Section 17: Protection, Control, Metering and Communication Solutions

As part of GE Consumer and Industrial, GE Multilin has the global mandate to design, manufacture, distribute and support protection, control, monitoring, metering, telecommunications, instrument transformers, software products, and services for industrial, utility and transportation customers worldwide.

GE Multilin products are based on leading technologies essential for the reliable operation required by mission-critical applications in generation, transmission, distribution, metering, motors and communications. Protection relay products are complemented by GE Multilin's fiber optic multiplexer telecommunication networks for utility teleprotection, transit, railways, and highway traffic management systems. Products are further complemented with a full line of potential transformers, current transformers, switches, indicating lights and other protection relay accessories. Additional customer value is provided through consulting services, training and packaged solutions. All relays are programmed and managed through EnerVista software.

Backed by more than 100 years of protection and control experience, GE Multilin has introduced a number of innovative protection and control technologies including embedded high speed Ethernet, common platforms across multiple applications, modularity allowing easy upgrades/replacements, modular draw out for quick replacements and one common software package for programming of all GE Multilin relays. GE Mutlilin has also lead the way in providing embedded UCA, DNP and Modbus open standard communications capability across applications and continues to lead the way in open standards with the introduction of the IEC61850 communications standard.

For more information on GE Multilin products, please visit our website at www.GEMultilin.com or contact your local sales representative. GE Multilin provides worldwide customer support 24/7 through its Customer Support Centers.

To contact us directly:

North America	***Europe/Middle East/Africa***
US Only: 1-800-431-7867	***+34 94 485 88 00***
Canada: 1-800-547-8629	***Other International Locations:***
(905)-294-6222	***(905)-201-6222***

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Application Selector Guide—Generator Protection

Generator Protection Product Selector Guide

Description	Device	MIGII	489	G30	G60
Protection					
Overspeed	12		•		
Speed Switch	14		•		
Distance Backup	21		•		•
Overexcitation	24		•	•	•
Synchronism check	25			•	•
Phase/Auxiliary Undervoltage	27P/A		P	P/A	P/A
Stator Ground (3rt Harmonic)	27TN		•	•	•
Reverse Power	32		•	•	•
Bearing RTD	38		•	•	•
Loss of Excitation Impedance or React. Power	40		•	•	•
Current Unbalance	46	•	•	•	•
Negative Sequence IOC	46/50	•	•		
Negative Sequence TOC	46/51	•	•		
Voltage phase reversal	47		•	•	•
Stator RTD	49	•	•		•
Inadvertent/Accidental Energization	50/27		•	•	•
IOC, Ground/Neutral/Phase/Negative Sequence	50G/N/P/Q	P/N	G/N/P/Q	G/N/P	G/N/P
IOC, Sensitive Ground	50SG		•	•	•
TOC, Ground/Neutral/Phase/Negative Sequence	51G/N/P/Q	P/N	G/N/P	G/N/P	G/N/P
TOC, Sensitive Ground	51SG			•	•
Split Phase	50SP			•	•
Voltage Restraint Overcurrent	51V		•	•	•
Breaker Failure	50BF		•		Logic
Custom programmable overcurrent curves			•	•	•
Phase/Auxiliary Overvoltage	59P/A		P	P/A	P/A
100% Stator Ground	64G		•	•	•
Current Directional, Ground/Neutral/Phase/Neg. Seq.	67P/G/N/Q		G	P/N/Q	P/N/Q
Out of Step Blocking	68				•
Out of Step Tripping	78				•
Voltage Transformer Fuse Failure	VTFF		•	•	•
Under/Overfrequency	81U/O		2U & 2O	•	•
Anti-Islanding Protection/Rate of Change of Frequency	81R			•	•
Lockout Functionality	86			•	•
Ground Differential	87N	•		•	•
Differential	87S		•		•
Group Differential	87T			•	
Monitoring of Reactive Power			•		
Settings Groups		2	2	6	6
Control					
Modular Construction				•	•
Drawout case			•		
Remote Display					•
Redundant Power Supply					Option
Non-volatile latches				•	•
Programmable Elements					
Programmable Logic		•		•	•
FlexElements				•	•
Digital Inputs		2	7	12	12
Contact Outputs		5	6	10	10
Configurable Push Buttons				16	16
Virtual Inputs/Outputs				32/64	32/64
Direct Inputs/Outputs				32	32
VFD/LCD Display		•	•	•	•
Key Pad/Numerical Keypad		•	•	•	•
Trip/Close Coil Supervision			Trip	Trip/Close	Trip/Close
Target LEDs not programmable		•	•		
User-Programmable LEDs		•		•	•
User-Programmable Push Buttons				•	•
User-Programmable Self Test				•	•
Selector Switch				•	•
Digital Counters		•		•	•
Digital Elements				•	•
IRIG-B Input			•	•	•
Analog Inputs/Outputs			•	•	•
RTD Inputs			12	8	8
Metering and Monitoring					
Power Factor			•	•	•
Thermal Capacity Used			•		
Load Profile Monitoring			•	•	•
Current – RMS		•	•	•	•
Current – Phasor				•	•
Current – Demand			•		
Current - Unbalance		•	•		
Current - Ground Leakage		•			
Voltage – RMS			•	•	•
Voltage 3rd Harmonic				•	•
Voltage – Phasor				•	•
Power - Apparent, Real, Reactive			•	•	•
MW, MVA, Mvar Demand			•		
Energy			•	•	•
Frequency			•	•	•
Temperature			•	•	•
Fault Report/Trip Data		•	•	•	•
User Programmable Fault Reports				•	•
Event Recorder - Number of Events		24	40	1024	1024
Oscillography - Cycles		24	64	93.5	93.5
Sampling Rate		8	12	16	16
Trip Counters			•	•	•
Data Logger			•	•	•
Test Mode with auxiliary contacts				•	•
Operating Temperature Range		-40 to 60	-40 to 60	-40 to 85	-40 to 85
Communications					
RS232/RS485 Ports		•	•	•	•
Ethernet Communications			•	•	•
Fiber Optic Port				•	•
GE Modem					
Modbus Protocol		•	•	•	•
Modbus User Map		•	•	•	•
DNP3 Protocol			•	•	•
UCA2/MMS Protocol				•	•
EGD Protocol				•	•
Peer-to-peer communication (Goose)				•	•
IEC 60870-104				•	•
IEC 61850 Protocol				•	•
Simple Network Time Protocol					•
TCP/IP			•	•	•

