GE
Digital Energy

Multilin™ D90Plus

Sub-Cycle Distance Protection and Advanced Automation Controller

Modern power systems are under increasing constraints in their ability to transmit power from generation facilities to major load centers, and are forced to operate closer to their natural stability limits. Under these conditions, the critical clearing angle and corresponding critical clearing time become progressively smaller, creating an increasing need to minimize the fault clearing time on these constrained circuits.

The Multilin D90Plus is ideally suited for application on circuits where fast fault detection and small breaker failure margin are required. The Multilin D90Plus allows transmission limits to be maintained or even increased while respecting the transient stability limits of the power system.

Key Benefits

- Secure sub-cycle distance protection to improve system stability and increase line loading
- True Capacitively Coupled Voltage Transformers (CCVT) filter for improved distance protection performance without intentional delays or reduced fault coverage
- Superior phase selection algorithms ensures secure high-speed single-pole tripping
- Reliable and secure protection on lines equipped with series compensation
- Configurable alarm annunciator, eliminating the need for separate annunciator panel
- Embedded Synchrophasor measurement capabilities (per IEEE® C37.118), eliminating the need for dedicated PMUs
- Increased network availability via failover time reduced to zero through IEC® 62439-3 "PRP" support
- Fault and disturbance recording, including internal relay operating signals at up to 128 samples/cycle
- Advanced fault and disturbance recording, including internal relay operating signals, eliminating the need for external recording devices

Applications

- Overhead lines including series compensated lines and underground cables of different voltage levels
- Single and dual-breaker circuits requiring single/three-pole autoreclosing and independent synchrocheck supervision
- Backup protection for generators, transformers and reactors
- Sub-cycle tripping with CCVT
- Circuits with in-zone power transformers and tapped transformer feeders
- Wide area monitoring and control using integrated protection and synchrophasor measurement

Protection & Control

- Secure time-domain algorithm providing sub-cycle distance protection
- Phase distance with independent compensation settings for in-zone power transformers
- Ground distance with independent self and mutual zero sequence compensation
- Out-of-step tripping and power swing blocking
- Synchronism check for dual breaker applications
- Advanced automation controller with independent automation programmable logic
- Bay control through front panel HMI

Advanced Communications

- Wide range of supported industry protocols: IEC 61850, DNP 3.0, Modbus Serial/TCP, IEC 60870-5-104, PRP
- Up to three independent IP addresses

Monitoring & Metering

- Continuous monitoring of AC input channels
- Current, voltage, frequency, power, energy and synchrophsors (per IEEE C37.118) measurement
- Advanced recording capabilities with high-capacity event recorder, transient & disturbance recording, configurable and extended waveform capture and data logger
- Large, integrated color HMI and annunciator for metering, phasors, maintenance, and fault information via front panel displays

imagination at work

D90Plus Line Distance Protection System

Intuitive HMI

- Customizable bay diagrams for various applications
- Local control and status indication of breakers & disconnect switches
- Local/remote control
- Fault, event, disturbance and transient reports

Digital Alarm Annunciator

- 96 customizable alarms in multiple pages
- Eliminates the need for separate annunciator

Advanced Protection

- Sub-cycle distance protection
- 512 lines of Protection FlexLogic @ 1 msec execution

Advanced Automation Controller

- Built-in programmable logic engine
- Advanced math, Boolean and control operations

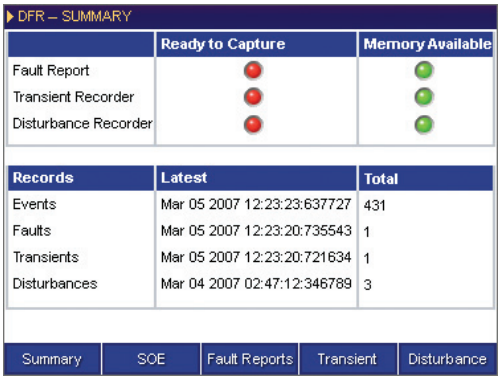
Advanced Communication Capabilities

- Up to three Ethernet ports
- IEC 61850, DNP 3.0, Modbus TCP/IP, IEC 60870-5-104 protocols
- IEEE C37.118 synchrophasors over Ethernet
- Front USB port for high-speed data transfer

Advanced Recorders

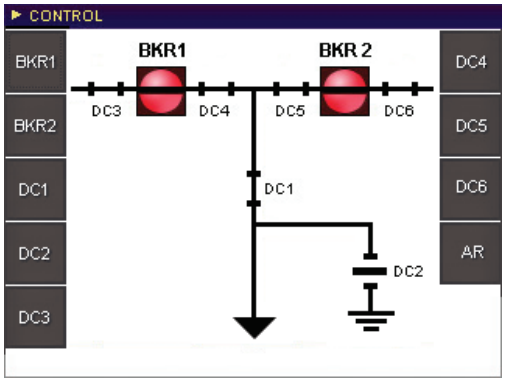
- Eliminate the need for stand-alone disturbance recorders
- 128 samples/cycle, 1 min duration transient recorder
- Seperate dynamic disturbance recorder for recording long term events
- Synchrophasors PMU recording

Advanced Disturbance Recorder Eliminates Stand-Alone DFR and Phasor Measurement Unit



Digital fault recorder summary with the latest information on events, faults, transients and disturbances.

