**KEY BENEFITS**

- Phase segregated differential protection ensures secure high-speed single-pole tripping
- High-speed cost-effective five zones quad or mho, phase and ground distance protection with multiple standard and customizable pilot schemes support
- Reliable and secure protection on lines equipped with series compensation
- In-zone power transformer enables savings on CTs and protection device requirements
- Increased sensitivity through dynamic charging current compensation and communication channel asymmetry compensation
- Phasor Measurement Unit (synchrophasor) according to IEEE® C37.118 (2011) and IEC® 61850-90-5 support
- Three independent fiber or copper Ethernet ports for simultaneous/dedicated network connections with 1 microsecond time synchronization via LAN with IEEE 1588 support
- Complete IEC 61850 Process Bus solution provides resource optimization and minimizes total P&C life cycle costs
- Increase network availability by reducing failover time to zero through IEC 62439-3 “PRP” support
- CyberSentry™ provides high-end cyber security aligned to industry standards and services (NERC® CIP, AAA, Radius, RBAC, Syslog)

**APPLICATIONS**

- Overhead lines including series compensated lines and underground cables of different voltage levels
- Circuits with tapped transformer feeders
- Suitable for three-terminal line configurations, with channel redundancy and direct transfer tripping (DTT)
- Wide area system monitoring and control, using integrated protection and synchrophasor measurement
- Single and dual-breaker circuits requiring single/three-pole autoreclosing and independent synchrocheck supervision
- Secure application with Capacitively-Coupled Voltage Transformers (CCVTs)

**FEATURES**

**Protection and Control**

- Phase segregated line current differential with adaptive restraint, ground differential, in-zone transformer and stub bus protection
- Phase distance (five zones) with independent compensation settings for in-zone power transformers
- Ground distance (five zones) with independent self and mutual zero-sequence compensation, reverse power
- Line pickup, reverse power, out-of-step tripping and power swing blocking
- Thermal overload, phase, neutral and negative sequence directional overcurrent and broken conductor
- Over, under and rate of change of frequency, synchronism check for dual breaker applications
- Multi-ended fault location consistently providing 2% accuracy
- Real-time monitoring of remote, local and differential per-phase currents
- Advanced recording capabilities deliver a 1024 event recorder, configurable and extended waveform capture and data logger
- P & M class synchrophasors of voltage, current and sequence components: reporting rate 1 to 120 frames/sec

**Communications**

- Networking interfaces: up to three Ethernet ports 100Mb fiber or copper, RS485, RS232, RS422, G.703, C37.94
- Multiple protocols: IEC 61850, DNP 3.0 and Modbus® serial/TCP, IEEE 1588, IEC 60870-5-104 and 103, PRP, Sntp, HTTP, Tftp
- Direct I/O: secure, high-speed exchange of data between L90s for DTT applications

**IEC 61850 Process Bus Interface**

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

**Monitoring and Metering**

- Graphical Logic Designer and Logic Monitor to simplify designing and testing procedures via EnerVista UR Engineer
- Service and update notification toolset that ensures device documents and software are up-to-date via EnerVista Launchpad
- EnerVista Integrator providing easy integration of data in the L90 into new or existing monitoring and control systems
Protection and Control

The L90 is a high-end cost-effective line current differential protection relay intended for transmission lines and cables of different voltages levels, providing reliable and secure operation even under the worst case power system conditions. The L90 provides high-speed phase-segregated fault clearance, suitable for single and three-pole tripping applications. Part of the Universal Relay (UR) family, the L90 comes with a variety of versatile features, truly integrating protection, monitoring, metering, communication, and control in one easy-to-use device. The UR family offers a high degree of modularity in its design and functionality, providing superior performance in protection and control, while meeting the toughest requirements of the marketplace.

Segregated Current Differential Protection

The L90 is a phase-segregated current differential protection relay, which uses superior and patented algorithms to address the challenges of bandwidth, security, dependability and sensitivity in current differential relaying. Bandwidth requirements are effectively addressed by means of a patented new data consolidation technique called “phaselets”. This permits application within a communications bandwidth of 64 Kbps, and can detect faults within a half-cycle plus channel delay.