Application Selector Guide—Transformer Protection

Transformer Protection Product Selector Guide

Description	Device	745	T35	T60
Protection				
Differential	87	•	•	•
Instantaneous Differential	50/87	•	•	•
Maximum Number of Windings		3	6	4
Dual Slope Characteristic		•	•	•
Harmonic Restraint		•		•
Internal Winding Phase Shift Compensation		•		•
Dynamic CT Ratio-Matching		•		•
CT Mismatch Range		16/1	32/1	32/1
Unrestrained Operation		•	•	•
Restricted Earth Fault	87N	Optional		•
Overexcitation	24	•		•
Phase Undervoltage	27			•
IOC, Ground/Neutral/Phase/Negative Sequence	50G/N/P/Q	G/N/P		G/N/P
IOC, Sensitive Ground	50SG			•
TOC, Ground/Neutral/Phase/Negative Sequence	51G/N/P/Q	G/N/P	P	G/N/Q
TOC, Sensitive Ground	51SG		•	•
Breaker Failure	50BF	•		
Custom programmable overcurrent curves		•	•	•
Overvoltage, Neutral/Phase/Auxiliary	59	•		•
Overvoltage, Symmetrical Component	59N			•
Current Directional, Ground/Neutral/Phase/Neg. Seq.	67P/G	G		
Voltage Transformer Fuse Failure	VTFF	•		•
Under/Overfrequency	81U/O	•		•
Lockout Functionality	86		•	•
Settings Groups		4	6	6
Control				
Modular Construction			•	•
Drawout case		•		
Remote Display				•
Redundant Power Supply				Optional
Non-volatile latches			•	•
Programmable Elements				
Programmable Logic			•	•
FlexElements			•	•
Multiple Applications			•	•
Self-Test Failure Contact		•	•	•
Digital Inputs		8	12	12
Contact Outputs (Fixed)		3		
Contact Outputs (Programmable)		3	10	10
Configurable Push Buttons				
Operator Control Push Buttons				
Virtual Inputs/Outputs			32/64	32/64
Direct Inputs/Outputs			32	32
Remote Control Switches				
VFD/LCD Display		•	•	•
Numerical Keypad		•	•	•
Trip/Close Coil Supervision		Trip	Trip/Close	Trip/Close
Breaker Control			•	•
User-Programmable LEDs			•	•
User-Programmable Push Buttons				
User-Programmable Self Test			•	•
Selector Switch			•	•
Digital Counters			•	•
Digital Elements			•	•
IRIG-B Input		•	•	•
Analog Inputs/Outputs		•	Optional	Optional
RTD Inputs		12		
Metering and Monitoring				
Power Factor		•	•	•
Load Profile Monitoring		•	•	•
Current – RMS		•	•	•
Current – Phasor			•	•
Current – Demand		•		
Current - Unbalance		•		
Current - Ground Leakage				
Voltage – RMS		•	•	•
Voltage – Phasor			•	•
Power - Apparent, Real, Reactive		•	•	•
MW, MVA, Mvar Demand				
Breaker Health Monitoring				
Energy		•	•	•
Frequency		•	•	•
Temperature		•		
Fault Report/Trip Data		•	•	•
User Programmable Trip Reports			•	•
Event Recorder - Number of Events		40	1024	1024
Oscillography - Cycles @ Sampling Rate		64 @ 12	93.5 @ 16	93.5 @ 16
Trip Counters		•	•	•
Data Logger		•	•	•
Test Mode with auxiliary contacts			•	•
Substation Battery Monitoring				
Operating Temperature Range		-40 to 60°C	-40 to 85°C	-40 to 85°C
Communications				
RS232 Port		•	•	•
RS485 Port		•	•	•
RS422 Port			Optional	Optional
Ethernet Port		•	Optional	Optional
Fiber Optic Port			Optional	Optional
Modbus Protocol		•	•	•
Modbus User Map		•	•	•
DNP3 Protocol		•	•	•
UCA2/MMS Protocol			•	•
EGD Protocol				•
Peer-to-peer communication (GOOSE)				•
IEC 60870-5-104				
IEC 60870-5-103				
IEC 61850 Protocol				•
Simple Network Time Protocol				•
TCP/IP			•	•

Publications and Reference: *See Section 21 for a list of additional product-related publications*

Application Selector Guide—Transmission Protection

Transmission Protection Product Selector Guide

Description	Device	D30	D60	L60	L90
Protection					
Typical Operating Time (cycles)		<2	<2	<1.5	<1.5
Trip Modes: Three-Pole/Single-Pole		3	1&3	3	1&3
Disturbance Detector		•	•	•	•
Application in Series Compensated Lines			•		•
Mho Distance, Phase (No. of Zones)	21P	3	5	1	1
Mho Distance, Ground or Neutral Phase (No. of Zones)	21G/N	3	5		
Quadrilateral Distance, Phase (No. of Zones)	21P	3	5	1	1
Quadrilateral Distance, Ground or Neutral Phase (No. of Zones)	21G/N	3	5		
Quadrilateral Distance, Ground Directional/Non-Directional		•	•	•	•
Quadrilateral Distance, Ground Zero/Neg Sequence Polarizing Currents		•	•	•	•
Directional Control Forward/Reverse	32	•	•		
Pilot Protection Logic			•		
Synchronism Check or Synchronizing	25	•	•	•	•
User Programmable Curves		4	4	4	4
Breaker Failure	50BF	Logic	•	•	•
Remote Open Detector					
IOC, Ground/Neutral/Phase/Negative Sequence	50G/N/P/Q	G/N/P/Q	G/N/P/Q	G/N/P/Q	G/N/P/Q
IOC, Sensitive Ground	50SG	•	•	•	•
TOC, Ground/Neutral/Phase/Negative Sequence	51G/N/P/Q	G/N/P/Q	G/N/P/Q	G/N/P/Q	G/N/P/Q
TOC, Sensitive Ground	51SG	•	•	•	•
Current Directional, Ground/Neutral/Phase/Neg. Seq.	67G/N/P/Q	N/P/Q	N/P/Q	N/P/Q	N/P/Q
Phase Overvoltage Phase/Auxiliary/Neutral	59P/A/N	P/A/N	P/A/N	P/A/N	P/A/N
Phase Undervoltage Phase/Auxiliary	27P/A	P/A	P/A	P/A	P/A
Negative Sequence Overvoltage	59-2	•	•		
Out-of-Step Blocking/Tripping	68B	•	•	•	•
AC Reclosing (No. of Shots)	79	4	4	4	4
Switch on to Fault (Line Pickup)	SOTF	•	•	•	•
Voltage Transformer Fuse Failure	VTFF	•	•	•	•
Current Transformer Supervision	CTS			•	•
Load Encroachment Logic		•	•	•	•
Lockout Functionality	86	•	•	•	•
Line Current Differential	87L			•	•
Line Current Differential Trip Logic: DTT, SBP, OPD					•
Control					
Non-volatile latches		•	•	•	•
Programmable Elements		•	•	•	•
Programmable Logic		•	•	•	•
FlexElements		•	•	•	•
Multiple Applications			2 Breakers		2 Breakers
Power Supply,		AC/DC	AC/DC	AC/DC	AC/DC
CT Inputs		5/1 A	5/1 A	5/1 A	5/1 A
Self-Test Failure Contact		•	•	•	•
User Programmable Self-Test Contact		•	•	•	•
Settings Groups		6	6	6	6
Flash Memory		•	•	•	•
Contact Inputs (Programmable) - Up to		16	96	96	96
Contact Outputs - Up to		8	64	64	64
Contact Outputs (Programmable)		•	•	•	•
CT Failure Detector				•	•
Virtual Inputs - Up to		32	32	32	32
Virtual Outputs - Up to		64	64	64	64
Direct Inputs/Outputs		•	•		
VFD/LCD Display		•	•	•	•
Numerical Keypad		•	•	•	•
Trip/Close Coil Supervision		•	•	•	•
Breaker Control		•	•	•	•
User-Programmable LEDs		•	•	•	•
User-Programmable Push Buttons		•	•	•	•
User-Programmable Self Test		•	•	•	•
User Definable Displays		•	•	•	•
Timers		•	•	•	•
Selector Switch		•	•	•	•
Digital Counters		•	•	•	•
Digital Elements		•	•	•	•
IRIG-B Input		•	•	•	•
Analog Inputs		•	•	•	•
Analog Outputs		•	•	•	•
RTD Inputs		•	•	•	•
Metering and Monitoring					
Power Factor		•	•	•	•
Current – RMS		•	•	•	•
Current – Phasor		•	•	•	•
Current – Demand					•
Voltage – RMS		•	•	•	•
Voltage – Phasor		•	•	•	•
Symmetrical Components		•	•	•	•
Power - Apparent, Real, Reactive		•	•	•	•
MW, MVA, Mvar Demand					•
Energy			•		•
Frequency		•	•	•	•
Fault Location		•	•	•	•
Fault Report/Trip Data		•	•	•	•
Event Recorder - Number of Events		1024	1024	1024	1024
Event Recorder - Time resolution - ms		1	1	1	1
Oscillography - Cycles @ Sampling Rate		64 @ 64	64 @ 64	64 @ 64	64 @ 64
Breaker Arcing Current		•	•	•	•
Operations Record including Recloser		•	•	•	•
Data Logger			•	•	•
Operating Temperature Range		-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C
Communications					
RS232 Port		•	•	•	•
RS485 Port		•	•	•	•
RS422 Port		•	•	•	•
High Speed Communications		•	•	•	•
Fiber Optic Port		•	•	•	•
ASCII Protocol					
Modbus Protocol		•	•	•	•
Modbus User Map		•	•	•	•
DNP3 Protocol		•	•	•	•
UCA2/MMS Protocol		•	•	•	•
Peer-to-peer communication (Goose)		•	•	•	•
IEC 61850 Protocol		•	•	•	•
Simple Network Time Protocol		•	•	•	•
TCP/IP		•	•	•	•