Integrated Bay Controller and Intuitive HMI Eliminates Stand-Alone HMI and Controller



Control screen for the pre-configured bay with breaker & disconnect control in multiple pages using dedicated pushbuttons in the front panel.

Protection and Control

The D90Plus offers a high degree of functionality, providing superior performance while meeting the toughest requirements of the marketplace.

Advanced protection and control features of this relay includes:

D90Plus Sub-Cycle Distance Protection

The D90Plus sub-cycle distance algorithm employs a combination of energy-based integrator/comparators and high-speed phase comparators to determine if a fault is internal or external.

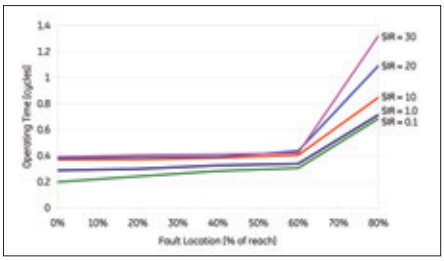
The energy integrator algorithm uses both the magnitude of the operating and polarizing signals as well as the relative phase information to provide fast, secure operation for obvious internal faults. The high-speed phase comparators examine the angular relationship between operating and polarizing signals independent of magnitude to provide greater security in the presence of CCVT transients. For faults with low SIR or close-in high magnitude faults, the D90Plus can provide trip times under ½ cycle for phase-phase faults and between ½ to ¾ of a cycle for ground faults.

CCVT Transient Filter

Transients generated by CCVTs tend to have relatively significant magnitudes and long durations. The impact of these transients is particularly pronounced when protecting transmission lines where the Source Impedance Ratio (SIR), the ratio between the system equivalent impedance and the relay reach impedance, is large. The voltage signals are crucial for proper operation of a distance element, but become significantly distorted by transient components that are generated but the CCVT. This presents a significant challenge particularly for fast impedance protection algorithms.

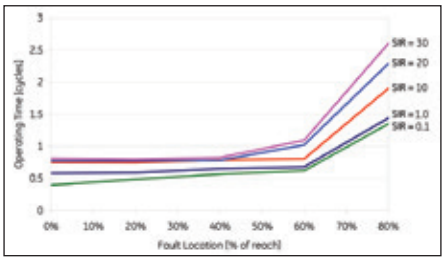
Generally, CCVT transients will cause the magnitude of the voltage signal to be underestimated, causing distance elements to overreach. Most relays detect CCVT transients under high SIR and incorporate an intentional operating delay on the distance elements to ride through the period with CCVT transients. Dynamically reducing the reach of the distance elements to prevent them from overreaching is another strategy to cope with CCVT transients.

Phase Distance Operating Times



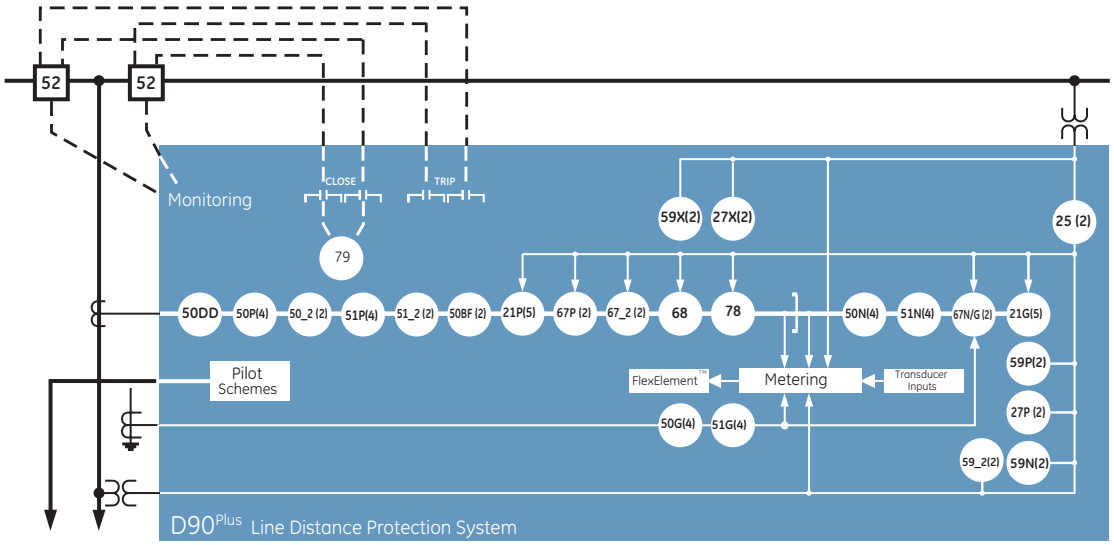
Phase Distance Element; CCVT Filter Enabled and Tuned.

Ground Distance Operating Times



Ground Distance Element; CCVT Filter Enabled and Tuned.

