

MULTILIN 850P

Innovative Multi Feeder Protection for Industrial and Utility Applications

The Multilin™ 850P relay is a member of the Multilin 8 Series protective relay platform and has been designed for the management, protection and control of multi feeder applications supporting both traditional voltage inputs as well as Low Energy Analog (LEA) inputs. A maximum of 4 feeders can be supported by the 850P.

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

The 850P helps our customers:

- Extend asset life and optimize system performance for greater reliability and higher return on investments
- Reduce unplanned system downtime due to environmental conditions and equipment failures
- Simplify device and install base management, reducing total life cycle costs
- Improve situational awareness of downstream distribution points
- Minimize maintenance effort and reduce inefficient truck rolls in the event of a power system disturbance

Key Benefits

Reduce number of IEDs in the system

- Less capital cost
- Less O&M cost
- Reduce battery sizing on Padmount switches

Mean time to repair less than 15mins

- Field swappable PSU
- Draw out construction
- Ready to consume service reports

Extended asset life

- Built-in Environmental monitoring
- Battery and advanced breaker monitoring

Same device based solution (850D/P)

- Reduce training needs as same platform used both inside and outside the substation
- Standardize SKU across systems
- Harmonized look and feel, operational experience

Applications

- Wide range of multi feeder applications for utility, oil & gas, mining & metals, process industry, commercial, and waste water
- Comprehensive protection and management of Padmount and Ring Main Unit feeders
- High speed fault detection for arc flash mitigation



Innovative Technology & Design

- Advanced multi feeder protection system in Padmount Switch Gear or Ring Main Units
- 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

Exceptional Quality & Reliability

- IPC A-610-E Class 3 manufacturing standards
- Highest reliability standards for electronics testing
- Comprehensive Accelerated & Highly Accelerated Life Testing (ALT, HALT)
- Rated for IP54 (front) applications
- Harsh Environment Coating

Uncompromising Service & Support

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



GE VERNOVA

Multilin 850P Overview

The Multilin 850P is an advanced multi feeder protection device designed for high performance, protection, control and monitoring of incoming and outgoing feeders for Padmount Switch Gear or Ring Main Units.

With an option for a maximum of 12 Current Transformers, the 850P can be used for either a 3 way or 4 way gear. The 850P supports either 6 Low Energy Analog (LEA) inputs or 4 Voltage Transformer (VT) inputs. With support for 6: LEA sensors, the 850P is capable of monitoring 2 separate sets of voltages, The Current Transformers can be freely configured with either set of voltage inputs for Power metering.

With up to 57 digital inputs and 22 digital outputs in a compact box, the 850P provides a versatile and cost effective control, protection, measurement & monitoring solution. The Flexlements and Flexlogic enables users to customize various schemes to meet a variety of applications.

The Multilin 850P delivers a more economical and reliable solution, enabling customers to reduce space, capital cost, O&M cost, battery sizing and simplify device integration, including safe and secure Wi-Fi communications for system configuration and diagnostics. With a complete portfolio offering for Feeder, Motor, Transformer & Generator protection, the 8 Series, helps reduce the customer need to familiarize with multiple devices & keep a large IED inventory.

With its faster response time, the 850P helps in reducing the SAIDI/SAIFI numbers.

When used in conjunction with motorized switchgear, the 8 Series, helps in effective FDIR/FLISR schemes.

Switchgear Control and Configurable SLD

The Multilin 850P 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.