Application Selector Guide—Bus Protection

Bus Protection Product Selector Guide

Description	Device	MIB	B30	B90
Protection				
Undervoltage, Phase	27P		•	•
Breaker Failure	50BF			0
IOC, Ground/Neutral/Phase	50G/N/P		P	•
TOC, Ground/Neutral/Phase	51G/N/P		N/P	•
Neutral Overvoltage	59N		•	
Auxiliary Overvoltage	59X		•	
FlexElements			•	
Differential, Bus	87B	•	•	•
Power Supply, AC or DC		DC	AC/DC	AC/DC
Control				
Self-Test Failure Contact		•	•	•
Settings Groups		2	8	6
Flash Memory		•	•	•
Contact Inputs (Fixed)		1		
Contact Inputs (Programmable) – up to		1	80	96 per box
Contact Outputs (Fixed)		3		
Contact Outputs (Programmable) – up to			40	69 per IED
Virtual Inputs			•	•
Virtual Outputs		•	•	•
Display		•	•	•
Keypad			•	•
Trip/Close Coil Supervision		•	O	0
Programmable Logic		•	•	•
User-Programmable LEDs		•	•	•
Timers		•	•	•
Digital Counters			•	
Digital Elements			•	•
Dynamic Bus Replica			•	•
IRIG-B Input			•	•
Metering and Monitoring				
Current – RMS		•	•	•
Current – Phasor			•	•
Voltage – RMS			•	•
Voltage – Phasor			•	•
Symmetrical Components			•	•
Frequency			•	•
Fault Report				•
Event Recorder		•	•	•
Oscillography (Waveform Capture)		•	•	•
Communications				
CT Trouble			•	•
Interface Program		•	•	•
RS232 Port		•	•	•
RS485 Port		•	1/2	1/2
10 BaseF Port			0/1/2	0/1/2
Modbus Protocol		•	•	•
Modbus User Map		•	•	•
DNP3 Protocol			•	•
UCA2/MMS Protocol			•	•
M-Link Protocol				•
TCP/IP			•	•

Publications and Reference: *See Section 21 for a list of additional product-related publications*

Application Selector Guide—Distribution Feeder Protection

Distribution Feeder Product Selector Guide

Description	Device	FM2	735/737	MIFII	F650	750/760	F35	F60
Protection								
Disturbance Detector								•
Synchronism Check or Synchronizing	25				•	•		•
Undervoltage, Phase/Auxiliary	27 P/A				P/A	P/A	P/A	P/A
Directional Power	32				•	•		•
IOC, Negative Sequence	46/50	•			•	•		•
TOC, Negative Sequence	46/51				•	•		•
Current Directional, Negative Sequence	46/67				•	•		•
Reverse Phase Sequence Voltage	47				•	•	Logic	•
Thermal Image	49	•		•	•			
User Programmable Curves				•	•	•	•	•
Breaker Failure	50BF			•	•	•	Logic	•
IOC, Phase/Neutral/Ground	50 P/N/G	G/N	P/N/G	P/N/G	P/N/G	P/N/G	P/N/G	P/N/G
IOC, Sensitive Ground	50SG			•	•	•	•	•
High Impedance Fault Detection								•
Load Encroachment Logic								•
TOC, Phase/Neutral/Ground	51 P/N/G	P	P/N/G	P/N/G	P/N/G	P/N/G	P/N/G	P/N/G
TOC, Sensitive Ground	51SG			•	•	•	•	•
TOC, Voltage Restrained	51V				•	•	•	•
Power Factor	55					•		
Overvoltage, Phase/Auxiliary/Neutral	59P/A/N				P/N/G	P/N	A/N	P/A/N
Overvoltage, Symmetrical Component	59_2				•	•		•
Current Directional, Phase/Neutral/Ground	67 P/N/G				P/N/G	P/N/G		P/N
Current Directional - External	67				•	•		•
AC Reclosing (Shots)	79			4	4	4	4	4
Underfrequency	81U				•	•	•	•
Overfrequency	81O					•	•	•
Lockout Protection	86		•			•	•	•
Broken Conductor Detection					•			•
Programmable Elements							•	•
FlexElements							•	•
Control								
Voltage Transformer Fuse Failure	VTFF				•	•		•
Redundant Power Supplies					•			
User Programmable Self-Test Contact					•		•	•
Settings Groups		1	1	2	3	4	6	6
Contact Inputs		16		2	Up to 32	14	Up to 96	Up to 96
User-Programmable Digital Inputs		•		•	•	•	•	•
Contact Outputs - Fixed		4	11	1	2	3		
Contact Outputs (Programmable)		2	8	4	Up to 16	5	Up to 64	Up to 64
User-Programmable Push Buttons					•		•	•
Virtual Inputs					Up to 32	20	Up to 32	Up to 32
Virtual Outputs					Up to 512		Up to 64	Up to 64
VFD/LCD Display		•		•	•	•	•	•
User-Definable Displays						•	•	•
Graphical Display					Optional			
Numerical Keypad						•	•	•
Keypad		•		•		•		
Trip/Close Coil Supervision					•	•	•	•
Programmable Logic				•	•	Limited	•	•
User-Programmable LEDs				•	•		•	•
Digital Counters					•		•	•
Digital Elements					•		•	•
Direct Inputs							•	•
Selector Switch							•	•
IRIG-B Input					•	•	•	•
Cold Load Pickup				•	•	•		•
Analog Inputs						1	Up to 24	Up to 24
Analog Outputs						8	Up to 4	Up to 4
RTD Inputs							Up to 24	Up to 24
Power Factor						•		
Automatic Transfer Scheme					FlexLogic	•		FlexLogic
Undervoltage Restoration		•			FlexLogic	•		FlexLogic
Underfrequency Restoration					FlexLogic	•		FlexLogic
Metering and Monitoring								
Current – RMS		•	Bargraph	•	•	•	•	•
Current – Phasor				•	•	•	•	•
Current – Demand					•	•	•	•
Voltage – RMS		•			•	•	•	•
Voltage – Phasor					•	•	•	•
Voltage Sag & Swell								
Power Factor					•	•	•	•
Symmetrical Components					•	•	•	•
Real, Reactive & Apparent Power		•			•	•	•	•
Real, Reactive & Apparent Power - Demand					•	•	•	•
Energy		•			•	•	•	•
Frequency					•	•	•	•
Frequency Decay						•		•
Analog Inputs						•	•	•
Fault Location					•	•	•	•
Event Recorder - Number of Events		1		32	479	256	1024	1024
Oscillography - Cycles				24	128	128	263	263
Oscillography - Sampling Rate		12		8	64	16	16	16
Breaker Arcing Current				Optional	•	•	•	•
Data Logger		•			•	•	•	•
THD & Harmonics Meter							•	•
Communications								
RS232 Port				1	1/2	1	1/2	1/2
RS485 Port		1	1	1	0/1/2	2	0/1/2	0/1/2
RS422 Port			Optional			1	0/1/2	0/1/2
Ethernet Port					•	•	•	•
Fiber Optic Port					•		•	•
Modbus Protocol		•	•	•	•	•	•	•
Modbus User Map					•	•	•	•
DNP3 Protocol					•	•	•	•
UCA2/MMS Protocol							•	•
EGD Protocol							•	•
Peer-to-peer communication					•		•	•
Simple Network Time Protocol							•	•
IEC 60870-5-104					•			
IEC 61850 Protocol					•		•	•
TCP/IP					•	•	•	•