Functional Block Diagram



ANSI® Device Numbers & Functions

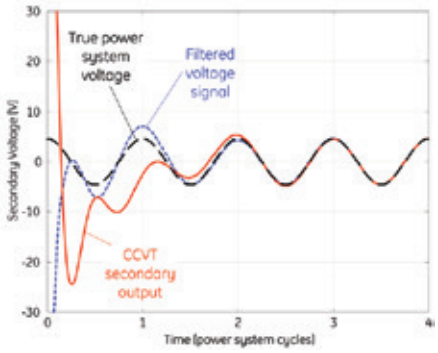
DEVICE NUMBER	FUNCTION
21G	Ground Distance
21P	Phase Distance
25	Synchronism Check
27P	Phase Undervoltage
27X	Auxiliary Undervoltage
50BF	Breaker Failure
50DD	Current Disturbance Detector
50G	Ground Instantaneous Overcurrent
50N	Neutral Instantaneous Overcurrent

DEVICE NUMBER	FUNCTION
50P	Phase Instantaneous Overcurrent
50_2	Negative Sequence Instantaneous Overcurrent
51G	Ground Time Overcurrent
51N	Neutral Time Overcurrent
51P	Phase Time Overcurrent
51_2	Negative Sequence Time Overcurrent
52	AC Circuit Breaker
59N	Neutral Overvoltage
59P	Phase Overvoltage

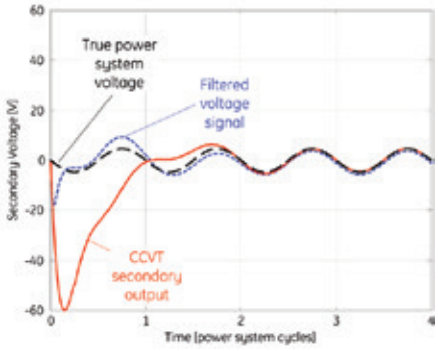
DEVICE NUMBER	FUNCTION
59X	Auxiliary Overvoltage
59_2	Negative Sequence Overvoltage
67N	Neutral Directional Overcurrent
67P	Phase Directional Overcurrent
67_2	Negative Sequence Directional Overcurrent
68	Power Swing Blocking
78	Out-of-Step Tripping
79	Automatic Recloser
81 U/O	Under and Over Frequency

The D90Plus introduces a true digital filter into the voltage signal path that removes distortions generated by the CCVT, resulting in a signal that is a more accurate reproduction of the power system voltage. The D90Plus is then able to provide sub-cycle distance protection in the presence of CCVT transients, without adding intentional delays or reducing fault coverage. The D90Plus sub-cycle distance algorithm is secure and sufficiently fast for a wide range of power system scenarios. The CCVT filter increases the speed of operation of the D90Plus for an even wider range of contingencies.

As with all filters, the D90Plus CCVT filter needs to be tuned to a specific application, so that the behaviour of the CCVT is characterized and reduced to 3 critical parameters that become settings for the relay.



CCVT Transient for Fault at Voltage Maximum and Corrected Voltage Signal.

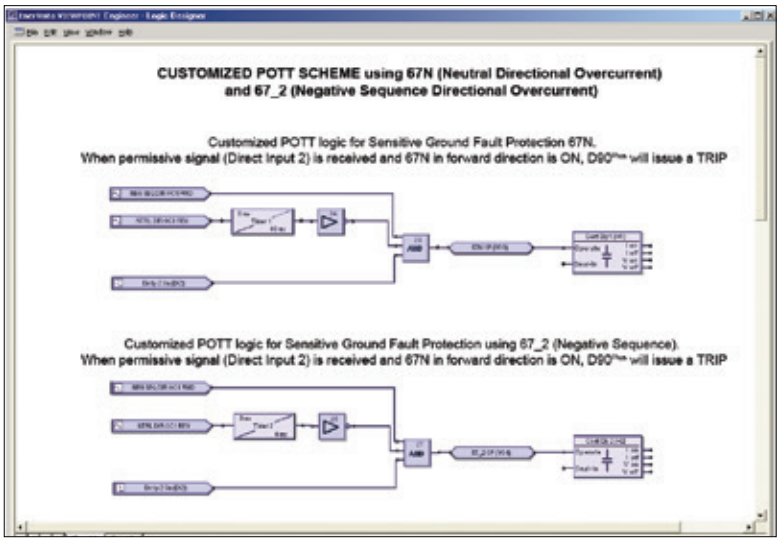


CCVT Transient for Fault at Voltage Zero-Crossing and Corrected Voltage Signal.

Fast Breaker Failure Reset

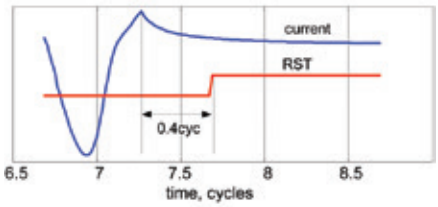
With stability limits shrinking, the ability to achieve fast breaker failure resetting times becomes more challenging to achieve. When the total worst-case clearing time including breaker failure starts to approach 10-12 cycles, often there is little more than 1 cycle margin left to allow for breaker failure protections to reset.

Custom Programmable Logic Designer



D90Plus user-programmable protection logic and independent automation logic allow users to build custom protection and automation schemes.

The D90Plus provides fully independent breaker failure protection for breaker-and-a-half or ring bus arrangements with consistent sub-cycle resetting times (5/8 of a power system cycle), allowing for shorter critical clearing times and increased line loading.



Even with CT saturation, current reversal and severe subsidence, the URPlus breaker failure element provides secure, dependable protection with consistent sub-cycle reset times.

In-Zone Transformer Compensation

Phase distance elements in the D90Plus can be used to detect faults "through" different types of three-phase wye/delta transformers, allowing application of the D90Plus for backup protection at generating stations.VTs and CTs can be installed independently of each other on either side of the power transformer. The relay automatically compensates for transformer connections for accurate far-reaching stepped distance backup protection schemes.

