardware is significantly aged or damaged.



Factory wired SR Terminal Block Frame to ensure mapping of SR terminal locations to the 8 Series terminal block

Existing SR Terminal Blocks easily plug-in

8 Series Protection Relay (matched to existing SR 735 or 750/760 device)

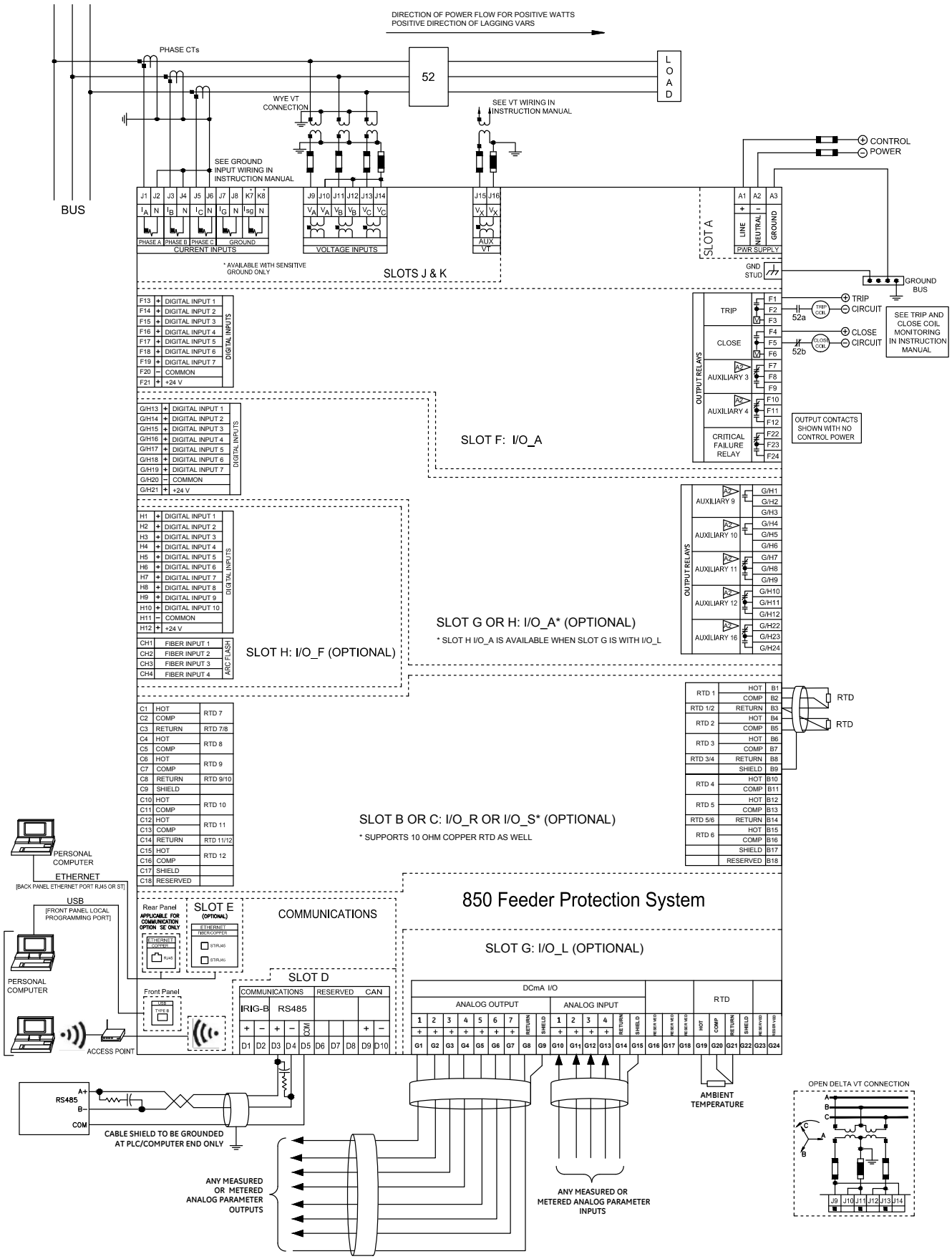
3" Depth Reduction Collar to ensure relay depth closely matches the previously installed SR device, eliminating the need to push or pull cables

Explore in Detail

visit us online to explore the SR to 8 Series retrofit kit in detail using our interactive app. **www.GEGridSolutions.com/8SeriesRetrofitKit**