The L90 innovative dual-slope-adaptive-restraint characteristic, based on estimates of measurement errors, allows the relay to be secure on severe external faults while maintaining sensitivity for internal faults. The estimate of errors in the input currents permits more sensitive settings than those used in the traditional percent differential schemes. The line differential element also has 2nd harmonic inrush-current inhibit for in-zone power transformer protection. This functionality enables the L30 to protect 2 or 3-terminal lines that have a power transformer in between ends.

The L90 approach to clock synchronization relies upon precise and distributed synchronization. Clocks are phase-synchronized to each other and frequency-synchronized to the power system frequency. Each relay compares its clock to the phase of the other clocks and makes appropriate adjustments. This allows for greater transient ride-through for power system and communications disturbances. Enhanced additional security is provided by a sensitive current disturbance detector,

Functional Block Diagram

The L90 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.

ANSI Device Numbers & Functions

<table>
<thead>
<tr>
<th>Device Number</th>
<th>Function</th>
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<tbody>
<tr>
<td>21G</td>
<td>Ground Distance</td>
</tr>
<tr>
<td>21P</td>
<td>Phase Distance</td>
</tr>
<tr>
<td>21F</td>
<td>Synchrocheck</td>
</tr>
<tr>
<td>21P</td>
<td>Phase Undervoltage</td>
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<tr>
<td>21X</td>
<td>Auxiliary Undervoltage</td>
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<tr>
<td>21Z</td>
<td>Sensitive Reverse Power</td>
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<tr>
<td>21I</td>
<td>thermal overloads</td>
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<tr>
<td>21MR</td>
<td>Breaker Failure</td>
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<tr>
<td>21DD</td>
<td>Current Disturbance Detector</td>
</tr>
<tr>
<td>21G11</td>
<td>Ground Instantaneous Overcurrent</td>
</tr>
<tr>
<td>21G21</td>
<td>Neutral Instantaneous Overcurrent</td>
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<td>Phase Instantaneous Overcurrent</td>
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<td>21S23</td>
<td>Neutral Time Overcurrent</td>
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<td>21S41</td>
<td>Neutral Overvoltage</td>
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<td>21S42</td>
<td>Phase Overvoltage</td>
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<td>21S43</td>
<td>Auxiliary Overvoltage</td>
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<td>21S51</td>
<td>Negative Sequence Directional Overcurrent</td>
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<tr>
<td>21S52</td>
<td>Neutral Directional Overcurrent</td>
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<td>Phase Directional Overcurrent</td>
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<td>21S54</td>
<td>Power Swing Blocking</td>
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<td>21S81</td>
<td>Out-of-Step Tripping</td>
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<tr>
<td>21S91</td>
<td>Automatic Recloser</td>
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<tr>
<td>21S55</td>
<td>Under/Over Frequency, df/dt</td>
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<tr>
<td>21S92</td>
<td>Segregated Line Current Differential</td>
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<td>21S56</td>
<td>Rate of Change of Frequency</td>
</tr>
<tr>
<td>21S57</td>
<td>Line Current Differential</td>
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</table>
which can be used to supervise the current differential element.

**Ground Differential "87G"**
The ground differential function "87G" protects against low-current single line-to-ground faults. It has a single slope characteristic and uses the vectorial sum of all in-zone phase currents to calculate the neutral differential current, with the maximum value of phase current being used as restraint. This function, together with the phase differential, delivers enhanced sensibility and selectivity to the protection scheme.

**Charging Current Compensation**
For long transmission lines and underground cables, the charging current may be large and result in excessively high pickup settings. The L90 can dynamically compensate the charging current, thus increasing its sensitivity to the fault current on long transmission lines.

**Enhanced Monitoring Features**
The L90 uses advanced error detection and supervising functions to secure itself against misoperation due to erroneous data. High bit errors are addressed by means of computing a 32-bit CRC checksum, effectively addressing the concerns of multiple bit errors due to high channel noise.

On multiplexed channels, channel asymmetry may be expected due to path switching causing spurious differential currents, which can endanger the security of the differential system. By using GPS time synchronization, up to 10ms of channel asymmetry can be compensated. Extra security has been implemented in the L90 to ensure proper operation in the event of IRIG-B signal failure.

Integrated channel monitoring provides real-time diagnostic data on the health of the L90. Communications channel deterioration or failure will activate an alarm, and can be used to enable backup protection. Channel propagation delay is monitored and adjusted according to variations in communication paths.