Series-Compensated Lines

The D90Plus 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.

Depending on the needs of the application, the relay can be programmed to dynamically be self-polarized or use memory voltage for polarization for additional security.

Single-Pole Tripping

The D90Plus relay uses a highly secure and dependable phase selection algorithm that provides fast and accurate fault type identification. A convenient trip function is built-in to coordinate actions of the key protection and teleprotection operands in single-pole tripping applications.

Communication Aided (Pilot) Schemes

The D90Plus supports several common teleprotection schemes for coordinated fault clearance within the zone of protection. The following types of pilot-aided schemes are available in the D90Plus:

- Direct Underreach Transfer Trip (DUTT)
- Permissive Underreach Transfer Trip (PUTT)
- Permissive Overreach Transfer Trip (POTT)
- Hybrid Permissive Overreach Transfer Trip (HYB POTT), permissive echo and transient blocking logic incorporated
- Directional Comparison Blocking Scheme (DCB)
- DirectionalComparison Unblocking Scheme (DCUB)

To support single-pole tripping applications, up to four bits can be keyed from the various teleprotection schemes.

Multiple Breaker

The D90Plus 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.

Advanced Automation

The D90Plus incorporates advanced automation features including powerful FlexLogic (user-programmable logic) independent for protection and automation schemes. Combined with the communication capabilities, the D90Plus provides an advanced, highly flexible platform for substation automation applications. The D90Plus integrates seamlessly with other relays for distributed applications like interlocking and special protection schemes.

FlexLogic

FlexLogic is the integral D90Plus platform programming logic engine that facilitates customizing the relay protection to meet the specific requirements of a given application without requiring auxiliary components and wiring.

Using Protection FlexLogic, the D90Plus can be programmed to provide required tripping logic along with custom scheme logic for breaker control, transfer tripping schemes for remote breakers and dynamic setting group changes.

Automation FlexLogic features math, Boolean and control functions that can be employed in advanced load shedding, load restoration and dynamic Volt/VAR control schemes.

Scalable Hardware

The D90Plus is available with a multitude of I/O configurations to suit a variety of application needs. The expandable modular design allows for easy configuration and future upgrades. Digital outputs include trip-rated Form-A and Solid State Relay (SSR), available with optional circuit continuity monitoring and current detection, to monitor the health of downstream circuits like breaker trip coils.

Monitoring and Metering

The D90Plus includes detailed 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.

Transient Recorder

A high resolution (128 samples/cycle) transient recorder with 1 minute or more of storage capacity is provided to record short duration system events like faults and reclosing sequences.

Disturbance Recorder

An independent disturbance recorder with a 5 minute storage capacity is intended to record long duration events like power swings and voltage sags and swells.

Sequence of Event Recorder

The advanced event recorder has the capability to store up to 8000 events.

Information for all three recorders can be accessed either through the front panel HMI or through EnerVista Launchpad software. The very high sampling rate and large amount of storage capacity available for data recording in the D90Plus can eliminate the need for installing stand-alone recording equipment.

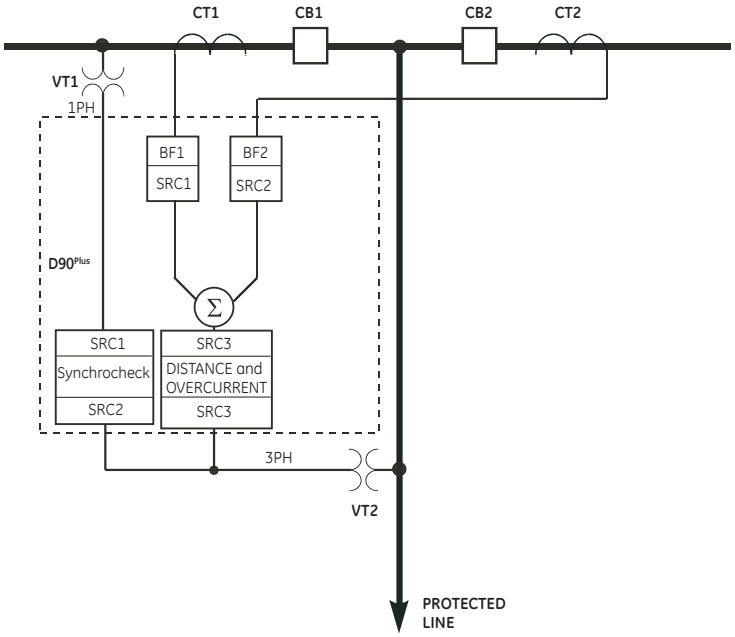
Communications

The D90Plus 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 availability of three independently configurable Ethernet options provides the means to create fault tolerant communication architectures in an easy, cost-effective manner.

The D90Plus supports the most popular industry standard protocols enabling easy, direct integration into SCADA systems.

- IEC 61850
- DNP 3.0
- IEC 60870-5-104
- Modbus RTU, Modbus TCP/IP
- PRP as per IEC 62439-3

D90Plus Dual Breaker Configuration



D90Plus supports dual breaker configurations. Two CTs can be measured individually and logically summed within the relay.

Interoperability with Embedded IEC 61850

The D90Plus with integrated IEC 61850 can be used to lower costs associated with protection, control and automation. GE Multilin's leadership in IEC 61850 comes from thousands of installed devices and follows on Multilin's extensive development experience with UCA 2.0.