Multilin 8 Series Retrofit

Typical Wiring



Ordering

	850	*	**	NN	**	*	*	*	A	*	*	*	*	*	*	*	*	*	*	*	*	N	Description
Base unit	850																						Feeder Protection Relay (Standard: English Language; High Voltage PS, Graphical Control Panel)
Application		E																					Industrial
		D																					Distribution Feeder
Phase Currents - Bank 1/2			P1																				1A three phase current inputs (J1) with 4 voltage inputs (J2)
			P5																				5A three phase current inputs (J1) with 4 voltage inputs (J2)
Phase Currents - Bank 3				NN																			No phase current inputs
Ground Currents					G1																		1A ground input (NA for N1)
					G5																		5A ground input (NA for N1)
					S1																		1A ground + 1A sensitive ground input (NA if 2nd set of CT selected)
					S5																		5A ground + 5A sensitive ground input (NA if 2nd set of CT selected)
					D1																		1A ground + 1A polarizing current input (NA if 2nd set of CT selected)
					D5																		5A ground + 5A polarizing current input (NA if 2nd set of CT selected)
Power Supply						H																	110 - 250 V dc/110 - 230 Vac
						L																	24 - 48 VDC
SLOT B - LV I/O							N																None
							R																6 X RTDs (Pt100, Ni100, Ni120)
							S																6 X RTDs (Pt100, Ni100, Ni120, Cu10)
SLOT C - LV I/O								N															None
								R															6 X RTDs (Pt100, Ni100, Ni120)
								S															6 X RTDs (Pt100, Ni100, Ni120, Cu10)
SLOT F - HV I/O									A														2 Form A (Vmon), 3 Form C, 7 Digital Inputs (Low / High voltage, Int/Ext supply)
SLOT G - HV I/O										N													None
										A													2 Form A (Vmon), 3 Form C, 7 Digital Inputs (Low / High voltage, Int/Ext supply)
										L													7 DcmA O/P + 4 DcmA I/P + 1 RTD
SLOT H - HV I/O											N												None
											A												2 Form A (Vmon), 3 Form C, 7 Digital Inputs (Low / High voltage, Int/Ext supply)
											F												10 Digital Inputs + 4 Arc flash inputs
Faceplate												M											Basic : Membrane key pad
												G											Standard : Rugged key pad
Current Protection													S										Basic = 50P, 50N, 50G, 51P, 51N, 51G
													M										Standard = Basic + 50SG, 50_2, 51SG, 51_2, RGF
													D										Standard = 37 (3), 50P (4/CT bank), 50N (4/CTbank), 50G (4/CT bank), 51P(4), 51N(4), 51G(2/CT bank), 50SG(4/CT bank), 50_2(4/CT bank), 51SG(2/CT bank), 51_2 (2/CT bank), RGF(3), SOTF (3/Bkr), 67P (4), 67N (4), 67G (1/CTbanks), 67SG (1/CTbanks), 67_2 (1/CT bank), 49 (2), Load Encroachment (1/CT bank), Broken Conductor (3)
													A										Advanced = Standard + 67P, 67N, 67G, 67SG, 67_2, 49, Load Encroachment, Broken Conductor
Voltage Monitoring & Protection														S									Standard = 27P (4/VT banks), 27X (2/VT banks), 59P(4), 59N(4), 59X (2/VT banks), 81O (6/VT banks), 81U (6/VT banks)
														P									Advanced = Standard + 25 (1/CT bank), 27T(4), 27Q (3/Bkr), 32(4), 32N(4), 55(4), 59_2(2/VT banks), 81R (6/VT banks), Fast U/F (8), Neutral Admittance (3)
Control															B								Basic = Setpoint Group Control, Virtual Inputs, Trip Bus, Breaker Control, VTFF
															F								Standard = Basic + Flexlogic, CLP, 50BF (2/CT bank), CT Spvn (3)
															D								Standard = Setpoint Group Control, Virtual Inputs, Trip Bus (6), Breaker Control (1/Bkr), VTFF (1/ VT bank), FlexLogic, CLP (1/Bkr), 50BF (2/CT bank), Pole Discordance (3), Autorelcose (1/Bkr), CT Spvn (3)
															C								Advanced = Standard + Autorelcose, Bus Transfer (Requires voltage option P)
															H								Advanced HMI = Advanced + Tab PBs, Annunciator Panel, Configurable SLDs with Bay Control
															T								Advanced HMI = Standard + Tab PBs, Annunciator Panel, Configurable SLDs with Bay Control
Monitoring																B							Basic = Breakers Coil Monitoring (1/Bkr), Breaker Arcing (1/Bkr), Harmonic Detection (6), THD, Current Demand (1/CT bank), Digital Counters (16), Data Logger
																C							Standard = Basic + Advanced Breaker Health (1/Bkr)
																A							Advanced = Standard + Harmonic Detection (6)
Communications																	S	E					Standard = Front USB, 1 x Rear RS485 : Modbus RTU, DNP3.0, IEC60870-5-103 + 1 x Ethernet (Modbus TCP, DNP)
																	1	E					Advanced = Front USB, 1 x Rear RS485 + 2 x Ethernet Fiber, MODBUS RTU / TCP, DNP3.0, IEC 60870-5-103/104, 1588, SNTP, OPC UA
																	1	P					Advanced + PRP
																	2	A					Advanced + IEC 61850
																	2	E					Advanced + PRP + IEC 61850
																	3	A					Advanced + Extended IEC 61850
																	3	E					Advanced + PRP + Extended IEC 61850
Advanced Communication Connector																			N				None
																			S				ST, Multi-mode 1310nm
																			C				RJ45, Copper 10/100M
Wireless Communication																				N			None
																				W			WiFi 802.11
Security																					B		Basic
																					A		Advanced - CyberSentry Level 1

Note: Harsh Environment Coating is a standard feature on all 8 series units.
**HV I/O, Option A - Max 2 across slots F through H*
Arc Flash Detection (Option F): Includes 4 x Arc Flash sensors, each 18 feet long

CONFIGURE ONLINE

GEGridSolutions.com

GEA-12739L(E)
English
170828

imagination at work