**Communication Topologies**
Relays can communicate through direct fiber, RS422, G.703, and IEEE C37.94 interfaces at 64/128Kbps, with extensive channel monitoring and diagnostics. In a current differential scheme, the L90s exchange data via the communication link, acting either as master collecting data, making calculations and making all relevant trip and restraint decisions, or as slave only, transmitting current data to the one acting as master. For two-terminal applications, use the redundant communications capability of the L90 for optimal reliability of the current differential line protection. For this scheme, data is continuously transmitted over both channels, so if a failure occurs, the L90 will continue to provide current differential protection.

For three-terminal applications, advanced inter-relay communication features eliminate the need for redundant communication channels due to the ability of the L90 to automatically switch between master and slave mode, maintaining a dependable system even with a failure of one of the communication channels.

**Distance Protection**
The L90 shares the core of the D60 relay, which is the distance function, and provides a high degree of sensitivity and selectivity for all types of faults. The distance function in the L90 comes with five zones of phase distance and ground distance, providing the user maximum flexibility to cater to different applications, which include primary line protection and backup protection for busbars, generators, transformers and reactors. The L90 can be applied to power systems with different earthing conditions, lines with in-zone transformers or tapped transformer feeders, and overhead lines with series compensation. Each zone element for the phase and ground distance can be independently set as quad or mho characteristics with the flexibility of designing different characteristic shapes to suit different power system conditions. The advanced comparator-based distance elements provide the utmost security, sensitivity and selectivity for different types of faults. Superior digital filtering techniques provide secure and optimum reach accuracy even under worst-case CCVT transients. Secure directional discrimination is achieved by using positive sequence memory voltage polarization, providing reliable directionality for worst-case close-in faults. Dual distance algorithms deliver exceptional security and speed performance to ensure average operating times of 1.5 cycles for 75% line reach and SIR 30, and <2.5 cycles for 90% line reach and SIR 60.

**Typical Applications**

**Typical 2-Terminal Application**

**Typical 3-Terminal Application**

Typical two and three-terminal applications of L90. L90 supports a variety of media cards for signaling between L90s including direct multimode or singlemode fiber, RS422, G.703 and IEEE C37.94.
The L90 employs a well-proven algorithm for phase selection, which provides faster, secure and reliable faulted phase identification for single-pole tripping and proper fault-distance calculation for a variety of power system conditions. An additional voltage monitoring function provides extra security to the distance element, which can be used to block the distance elements under voltage source fuse-failure conditions.

In-Zone Transformer Compensation
Phase distance protection in the L90 can be used to detect faults through different types of three-phase wye/delta transformers, allowing application of the L90 for backup protection on generators. VTs and CTs can be installed independently of each other on either side of the power transformer. The relay automatically compensates for transformer connections, to guarantee accurate reach for any type of fault.

Load Encroachment
The load encroachment feature offers discrimination between line loading conditions and fault conditions, especially for long lines under heavy loads by supervising the distance elements or any overcurrent element. This prevents unwanted tripping under heavy line load conditions and enables optimum operation of the line while meeting regulatory requirements for line loading.

Line Pickup (Switch-on-to Fault)
The line pickup feature uses a combination of undervoltage and undervoltage to identify a line that has been de-energized (line end open). Three instantaneous overcurrent elements are used to identify a previously de-energized line that has been closed on to a fault.

Power Swing Detection
Dynamic transients in the power system, due to short-circuits, circuit switching, or load unbalance changes, can travel across the power network as power swings (characterized by fluctuating currents and voltages). This can result in unwanted tripping since distance elements can respond to these power swings as faults. The L90 power swing detection element provides both power swing blocking and out-of-step tripping functions. The element measures the positive sequence apparent impedance and traces its locus with respect to either a two or three-step user-selectable mho or quad operating characteristic. Negative sequence current supervisors provide extended selectivity for detecting evolving faults that may appear as a power swing event (faults with slow moving impedance locus).

Series Compensated Lines
The L90 provides enhanced stability and security by employing an adaptive distance reach control to cope with the overreaching and sub-synchronous oscillations when applied to, or in the vicinity of, series compensated lines. For directional integrity the relay uses memory voltage polarization and a multi-input comparator to deal with current inversion issues in series compensated lines.