- Replace expensive copper wiring between devices with direct transfer of data using GOOSE messaging
- Configure systems based on IEC 61850 and also monitor and troubleshoot them in real-time with EnerVista Viewpoint Engineer
- Integrate GE Multilin IEDs and generic IEC 61850-compliant devices seamlessly in EnerVista Viewpoint Monitoring

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.

EnerVista Software

The EnerVista suite is an industry-leading set of software programs that simplifies every aspect of using the D90Plus relay. The EnerVista suite provides all the tools to monitor the status of your protected asset, maintain the relay, and integrate information measured by the D90Plus into DCS or SCADA monitoring systems. Convenient COMTRADE and Sequence of Events viewers are an integral part of the URPlus setup software included with every URPlus 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 GE Multilin products. The setup software within Launchpad allows for the configuration of 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

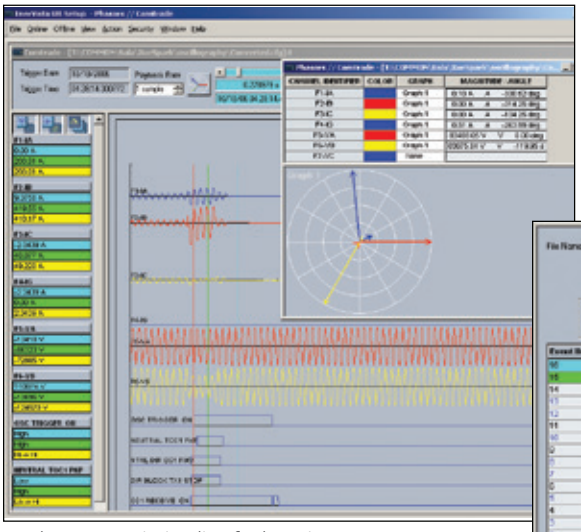
Viewpoint Engineer

Viewpoint Engineer is a set of powerful tools that will allow you to configure and test 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:

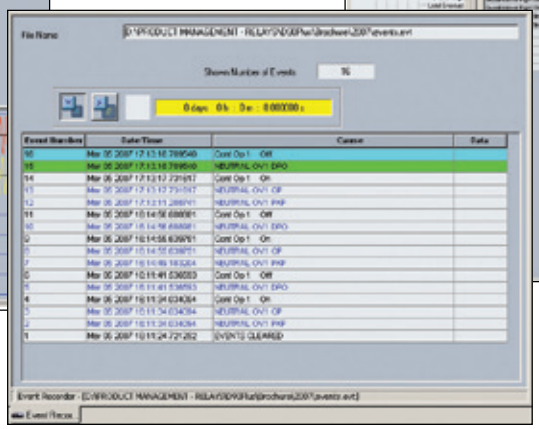
- Graphical Logic Designer
- Graphical System Designer
- Graphical Logic Monitor
- Graphical System Monitor

Power System Troubleshooting

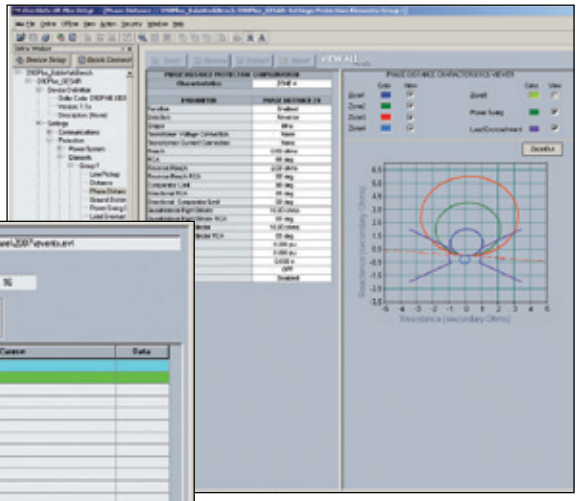
The URPlus setup software contains many tools and reports that simplify and reduce the amount of time required for troubleshooting power system events.



Analyze transmission line faults using system voltage, current and appropriate pickup flags that are measured & recorded up to 128 samples/cycle.



View the operation of the internal D90Plus inputs and outputs with time-stamped accuracy.



View characteristic shapes for phase and ground distance, power swing and load encroachment elements.

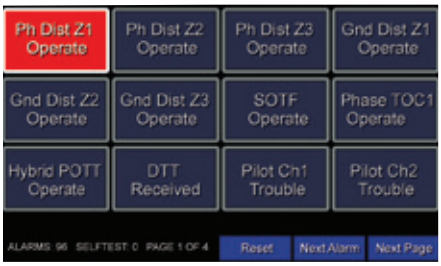
User Interface

The D90Plus provides local HMI capability through two color LCD display panels. One serves as a digital annunciator and the other optional HMI is for display and control functions.

Annunciator

The D90Plus provides an embedded, configurable color LCD annunciator on the front panel of the device eliminating the need for separate annunciators in the relay panel.

- The status of any contact or remote input or internally generated FlexLogic operand can be assigned to the annunciator.

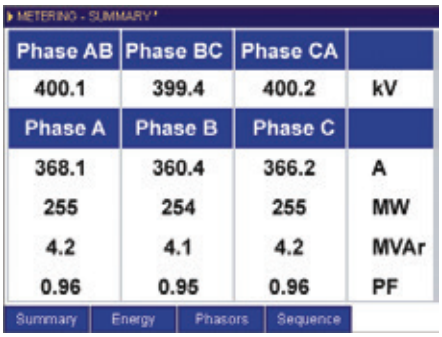


12 to 48 user-configurable alarms per page eliminate the need for separate annunciator.