Application Selector Guide—Motor Protection

Motor Protection Product Selector Guide

Description	Device	LM10	MMII	239	269 Plus	369	469	M60
Protection								
Breaker Failure	50BF			•		•	•	•
Thermal Model			•	•	•	•	•	•
Custom programmable overload curves				Optional	•	•	•	•
Voltage dependent thermal model							•	
IOC, Phase, Ground, Sensitive Grnd, Neutral	50P/G/SG/N	G	G	P/G/SG	P/G/SG	P/G/SG	P/G/SG	P/G/SG/N
TOC, Phase, Ground, Sensitive Grnd, Neutral	51P/G/SG/N	P						G/SG
Jam Protection	51R	•	•	•	•	•	•	•
Stall Protection		•	Optional	•	•	•	•	•
Current Directional Phase, Ground, Neutral	67P/G/N			(G) Optional				P/N
Phase, Auxiliary, Neutral Overvoltage	59P/A/N	P	P			P	P	P/A/N
Phase, Auxiliary Undervoltage	27P/A	P	P		(P) Optional	P	P	P/A
Power Loss/Undervoltage auto-restart	27/79	•	•				•	
Negative Sequence Overvoltage	59-2							•
Voltage Transformer Fuse Failure	VTFF							•
Under/Overfrequency	81U/O					•	•	
Lockout Functionality	86		•	•	Optional	•	•	•
Jogging	66			Optional	•	•	•	•
Undercurrent/Underpower	37	•	•	•	•	•	•	
Current Unbalance	46	•	•	•	•	•	•	•
Overtemperature	49		•	•	•	•	•	•
Phase Reversal	47				Optional	•	•	•
Frequency	81				Optional	•	•	
Power Factor	55				Optional	•	•	
Reduced Voltage Start	19				•	•	•	
Incomplete Sequence	48			•	•	•	•	•
Speed Switch	14				•	•	•	
Overspeed	12						•	
Reverse Power	32					•	•	•
Reactive Overpower						•	•	
Remote Start/Stop via Communications			•			•	•	•
Back-spin Detection						•		
Back-spin Timer				Optional	•	•	•	•
Start Inhibit			•	Optional	•	•	•	•
Emergency Start			•	•	•	•	•	•
Two-speed motor protection				•			•	•
Control								
Drawout Construction					Optional		•	•
Modular Construction								•
Remote Display		•			Optional	•		•
Non-volatile latches			•					•
Programmable Logic								•
FlexElements								•
Settings Groups			1	1	1	1	1	6
Contact Inputs		6	16	5	5	5	4	Up to 96
Contact Inputs (Fixed)		6	6	3			3	1
User-Programmable Digital Inputs			10	2	1	1	4	Up to 96
Contact Outputs (Fixed)		3	2	1	2	2	4	
Contact Outputs (Programmable)		1	2	3	2	2	2	Up to 64
Configurable Push Buttons			•					16
Virtual Inputs								32
Virtual Outputs								64
Direct Inputs/Outputs								Up to 32
VFD/LCD Display		•	•	•	•	•	•	•
Keypad		•	•	•	•	•	•	•
Trip/Close Coil Supervision							•	•
User-Programmable LEDs								•
User-Programmable Push Buttons			•					•
User-Programmable Self Test								•
Timers			•					•
Selector Switch								•
Digital Counters						•		•
Digital Elements								•
IRIG-B Input								•
Analog Inputs			•				•	•
Analog Outputs				Optional	1	4	•	•
Thermistor Inputs			•	1				
Remote RTDs						•		
RTD Inputs			4	Optional	10	12	12	•
Metering and Monitoring								
Learned motor data		•	•	•	•	•	•	•
Thermal Capacity Used			•	•	•	•	•	•
Current – RMS		•	•	•	•	•	•	•
Current – Phasor						•	•	•
Current – Demand						•		
Current - Unbalance		•	•	•	•	•	•	•
Current - Ground Leakage			•	•	•	•	•	•
Voltage – RMS		•	•		Optional	•	•	•
Voltage – Phasor						•	•	•
Power - Apparent, Real, Reactive, Power Factor		Active	Active		Optional	•	•	•
MW, MVA, Mvar Demand						•		
Torque							•	
Energy			Active		Optional	•	•	•
Frequency					Optional	•	•	•
Temperature				•	•	•	•	•
Fault Report/Trip Data		•	•	•	•	•	•	•
User Programmable Fault Report/Trip Data								•
Event Recorder - Number of Events		10				250	40	1024
Oscillography - Cycles/Sample Rate						64 @ 16	64 @ 12	64 @ 64
Trip Counters			•			•	•	•
Data Logger						•	•	•
Operating Temperature Range - Minimum °C		0 to 60	0 to 60	0 to 60	-10 to 60	-40 to 60	-40 to 85	-40 to 85
Communications								
RS232 Port		•				•	•	•
RS485 Port			•	•	•	•	•	•
RS422 Port					Optional			
Ethernet Communications						•	•	•
Fiber Optic Port						•		•
Modbus Protocol			•	•	•	•	•	•
Modbus User Map			•	•		•	•	•
Profibus Port						•		
Device Net		•						
DNP3 Protocol								•
EGD Protocol								•
UCA2/MMS Protocol								•
Peer-to-peer communication (Goose)								•
IEC 61850 Protocol								•
Simple Network Time Protocol								•