Single-Pole Tripping
The L90 relay uses a state-of-the-art dual phase selection algorithm that provides fast and accurate fault type identification even under weak infeed conditions.

Direct Transfer Trip (DTT)
Use the DTT feature of L90 to trip remote breakers. Both single and three-pole DTTs are supported. Up to eight signals can be sent over pilot communications channels, selectable through user-configurable logic.

Overvoltage and Undervoltage Protection
Long lines under lightly loaded or no-load conditions may experience voltages exceeding rated per unit voltage level of the line. Use the three-phase overvoltage elements of the L90 to initiate a local trip as well as a remote trip using DTT.

Overcurrent Functions
The L90 provides thermal overload, and time and instantaneous overcurrent elements for phase, neutral, ground, negative sequence, phase and neutral directional. The neutral directional overcurrent element supports enhanced dual polarization modes which can be configured to prioritize on voltage or current polarization. Any of them can run in parallel with primary differential protection or can be programmed to run when the differential element is not available.

Communication Aided (Pilot) Schemes
L90 supports different teleprotection functions for fast fault clearance for any faults within the protected line. The following types of pilot-aided schemes are available in the L90:
- Direct Underreach Transfer Trip (DUTT)
- Permissive Underreach Transfer Trip for Distance and Current (PUTT)
- Two Permissive Overreach Transfer Trip (POTT)
- Hybrid Permissive Overreach Transfer Trip (HYB POTT), permissive echo and transient blocking logic incorporated
- Directional Comparison Blocking Scheme (DCB)
- Directional Comparison Unblocking Scheme (DCUB)
- Customizable version of the POTT and DCB schemes (POTT1 and DCB1)

Autoreclosing
The L90 provides multi-shot autoreclosing (up to 4 shots) for single or three-pole autoreclose on all types of faults with independent settings for each shot. Any of the autoreclose elements can be dynamically blocked or unblocked by other elements or user logic. This way they can be coordinated with the L90 protection setting groups. Four different autoreclose operation modes are available, enabling users to select the autoreclosing mode to suit specific applications.

Synchronism Check
The L90 provides four synchrocheck elements that monitor voltage difference, phase angle difference and slip frequency, to ensure proper breaker closure as per user requirements. Any of the four synchrocheck elements can be dynamically blocked or unblocked by other elements or user logic. The L90 also provides additional enhancements in synchronizing by allowing synchrocheck verification between local and remote line terminal voltages.

Breaker Failure
The L90 is able to provide fully independent breaker failure protection for the breakers associated to the line when connected to a substation with a breaker-and-a-half or ring bus arrangement. The L90 provides the required elements to perform two independent breaker failure functions.

Multiple Breaker Configurations
The L90 supports multi-breaker busbar configurations, such as breaker-and-a-half
or ring bus arrangements, providing dual breaker autoreclose dual synchrocheck elements, and dual independent breaker failure elements. The design provides secure operation during external faults with possible CT saturation.

**Special Applications - Distributed Busbar**

Use the L90’s capability of supporting up to 4 directly connected CTs for applications where the use of conventional bus differential relaying is not practical or economically feasible. The L90 can be used to protect both line and buses by measuring currents from the feeder CTs as shown. The L90 provides primary protection for both the buses and the circuit connecting them.

**IEC 61850 Process Bus**

The IEC 61850 Process Bus module is designed to interface with the Multilin HardFiber™ System, allowing bi-directional IEC 61850 fiber optic communications. The HardFiber System is designed to integrate seamlessly with existing UR applications, including protection functions, FlexLogic, metering and communications.

**HardFiber System benefits:**
- Communicates using open standard IEC 61850 messaging
- Drastically reduces PEC design, installation and testing labor by eliminating individual copper terminations
- Integrates with existing L90’s by replacing traditional CT/VT inputs with the IEC 61850 Process Bus module

**Flexible Hardware**

The L90 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
- Mechanically latching outputs can be used to develop secure interlocking applications and replace electromechanical lockout relays

**Monitoring and Metering**

The L90 includes high accuracy metering and recording for all AC signals. Voltage, current, and power metering are built into the relay as a standard feature. Current and voltage parameters are available as total RMS magnitude, and as fundamental frequency magnitude and angle.