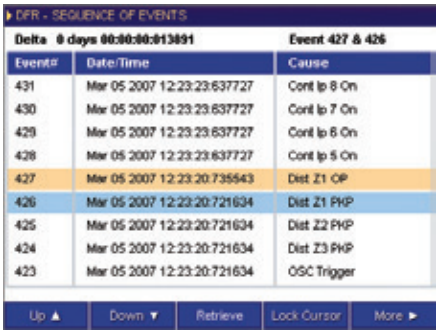
- The annunciator can display 12/24/48 targets per page to a maximum of 8 pages.
- A separate self-test message page on the annunciator panel shows error messages and troubleshooting advice.

HMI

- Comprehensive data visualization
- Single line diagrams for bay monitoring and control
- User pushbuttons can be assigned to several functions through multiple menu levels
- Local/remote control
- Pre-programmed comprehensive displays for:
  - Metering
  - Bay Control
  - Fault Reports
  - Sequence of Event Reports
  - Transient Records Summaries
  - Disturbance Record Summaries
  - Real-Time Phasor Displays of Voltage, Current and Sequence Components



Tabular display of metering values.



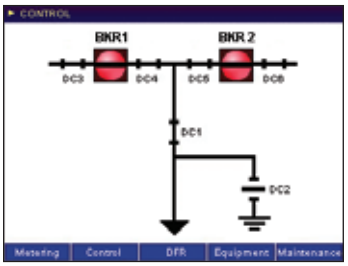
Sequence of event records with the ability to view the time difference between two events for troubleshooting and analysis.

Front Panel USB

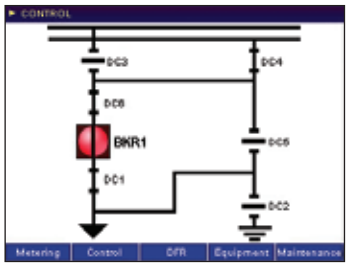
The front panel of the D90Plus provides a USB 2.0 host for field laptop connections for high-speed data transfer, making downloading and uploading faster than an RS232 connection.

Bay Configurations

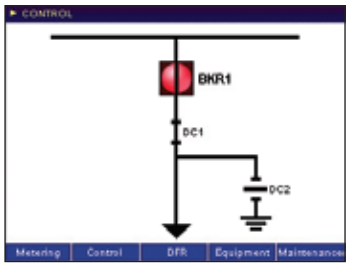
The D90Plus supports customizable single line diagrams along with 12 pre-configured diagrams and corresponding controls for each bay-level equipment.