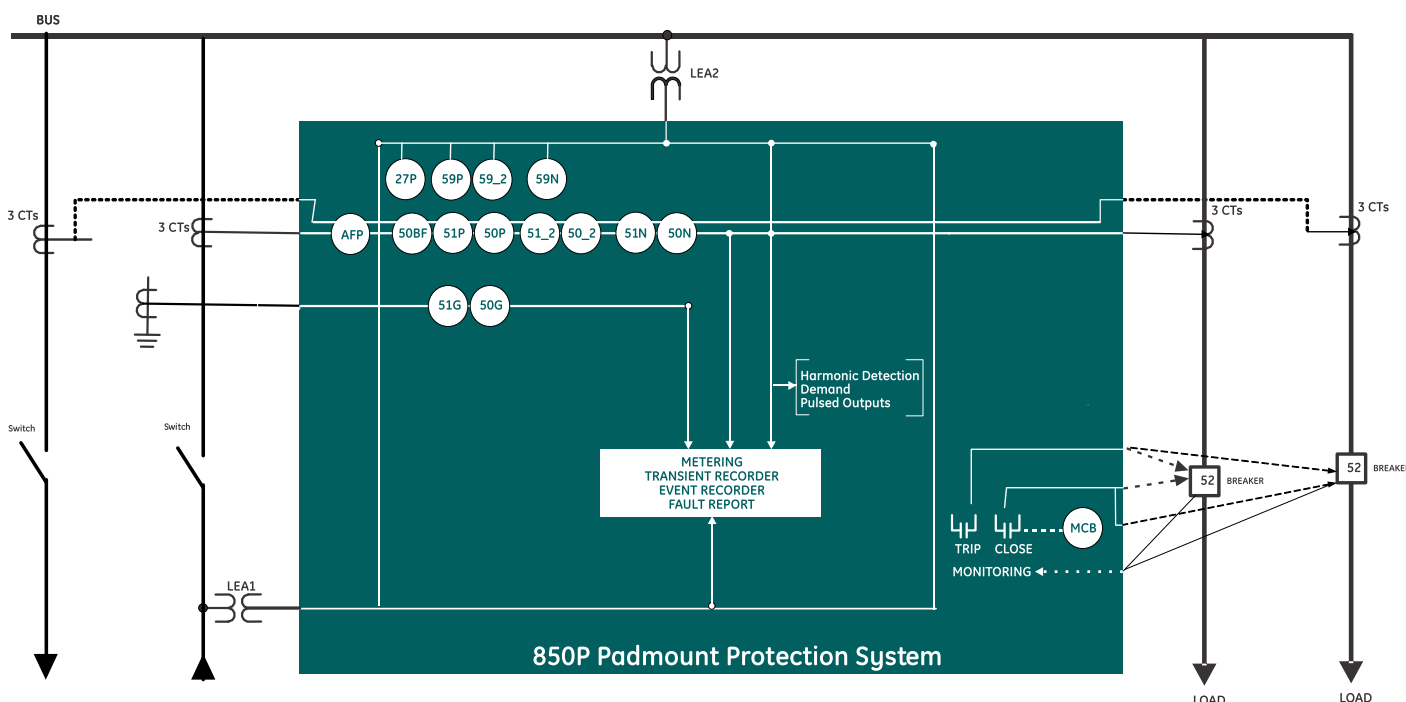
The provision of such powerful control and display capability within the relay ("One Box concept") eliminates the need for external controls, switches and annunciation on the panel reducing equipment and engineering cost.

Annunciator Panel and Virtual Push Buttons

The Multilin 850P 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 ones. This off sets the need for additional programmable LEDs. The alarms can be displayed on the front panel in a configurable grid layout of 2x2 or 3x3.

The Multilin 850P 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.

Functional Block Diagram



ANSI DEVICE	DESCRIPTION
27P	Phase Undervoltage
50BF	Breaker Failure
50G	Ground Instantaneous Overcurrent
50N	Neutral Instantaneous Overcurrent
50P	Phase Instantaneous Overcurrent
50_2	Negative Sequence Instantaneous Overcurrent
51G	Ground Time Overcurrent

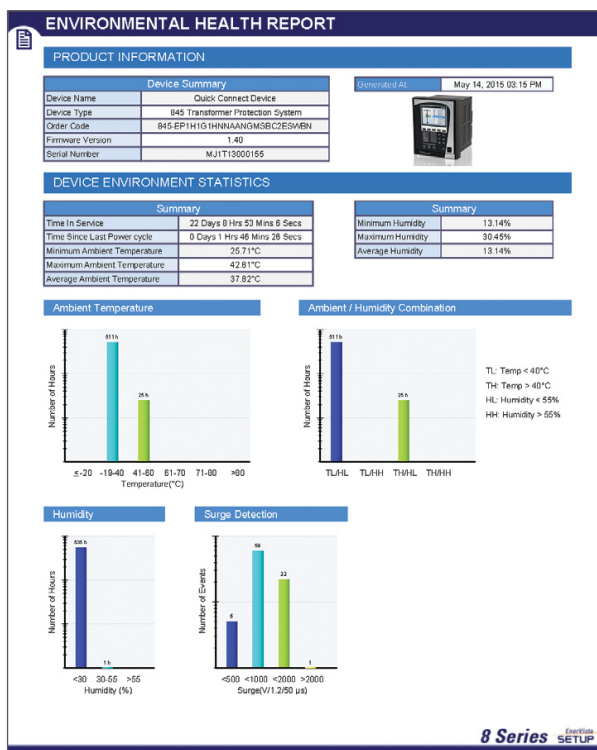
ANSI DEVICE	DESCRIPTION
51SG	Sensitive Ground Time Overcurrent
51N	Neutral Time Overcurrent
51P	Phase Time Overcurrent
51_2	Negative Sequence Time Overcurrent
59N	Neutral Overvoltage

Note: Ground option is not available for 4 sets of phase protection.