Publications and Reference: *See Section 21 for a list of additional product-related publications*

Application Selector Guide—Meter Protection System

Meter Product Selector Guide

		Commercial/Residential			Low End Metering for Industrials				Power Quality Mid Range PQM Metering	Transient High End PQ/ Transients/Web Mid Range PQM Metering/Web
		Sub-Metering	Multi-Channel	Basic Metering	Basic Metering					
	Market Segment	EPM 1000	EPM 4000	EPM 2000	EPM 5200	EPM 5300	EPM 5350	EPM 6000	PQM II	EPM 9650Q
Applications	Revenue Metering	•	•		•	•	•	•	•	•
	Data Logging	•	•						•	•
	Waveform Capture/Recording								•	•
	Power Quality								•	•
	Transient Capture									•
	ANSI C12.20 CA0.2							•		•
Front Panel	Display	•	•	•	•	•	•	•	•	•
	Keypad for configuration	•	•	•	•	•	•	•	•	
	PC Connection	•	•	•				IrDA	RS232	RS232/485
	Test Pulse							•		•
	% Load Bar							•		
Voltage	per ph & average	•	•	•	•	•	•	•	•	•
	Unbalance				•	•	•	•	•	•
Current	per ph & average	•	•	•	•	•	•	•	•	•
Power	kW, kVAR, kVA	•	•	•	•	•	•	•	•	•
	Bidirectional Power measurement	•	•	•	•	•	•	•	•	•
Energy	kWh, kVARh, kVAh	•	•	•	•	•	•	•	•	•
	Power Factor	•	•	•	•	•	•	•	•	•
Phasor Diagram								•		•
Demand		•	•	•	•	•	•	•	•	•
Accuracy (full scale)	V, I	0.5%	0.5%	0.5%	0.3%	0.2%	0.2%	0.1%	0.2%	0.02%
	kVA	0.4%	0.5%	1.0%	0.6%	0.4%	0.4%	0.2%	0.4%	0.04%
A/D Conversion			10 bit	8 bit	10 bit	10 bit	10 bit	24 bit	10 bit	16 Bit
Data Logging	Data Logging	•	•						•	•
	16 parameters at hourly interval	❍	❍						13.5days	260 days
	Time stamping Recording	•	•							1ms
	Time stamping Resolution	❍	❍							1ms
Waveform Scope						•	•			•
Waveforms	Waveform capture								•	•
	Rate: Samples / cycle x Cycles								256x1	512x768
	Waveform recorder									•
	Rate: Samples / cycle x Cycles									16x4096 to 512x512
Power Quality	Harmonics: Individual on meter					1	1		62nd	127th
	THD	❍	❍			•	•		•	•
	Symmetrical Components									
	K-Factor					•	•			•
Transient	Sag/Swell detection									•
	Transient Capture									32µs
I/O Points[2]	Total (Standard)								13	8
	Input / Output	4							5 / 8	8 / 0
Communciations	RS-232		•						•	•
	RS-485	•	•	•	•	•		•	•	•
	Top Serial Baud Rate		9600	1200	9600	9600	9600	57600	19200	115,000
	IR Port	•						•		
	Internal Modem									•
	Ethernet Port (optional)						•			•
	Web Pages/Server									•
Protocol	Modbus RTU	•	•		•	•	•	•	•	•
	DNP 3.0			•	•	•				•
	Telnet									•
ANSI Compliance	ANSI C12.20 (1999) CA0.5							•		•
	ANSI C12.20 (1999) CA0.2							•		•
	ANSI C12.1		•		•	•	•	•		
	ANSI C12.16	•	•							

[1] *EPM 5300 and 5350 calculate THD and K Factor through the 31st harmonic.*

[2] *I/O point on 9450 and 9650 can be expanded to over 60 points using auxiliary I/O modules.*
PQM: digital 4 in / 4 out, analog 1 in / 4 out.

SR Family—Relay Family

Comprehensive Industrial Power Management Systems for Motors, Generators, Transformers and Feeders

Key Values

—Ability to view in direct sunlight - Large backlit display with 40 characters (Except 735/737)
—Minimize replacement time - Draw-out construction
—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout (Except 735/737)
—Reduce troubleshooting time and maintenance costs - IRIG-B time synchronization, event reports, waveform capture, data logger (Except 735/737)
—Simplify testing - Built in simulation features
—Access information - via Modbus RTU and Ethernet
—Complete asset monitoring - Analog I/O, Full metering including demand and energy (Except 735/737)
—Follow technology evolution - Flash memory for product field upgrade (Except 735/737 that requires an EEPROM replacement)
—Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating (Except 735/737)

Features and Benefits

—Large backlit 40 character display (except 735/737)
—Incorporates protection, control and metering
—Local and remote user interfaces
—Simulation function
—Internal memory
—Diagnostic features - event recording, oscillography and data logging (Except 735/737)

Monitoring and Metering

—Event recorder
—Oscillography and Data Logger
—Self diagnostic
—Metering
—Demand

User Interface

—Front Panel LEDs, full key pad, and backlit LCD display
—RS232, RS485 and RS422 ports - up to 19,200 bps
—Ethernet port
—Multiple protocols - Modbus RTU, DNP 3.0
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Description

The SR Family of protection relays is a microprocessor based multi-functional line of products. By providing an economical system for protection, control, monitoring and metering, and both local and remote user interfaces in one assembly, the SR relays effectively eliminate the need for expensive discrete components.
In addition to traditional current and voltage inputs, the SR Family also offers several analog and digital inputs. These inputs provide the relay with vital information such as vibration, pressure, temperature, and breaker status. Several additional output relays are available for flexibility in creating custom protection schemes.
The SR Family offers analog outputs which eliminate the need for external transducers. When connected to a PLC for process control, the result is truly real time.

All SR relays have three independent communications ports: a rear RS485 port, a second rear RS485 or RS422 port and a front panel RS232 port for easy local PC access. The rear ports offer remote communications or connection to a DCS, SCADA, or PLC. All three ports support the Modbus RTU protocol. In addition, the 489, 745, 750 and 760 all support Distributed Network Protocol (DNP) 3.0 Level 2. All communications ports may be active simultaneously.
With the exception of the 735/ 737, all relays utilize EnerVista setup software for communication, monitoring and metering. The software can also provide a simulation for training and testing. Actual values, setpoints, status, trending, and waveform capture information may all be viewed via the software, and can be used for troubleshooting.
All units feature drawout construction. When removed, the CT secondaries will automatically be connected to prevent dangerous high voltages from open CTs.

EnerVista Launchpad

EnerVista Launchpad is a complete set of powerful device setup and configuration tools that is included at no extra charge with the SR Relays.
—Set up the SR Relays - and any other GE Multilin device - in minutes. Retrieve and view oscillography and event data at the click of a button.
—Build an instant archive on any of the latest GE Multilin manuals, service advisories, application notes, specifications or firmware for your SR Relay.
—Updates via the Internet and detailed e-mail notification of new releases.

Product Upgrades

Flash memory technology allows product upgrades without unit removal. Firmware upgrades may be downloaded to the unit via the RS232 ports.