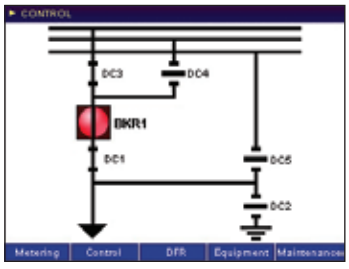
Breaker-and-Half Configuration



Double Bus Configuration

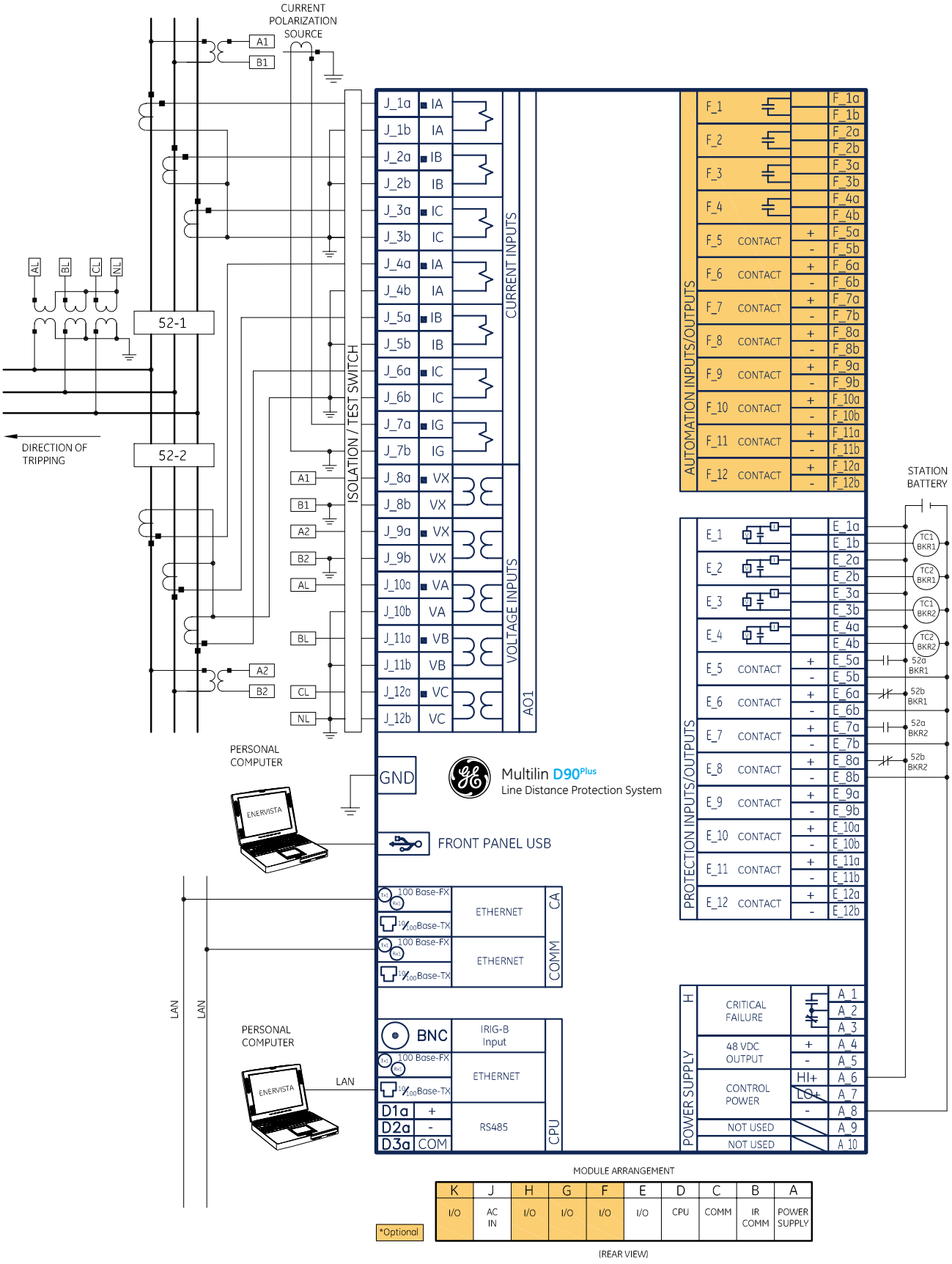


Single Bus Configuration



Two-Main and Transfer Bus Configuration

Typical Wiring Diagram



General Specifications

AC CURRENT

CT rated secondary:	1 A to 5 A
Relay burden:	< 0.2 VA ar rated secondary
Conversion range:	0.02 to 46 x CT rating RMS symmetrical
Current withstand:	20 ms at 250 times rated 1 sec at 100 times rated Continuous at 3 times rated

AC VOLTAGE

VT rated primary:	50.0 to 240.0 V
VT ratio:	1.00 to 24000.00
Relay burden:	< 0.25 VA at 120 V
Conversion range:	1 to 275 V
Voltage withstand:	Continuous at 260 V to neutral 1 min/hr at 420 V to neutral

CONTACT INPUTS

Input rating:	300 V dc maximum
Selectable threshholds:	20 to 250 V
Maximum current:	10 ma during turn-on 0.5 ma steady state
IRIG-B Input	
Amplitude modulation:	1 to 10 Vpk-pk
DC shift:	TTL
Input impedance:	50 kΩ
Isolation:	2 kV

FORM-A RELAY

Make and carry for 0.2 s:	30 A per ANSI C37.90
Carry continuous:	6 A
Break at L/R of 40 ms:	0.250 A dc at 125 Vdc 0.125 A dc at 250 Vdc
Operate time:	< 4 ms
Contact material:	Silver alloy

SOLID STATE RELAY

Make and carry for 0.2 s:	30 A as per ANSI C37.90
Carry continuous:	6 A
Break at L/R of 40 ms:	10.0 A dc at 250 Vdc
Operate time:	< 100 µs

CRITICAL FAILURE RELAY

Make and carry for 0.2 s:	10 A
Carry continuous:	6 A
Break at L/R of 40 ms:	0.250 A dc at 125 Vdc 0.125 A dc at 250 Vdc 0.10 A dc at 125 V
Operate time:	< 8 ms
Contact material:	Silver alloy

POWER SUPPLY

Nominal DC voltage:	125 to 250 Vdc
Min/max DC voltage:	80/300 Vdc
Nominal AC voltage:	100 to 240 Vac at 50/60 Hz
Min/max AC voltage:	80/275 Vac at 48 to 62 Hz
Voltage withstand:	2 x Highest nominal voltage for 10 ms 1 sec at 100 times rated
Voltage loss hold-up:	200 ms duration at nominal
Power consumption:	Typical-30 VA; Max-65 VA

CONTROL POWER EXTERNAL OUTPUT

(For dry contact input)	
Capacity:	100 mA dc at 48 V dc
Isolation:	2 kV

FRONT USB

Standard:	Type B USB connector supporting setup software

REAR RS485

19.2 to 115 kbps supporting Modbus RTU & DNP3.0	
Distance:	1200 m
Isolation:	2 kV

ETHERNET PORTS

Standard:	1 port supporting Modbus RTU and DNP 3.0
10/100Base-TX:	RJ45 connector
Optional:	2 ports supporting DNP 3.0, IEC 60870-104, IEC 61850 or PRP on communications card
100Base-FX:	1300 nm, multi-mode, half-duplex/full-duplex, fiber optic with ST connector
Power budget:	10 db
Max optical input power:	-14 dBm
Max optical output power:	-20 dBm
Receiver sensitivity:	-30 dBm
Typical distance:	2.0 km
SNTP clock synchronization error:	<10 ms (typical)

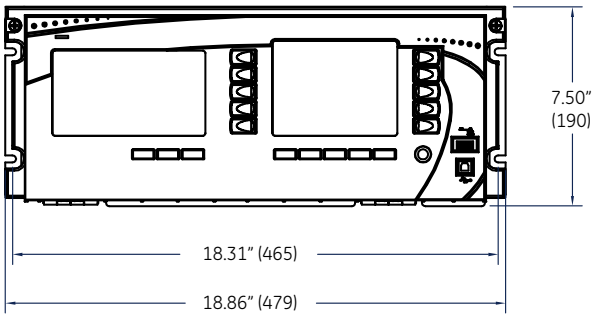
APPROVALS

UL listed for the USA and Canada manufactured under an ISO9000 registered system.