**Fault and Disturbance Recording**

The advanced disturbance and event recording features within the L90 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
  - Events with up to 45s length
- **Data Logger and Disturbance Recording**
  - 16 channels up to 1 sample/cycle/channel
- **Fault Reports**
  - Powerful summary report of pre-fault and fault values
- **Multi-Ended Fault Location**
  - Calculation of fault location on two or three-terminal lines with 2% accuracy

The very high sampling rate and large amount of storage space available for data recording in the L90 can eliminate the need for installing costly stand-alone recording equipment.

**Advanced Device Health Diagnostics**

The L90 performs comprehensive device health diagnostic tests at startup and
Cyber Security – CyberSentry UR

CyberSentry UR enabled UR devices deliver full cyber security features that help customers to comply with NERC CIP and NIST® IR 7628 cyber security requirements. This software option delivers the following core features:

**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 UR devices. The new and advanced access functions allow users to configure up to five 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.

**Communications**
The L90 provides for secure remote data and engineering access, making it easy and flexible to use and integrate into new and existing infrastructures. 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 and the embedded managed Ethernet switch provide the means to create fault tolerant communication architectures in an easy, cost-effective manner.

The L90 supports the most popular industry standard protocols enabling easy, direct integration into monitoring and SCADA systems.

- IEC 61850
- DNP 3.0
- IEC 60870-5-103 and IEC 60870-5-104
- IEEE 1588 for time synchronization
- Modbus RTU, Modbus TCP/IP
- PRP as per IEC 62439-3

**Interoperability with Embedded IEC 61850**
The L90 with integrated IEC 61850 can be used to lower costs associated with line protection, control and automation. GE Digital Energy’s leadership in IEC 61850 comes from thousands of installed devices and follows on extensive development experience with UCA 2.0.

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

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

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

**EnerVista Software**
The EnerVista suite is an industry-leading set of software programs that simplifies every aspect of using the L90 relay. The EnerVista suite provides all the tools to monitor the status of the protected asset, maintain the relay, and integrate information measured by the L90 into DCS or SCADA monitoring systems. Convenient COMTRADE and SOE viewers are an integral part of the UR setup software included with every UR relay, to carry out postmortem event analysis and ensure proper protection system operation.

**EnerVista Launchpad**
EnerVista Launchpad is a powerful software package that provides users with all of the setup and support tools needed for configuring and maintaining Multilin products. The setup software within Launchpad allows for the configuration of devices in real-time by communicating via 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 & Brochures
- Application Notes
- Guideform Specifications
- 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
- Trending Reports
- Automatic Event Retrieval
- Automatic Waveform Retrieval

**Viewpoint UR Engineer**

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

- Graphical Logic Designer
- 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 Retrieval

**EnerVista Integrator**

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

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

**User Interface**

The L90 front panel provides extensive local HMI capabilities. The local display is used for monitoring, status messaging, fault diagnosis, and device configuration. User-configurable messages that combine text with live data can be displayed when user-defined conditions are met.
### Ordering

#### Base Unit

<table>
<thead>
<tr>
<th>CPU</th>
<th>L90</th>
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#### Software Options

(see note 2)

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#### Mount / Coating

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#### User Interface

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#### Power Supply

(see note 3)

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#### Digital I/O

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<th>Digital I/O</th>
<th>16 Digital Inputs with Auto-Burnish</th>
<th>16 Digital Inputs</th>
<th>8 Form-C Outputs</th>
<th>8 Digital Inputs</th>
<th>4 Form-C Outputs, 8 Digital Inputs</th>
<th>4 Form-C Outputs, 8 Digital Inputs</th>
<th>8 Fast Form-C Outputs</th>
<th>4 Fast Form-C Outputs</th>
<th>4 Form-C Outputs, 4 Digital Inputs</th>
<th>2 Form-A (No Monitoring) Outputs, 4 Digital Inputs</th>
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#### Inter-Relay Communications

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#### Inter-Relay Communications

| Inter-Relay Communications | 8 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs | 4 Form-C Outputs, 4 Digital Inputs |

### Ordering Notes:

1. For vertical mounting order codes, please visit our online store.
2. To view all the options available for L90, please visit GE’s On-Line Store http://store.gedigitalenergy.com.
3. Redundant power supply only available in horizontal unit. If redundant is chosen, must be same type. Maximum 2 per chassis.