SR Family of Products Include:

—469 Motor Protection System
—489 Generator Protection System
—735/737 Feeder Protection System
—745 Transformer Protection System
—750/760 Feeder Protection System

Publications and Reference: *See Section 21 for a list of additional product-related publications*

SR 469 Motor Protection System

Complete, Integrated Protection and Management of Medium and Large Motors

Key Values

- *Unique protection features - Voltage dependent overload curves, torque metering and protection, broken rotor bar protection*
- *Most advanced thermal model including multiple RTD inputs for stator thermal protection*
- *Advanced monitoring functions - vibration, bearing temperature*
- *Ability to view in direct sunlight - Large backlit display with 40 characters*
- *Minimize replacement time - Draw-out construction*
- *Complete asset monitoring - temperature, Analog I/O, full metering including demand and energy*
- *Improve uptime of auxiliary equipment through I/O monitoring*
- *Ease of use and installation - same front panel programming, common cutout*
- *Reduce troubleshooting time and maintenance costs - event reports, waveform capture, data logger*
- *Simplify testing - Built in simulation features*
- *Access to information - via Modbus RTU and Ethernet*
- *Follow technology evolution - Flash memory for product field upgrade*
- *Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating*

Applications

- *Medium and large motors*

Features and Benefits

- *Digital relay*
- *Large backlit 40 character display*
- *Incorporates protection, control and metering*
- *Local and remote user interfaces*
- *Simulation function*
- *Internal memory*
- *Diagnostic features - event recording, oscillography and data logging*

Monitoring and Metering

- *A V W var VA PF Hz Wh varh demand*
- *Torque, temperature*
- *Event recorder*
- *Oscillography and Data Logger*

Protection and Control

- *Thermal model biased with RTD and negative sequence current feedback*
- *Voltage compensated acceleration*
- *Undervoltage, overvoltage*
- *Phase differential protection*
- *Under power for load loss*
- *Reverse Power*
- *Dual overload curves for 2 speed motors*
- *Reduced voltage starting control*

Inputs and Outputs

- *12 RTDs, programmable*
- *5 pre-defined and 4 assignable digital inputs*
- *6 output relays*
- *4 analog inputs*
- *4 programmable analog outputs*

User Interface and Programming

- *Front Panel LEDs, full key pad, and backlit LCD display*
- *RS232, and RS485 ports - up to 19,200 bps*
- *Ethernet port*
- *Modbus RTU Protocol*
- *EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices*

Ordering

469	*	*	*	*	Description
469					Basic unit
	P1				1 A phase CT secondaries
	P5				5 A phase CT secondaries
		LO			DC: 24 – 60 V; AC: 20 – 48 V @ 48 – 62 Hz control power
		HI			DC: 90 – 300 V; AC: 70 – 265 V @ 48 – 62 Hz control power
			A1		0 – 1 mA analog outputs
			A20		4 – 20 mA analog outputs
				E	Enhanced display, larger LCD, improved keypad

Accessories

EnerVista	Provided free with each relay
DEMO	Metal carry case in which 469 unit may be mounted
19-1 PANEL	Single cutout 19" panel
19-2 PANEL	Dual cutout 19" panel
SCI MODULE	RS232 to RS485 converter box designed for harsh industrial environments
Phase CT	50, 75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 750, 1000
HGF3, HGF5, HGF8	For sensitive ground detection on high resistance grounded systems
1 3/8" Collar	For shallow switchgear, reduces the depth of the relay by 1 3/8"
3" Collar	For shallow switchgear, reduces the depth of the relay by 3"

Dual mounting available with the 19-2 Panel.

SR 489 Generator Protection System

Economical Protection, Monitoring and Metering for Generators.

Key Values

—*Unique protection features - Multiple RTD inputs for stator thermal protection*
—*Advanced monitoring functions - vibration, bearing temperature*
—*Optimize operation - Built in inductive hall effect sensor for speed monitoring*
—*Follow technology evolution - Flash memory for product field upgrade*
—*Minimize replacement time - Draw-out construction*
—*Improve uptime of auxiliary equipment through I/O monitoring*
—*Ease of use and installation - same front panel programming, common cutout*
—*Reduce troubleshooting time and maintenance costs - IRIG-B time synchronization, event reports, waveform capture, data logger, learned data*
—*Simplify testing - Built in simulation features for setpoint verification*
—*Access to information - via Modbus RTU and Ethernet*
—*Complete asset monitoring - Analog I/O, Full metering including demand and energy*
—*Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating*

Applications

—*25, 50 or 60 Hz synchronous or induction generators*
—*Primary, backup and co-generator applications*

Features and Benefits

—*Large backlit 40 character display*
—*Tracks power system frequency*
—*Adjusts sampling rate to maintain accuracy*
—*Incorporates protection, control and metering*
—*Local and remote user interfaces*
—*Simulation function*
—*Internal memory*
—*Diagnostic features - event recording, oscillography and data logging*

Monitoring and Metering

—*Metering: A, V, W, VAR, VA, Wh, VARh, PF, Hz*
—*Demand values: A, W, VAR, VA*
—*Event recorder*
—*Oscillography and Data Logger*

Protection and Control

—*Phase differential*
—*100% stator ground*
—*Ground directional overcurrent*
—*Anti-motoring (reverse power)*
—*Loss of field*
—*Negative sequence overcurrent*
—*High-set overcurrent*
—*Voltage restrained phase overcurrent*
—*Overexcitation, V/Hz*
—*Undervoltage and overvoltage*
—*Voltage phase reversal*
—*Underfrequency and overfrequency*
—*Distance element*
—*Stator and bearing overtemperature*
—*Stator and bearing vibration monitoring*
—*Inadvertent generator energization*
—*Breaker failure detection*
—*Overspeed*
—*VT fuse failure detection*
—*Trip coil supervision*
—*4 analog outputs, 4 analog inputs*

User Interface and Programming

—*Front Panel LEDs, full key pad, and backlit LCD display*
—*RS232 and RS485 ports - up to 19,200 bps*
—*Ethernet port, 10 Mbps*
—*Multiple protocols - Modbus RTU, DNP 3.0 DeviceNet[1]*
—*EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices*

[1]Contact GE Multilin for availability.