With a fast protection pass, running every 2 msec, the 850P relay provides faster response to current, voltage, power, and frequency protection elements; helping reduce stress on assets. The Multilin 850P 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, integrating into new or existing networks.

Applications

With multi feeder support for up to 12 CT inputs and 6 Low voltage Analog (LEA) or 4 traditional VT inputs, the 850P can now be used quite effectively for protection, control and monitoring of up to 4 ways of pad mount switchgear or RMUs. The protection/control functions available are per CT bank, thus providing cost effective solutions for protection, monitoring and control of 2, 3 or 4 feeders. This solution enables customers to reduce the number of IEDs in the system, reduce the mean time to repair to less than 15 minutes, and extend asset life all while leveraging the same device-based solution.



Environmental health report is available via Multilin PC Software

Protection & Control

As part of the 8 Series family, the Multilin 850P provides superior protection and control. The 850P 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.

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 850P 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.

Advanced Automation

The Multilin 850P 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 850P 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 a 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 850P 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 850P 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.

Environmental Monitoring

The 850 has an Environmental Awareness Module (EAM) to record environmental data over the life of the product. The patented module measures temperature, humidity, surge pulses and accumulates the events every hour in pre-determined threshold buckets over a period of 15 years. This data can be retrieved using the EnerVista Setup Software. This report helps identify the operating condition of the installed fleet so that remedial action can be taken.

Inputs and Outputs

The 850P provides a max of 57 Digital inputs and 22 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.

Metering

The Multilin 850P 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.

- 32 digital points and 16 analog values.
- Comprehensive data logger provides the recording of 16 analog values.
- Detailed Fault Report. The 850P stores fault reports for the last 16 events. 1024 Event Recorder.

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 850P 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, a USB front port and Wi-Fi for ease of access to the relay.

Wi-Fi Connectivity:

- Simplify set-up and configuration
- Eliminate personnel in front of switchgear
- Simplify diagnostic retrieval
- 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)
- Event Recorder (Syslog for SEM)
- Role Based Access Control (RBAC)



Cyber Security with Radius Authentication

Front View Front View - Advanced Membrane Front Panel

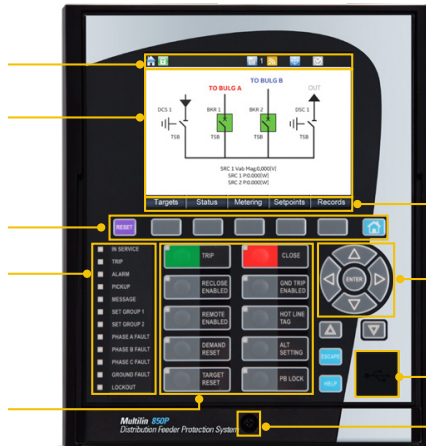
Menu path display indicating location within menu structure

Graphic Control Panel (GCP)

Soft menu navigation keys

LED status indicators

10 User-Programmable Push Buttons



Soft key navigation menu

Navigation keys

Front USB port

Self-captive screw on draw-out handle



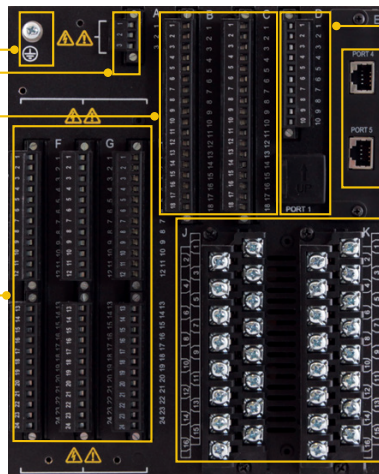
WANT TO LEARN MORE?
EXPLORE IN 3D

Rear View

Grounding screw
Power supply

RTDs

Digital I/O, DCMA



Standard serial and RJ45
Ethernet module

Advanced communications
module (Fiber Optic or Copper
ports)

CT, VT inputs

Optional IP20 cover available

Dimensions and Mounting



For more information, visit
gevernova.com/grid-solutions

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