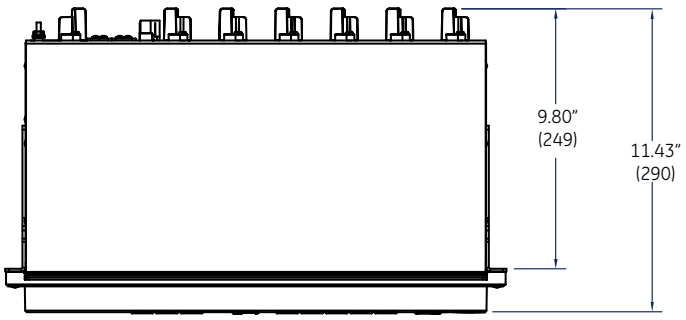
CE: LVD EN61010-1, EN60255-5
EMC EN50263, IEC 60255-26

Dimensions

HORIZONTAL FRONT VIEW



HORIZONTAL TOP VIEW



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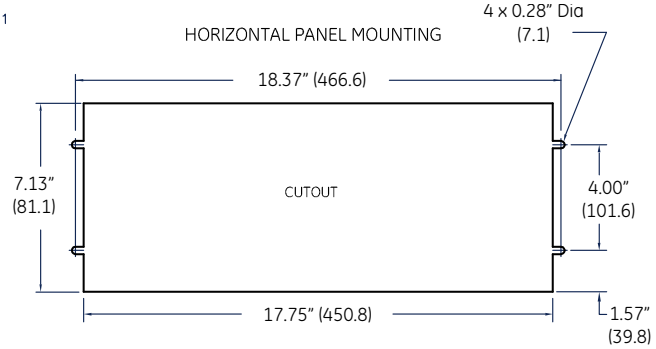
HORIZONTAL PANEL MOUNTING



Ordering

D90P -	*	*	-	*	*	**	*	*	*	-	*	*	*	*	*	**	*	*	*	*	Description
Interface																					
Front Panel	A																				Annunciator (Standard)
	H																				+ HMI
Language		E																			English (Standard)
Features																					
Protection				S																	3-pole Distance (Standard)
				E																	3-pole Distance + Tele Protection + FlexLogic
				A																	1/3-pole Sub-cycle Distance + Series Compensation + Tele- Protection + FlexLogic
Automation					S																Breaker Control + Synchrocheck (Standard)
					E																+ Automation FlexLogic
Communications						01															ModBus TCP/IP + ModBus Serial + DNP 3.0 (Standard)
						02															ModBus TCP/IP + IEC 61850
						03															ModBus TCP/IP + IEC 61850 + DNP 3.0 TCP/IP
						04															ModBus TCP/IP + IEC 61850 + IEC 60870-5-104
						A2															ModBus TCP/IP, IEC 61850 & PRP
						A3															ModBus TCP/IP, IEC 61850, DNP 3.0 TCP/IP & PRP
						A4															ModBus TCP/IP, IEC 61850, IEC 60870-5-104 & PRP
Metering							S														+ ModBus TCP/IP + IEC61850 + IEC 60870-5-104
							P														Basic Metering (Standard)
							L														+ Synchrophasors
							U														+ Data Logger
DFR								S													+ Data Logger + Synchrophasors
								D													Transient Recorder + Sequence of Events (Standard)
Equipment Manager									S												+ Disturbance Recorder
																					Circuit Breaker/Communication Statistics + Battery Monitor (Standard)
Hardware																					
Harsh Environment Coating										X											
										C											None (Standard)
Power Supply											H										Harsh Environment Conformal Coating
																					High (88-275VAC/80-300VDCI) (Standard)
Peer-to-Peer Communications Module												X									
																					None (Standard)
Communication Module													X								
	Type CA												A								None (Standard)
AC Module	Type A01																		01		Dual ST fiber & copper
	Type A02																		02		5 VT & 7 CT (5 Amp current) (Standard)
I/O Module														X	X	X	X			X	5 VT & 7 CT (1 Amp current)
	Type IA													A	A	A	A			A	None
	Type IB													B	B	B	B			B	8 Inputs, 4 Form-A Outputs with Voltage + Current Monitoring (Standard)
	Type IC													C	C	C	C			C	8 Inputs, 4 Solid State Outputs with Voltage + Current Monitoring
	Type ID													D	D	D	D			D	8 Inputs, 4 Form-A Outputs
	Type IE													E	E	E	E			E	4 Inputs, 8 Form-A Outputs
	Type IF													F	F	F	F			F	23 Inputs 12 Form-A Outputs

Order Code Example:																					
D90P	-	H	E	-	A	E	04	U	D	S	-	C	H	X	A	B	C	X	D	01	X

Note: The order code is for a D90Plus with sub-cycle distance protection, front panel HMI, advanced automation features, dual redundant IP communications, transient & disturbance recorders with the appropriate I/O cards for dual configurations.

imagination at work

GEA-12591A(E)
English
150203