Ordering

489	*	*	*	*	Description
489					Base unit generator management relay
	P1				Current transformer inputs: 1 A CT secondaries
	P5				Current transformer inputs: 5 A CT secondaries
		LO			Control power: DC: 20 – 60 V; AC: 20 – 48 V @ 48 – 62 Hz
		HI			Control power: DC: 90 – 300 V; AC: 70 – 265 V @ 48 – 62 Hz
			A1		0 – 1 mA analog outputs
			A20		4 – 20 mA analog outputs
				E	Enhanced display, larger LCD, improved keypad

Accessories

EnerVista Software	Included with each relay (LaunchPad)
DEMO	Metal carry case in which 489 unit may be mounted
19-1 PANEL	Single cutout for 19" panel
19-2 PANEL	Double cutout for 19" panel
SCI MODULE	RS232 to RS485 converter box, designed for harsh industrial environments
Phase CT	50, 75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 750, 1000
HGF3, HGF5, HGF8	For sensitive ground detection on high resistance grounded systems
1 3/8" Collar	For shallow switchgear, reduces the depth of the relay by 1 3/8"
3" Collar	For shallow switchgear, reduces the depth of the relay by 3"
IP54 Collar	
Conformal Coating	For harsh environments

Dual mounting available with the 19-2 Panel. For dimensions see SR Family brochure

Publications and Reference: *See Section 21 for a list of additional product-related publications*

SR 735/737 Feeder Protection System

Three-Phase and Ground Feeder Protection

Key Values

—Minimize replacement time - Draw-out construction
—Ease of use and installation - Front panel programming, common cutout
—Simplify testing - Built in simulation features
—Access information - via Modbus RTU

Applications

—Primary circuit protection on distribution networks at any voltage level
—Backup protection of busses, transformers and power lines

Features and Benefits

—Digital relay
—Incorporates protection features only
—Local and remote user interfaces
—Simulation function

Monitoring and Metering

—Trip record of last 5 trips
—Pre-trip data includes currents
—True RMS sensing

Protection and Control

—3 phase time overcurrent
—Ground time overcurrent
—5 curve shapes
—4 curve shift multipliers per curve
—10 time multipliers per curve
—ANSI, IAC, or IEC/BS142 curves
—Phase instantaneous overcurrent
—Ground instantaneous overcurrent
—Pickup level for each overcurrent
—Outputs: trip, aux trip, service
—Aux trip: 86 lockout, ground trip
—SR737 has 8 additional output relays

User Interface and Programming

—8 LED trip indicators
—4 LED status indicators
—Current bar graph, % of CT
—RS485 or RS422 communications
—Modbus RTU protocol
—Baud rate up to 19,200 bps

Ordering

*	*	*	*	*	Description
735					Standard relay with 50/51, 50G/51G protection
737					Relay with 8 additional outputs
	1				1 A phase CT secondaries
	5				5 A phase CT secondaries
		1			1 A ground CT secondaries
		5			5 A ground CT secondaries
			LO		20 – 60 Vdc; 20 – 48 Vac @ 50, 60 Hz control power
			HI		90 – 300 Vdc; 70 – 265 Vac @ 50, 60 Hz control power
				485	RS485 2-wire communications (standard)
				422	RS422 4-wire communications (optional)

Accessories

19-1 PANEL	Single cutout panel
19-2 PANEL	Dual cutout panel
SCI	RS232 to RS485 convertor
735/737-DEMO	737 demo/test case
1 3/8" Collar	For shallow switchgear, reduces the depth of the relay by 1 3/8"
3" Collar	For shallow switchgear, reduces the depth of the relay by 3"

SR 745 Transformer Protection System

High-Speed, Multi-processor Based Relay for Primary Transformer Protection and Management

Key Values

- —IRIG-B time synchronization
- —Optimum transformer life expectancy - Harmonic de-rating, advanced loss of life algorithm, THD monitoring
- —Built-in winding adaptive overcurrent elements for backup protection.
- —Follow technology evolution - Flash memory for product field upgrade
- —Minimize replacement time - Draw-out construction
- —Improve uptime of auxiliary equipment through I/O monitoring
- —Ease of use and installation - same front panel programming, common cutout
- —Reduce troubleshooting time and maintenance costs - IRIG-B time synchronization, event reports, waveform capture, data logger, learned data
- —Simplified testing - Built in simulation features for setpoint verification
- —Access to information - via Modbus RTU and Ethernet
- —Complete asset monitoring - Analog I/O, Full metering including demand and energy
- —Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating

Applications

- —Primary circuit protection on distribution networks at any voltage level
- —Backup protection of busses, transformers and power lines

Features and Benefits

- —Large backlit 40 character display
- —Tracks power system frequency
- —Adjusts sampling rate to maintain accuracy
- —Incorporates protection, control and metering
- —Programmable Logic (FlexLogic)
- —Local and remote user interfaces
- —Simulation function
- —Internal memory
- —Diagnostic features - event recording, oscillography and data logging

Monitoring and Metering

- —All currents
- —THD and harmonics
- —Demand
- —Harmonic analysis
- —Voltage
- —Calculated 3 Phase Power
- —Tap position
- —Ambient temperature
- —Analog transducer input
- —Event recorder
- —Oscillography and Data Logger
- —Oscillography playback

Protection and Control

- —Percent differential
- —Adaptive harmonic restraint
- —Multiple overcurrent elements
- —Adaptive time O/C elements
- —16 digital (logic) inputs
- —Underfrequency
- —Frequency rate-of-change
- —Overexcitation (V/Hz)
- —4 setpoint groups
- —9 control outputs
- —Restricted ground fault (optional)
- —1 analog transducer input (optional)
- —7 analog transducer outputs (optional)

User Interface and Programming

- —Front Panel LEDs, full key pad, and backlit LCD display
- —RS232, RS485 and RS422 ports - up to 19,200 bps
- —Ethernet port
- —Multiple protocols - Modbus RTU, DNP 3.0 DeviceNet[1]
- —EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

[1]Contact GE Multilin for availability.

Ordering

745	*	*	*	*	*	*	*	*	Description
745									Base unit transformer management relay
	W2								2 windings per phase
	W3								3 windings per phase
									Phase current input rating
		P1							1 A for all windings
		P5							5 A for all windings
		P15							1 A for winding 1, 5 A for winding 2
		P51							5 A for winding 1, 1 A for winding 2
		P115							1 A for winding 1, 1 A for winding 2, 5 A for winding 3
		P151							1 A for winding 1, 5 A for winding 2, 1 A for winding 3
		P155							1 A for winding 1, 5 A for winding 2, 5 A for winding 3
		P511							5 A for winding 1, 1 A for winding 2, 1 A for winding 3
		P515							5 A for winding 1, 1 A for winding 2, 5 A for winding 3
		P551							5 A for winding 1, 5 A for winding 2, 1 A for winding 3
									Ground current input rating
			G1						1 A for windings 1 and 2, 1 A for windings 2 and 3
			G5						5 A for windings 1 and 2, 5 A for windings 2 and 3
			G15						1 A for windings 1 and 2, 5 A for windings 2 and 3
			G51						5 A for windings 1 and 2, 1 A for windings 2 and 3
				LO					24 – 60 Vdc, 20 – 48 Vac @ 48 – 62 Hz
				HI					90 – 300 Vdc, 70 – 265 Vac @ 48 – 62 Hz
					A				Analog input/outputs option
						L			Loss of Life
							R		Restricted ground fault option
								E	Enhanced display, larger LCD, improved keypad

Dual mounting available with the 19-2 Panel. For dimensions see SR Family brochure

Accessories

Conformal coating	for harsh environments

Publications and Reference: *See Section 21 for a list of additional product-related publications*

SR 750/760 Feeder Protection System

Complete, Economical Protection and Monitoring of Industrial and Utility Feeders

Key Values

—Unique built-in control features - Automatic Transfer Scheme, Under Voltage and Under Frequency auto-restore
—Ability to view in direct sunlight - Large backlit display with 40 characters
—Minimize replacement time - Draw-out construction
—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout
—Reduce troubleshooting time and maintenance costs - IRIG-B time synchronization, event reports, waveform capture, data logger
—Simplify testing - Built in simulation features
—Access information - via Modbus RTU and Ethernet
—Complete asset monitoring - Analog I/O, Full metering including demand and energy
—Follow technology evolution - Flash memory for product field upgrade
—Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating

Applications

—Management and primary protection of distribution feeders
—Management and backup protection of busses, transformers and power lines
—Reliable Distributed Generation interconnection

Features and Benefits

—Large backlit 40 character display
—Tracks power system frequency
—Adjusts sampling rate to maintain accuracy
—Incorporates protection, control and metering
—Local and remote user interfaces
—Simulation function
—Internal memory
—Diagnostic features - event recording, oscillography and data logging

Monitoring and Metering

—Fault locator, record of last 10
—Breaker operation and trip failure
—Analog input - level and rate
—Oscillography and Data Logger
—VT Failure
—Event recorder
—Total breaker arcing current
—Metering: V I Hz W var VA PF
—Power factor - two independent stages
—Demand: Ia , Ib , Ic , MW, Mvar, MVA

Protection and Control

—Complete time, instantaneous and directional overcurrent
—Undervoltage and overvoltage
—Negative sequence voltage
—Undervoltage automatic restoration
—Bus underfrequency
—Underfrequency automatic restoration
—Automatic bus transfer
—Breaker failure
—Manual close control
—Cold load pickup control
—4 setting groups
—Synchrocheck - V, f, Hz, and dead-source
—20 Programmable logic inputs

User Interface and Programming

—Front Panel LEDs, full key pad, and backlit LCD display
—RS232, RS485 and RS422 ports - up to 19,200 bps
—Ethernet port, 10 Mbps
—Multiple protocols - Modbus RTU, DNP 3.0 DeviceNet[1]
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

[1]Contact GE Multilin for availability.

Ordering

***	*	*	*	*	*	*	*	Description
750								Base unit
760								Base unit with autoreclosure
	P1							1 A phase current inputs
	P5							5 A phase current inputs
		G1						1 A zero sequence current inputs
		G5						5 A zero sequence current inputs
			S1					1 A sensitive ground current input
			S5					5 A sensitive ground current input
				LO				20 – 60 Vdc, 20 – 48 Vac @ 48 – 62 Hz
				HI				88 – 300 Vdc, 70 – 265 Vac @ 48 – 62 Hz
					A1			Eight 0 – 1 mA analog outputs
					A5			Eight 0 – 5 mA analog outputs
					A10			Eight 0 – 10 mA analog outputs
					A20			Eight 4 – 20 mA analog outputs
						R		Red breaker closed LED
						G		Green breaker closed LED
							E	Enhanced display, larger LCD, improved keypad

Accessories

Conformal coating	for harsh environments

F650 Feeder Protection System

Protection, Control, Monitoring, Analysis and Energy Metering System

Key Values

—Cost effective – Complete feeder protection and control of multiple devices including main breaker and motorized switches
—Access to information - Wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication
—Complete asset monitoring – full metering, data logger
—Reduce troubleshooting time and maintenance cost – event reports, waveform capture, IRIG-B time synchronization
—Reduced number of devices – control functions, built in HMI, programmable LEDs
—Design flexibility - Many I/O options, programming logic

Applications

—HV feeders, busbars and bus couplers
—MV feeders, transformers and capacitor banks
—Auxiliary services or component in a control system

Features and Benefits

—Phase, neutral and ground IOCs and TOCs
—Four-shot configurable recloser
—Phase under/overvoltage elements
—Flash memory for field upgrades
—Drawout modules for serviceability
—High resolution oscillography
—Configurable graphical HMI interface
—Directional control for each unit
—Redundant power supply

Monitoring and Metering

—Fault location, event and fault recording
—Current, voltage, power, power factor, energy, demand, frequency metering

Protection and Control

—Bidirectional protection
—Sensitive earth fault
—Autoreclosure
—Breaker failure
—Trip circuit supervision
—Alarm panel

User Interface and Programming

—RS485 serial port
—40 character illuminated display
—6 LED indicators
—Includes EnerVista software - an industry-leading suite of software tools that simplifies every aspect of working with GE Multilin devices
—IEC61850, Modbus RTU, DNP 3.0

Ordering

650	*	*	*	F	*	G	*	*	Description
650									**Digital bay management device**
	B								Basic display (4 x 20 characters)
	M								Graphical mimic display (240 x 128 pixels)
									Rear Serial Communications Board 1
		F							None
		A							Redundant RS485
		P							Redundant plastic F.O.
		G							Redundant glass F.O.
		X							Redundant RS485 + remote CAN bus I/O[1]
		Y							Redundant plastic F.O. + remote CAN bus I/O[1]
		Z							Redundant glass F.O. + remote CAN bus I/O[1]
									Rear Ethernet Communications board 2
			B						10/100 BaseT
			C						10/100 BaseT + 10/100 BaseF
			D						10/100 BaseT + redundant 10/100 BaseF
									I/O board 1
					1				16 inputs + 8 outputs
					2				8 Inputs, 4 circuits for circuit supervision, 6 Outputs + 2 outputs with circuits for trip current supervision (latching)
									I/O board 2
						0			None
						1			16 Inputs + 8 Outputs
									Auxiliary Voltage
							LO		24-48 Vdc (range 19.2 - 57.6)
							HI		110-250 Vdc (range 88-300)120-230 Vac (range 88-264)
							LOR		Redundant LO
							HIR		Redundant HI

[1]*Please refer to CIO remote CAN bus I/O module ordering code to complete your order.*

Publications and Reference: *See Section 21 for a list of additional product-related publications*

239 Motor Protection System

Motor Protection and Management for Small to Medium Size Motors

Key Values

—Compact design
—Enhanced protection - incorporates thermal models
—Setting flexibility - Multiple setpoint groups
—Simplify testing - Built in simulation features
—Asset Monitoring - Temperature monitoring via RTDs
—Access information - via Modbus RTU and Ethernet
—Follow technology evolution - Flash memory for product field upgrade

Applications

—Small to medium sized motors
—Pumps, conveyors, compressors, fans, sawmills, mines

Features and Benefits

—Incorporates protection, control and metering
—Local and remote user interfaces
—Simulation function
—Internal memory

Monitoring and Metering

—Status/current/temperature display
—Fault diagnosis
—Trip record, last 5
—Process control
—Optional analog output

Protection and Control

—Overload (15 selectable curves)
—Phase short circuit
—Locked rotor / mechanical jam
—Thermal memory lockout
—Single phase/unbalance
—Ground fault
—Overtemperature: thermistor
—Additional 3 RTDs optional
—Undercurrent
—Trip/alarm/auxiliary/service outputs

User Interface and Programming

—RS485 serial port
—40 character illuminated display
—6 LED indicators
—Modbus RTU Protocol

Ordering

239	*	*	Description
239			Basic unit
	RTD		3 RTDs: stator/bearing; programmable type: platinum, nickel, copper
		AN	Single isolated, analog output: 0 – 1, 0 – 20, 4 – 20 mA Programmable output parameters: thermal capacity, % full load, phase current, RTD1, RTD2, RTD3 temperature

Accessories

239PC supplied free
Phase and ground CTs
Emergency restart keyswitch ERSW
RS485 terminating network
RS232 to RS485 convertor (required to interface a computer to the relay)
2.25" collar for limited depth mounting (1009-0068)

Modifications

MOD 501	20 – 60 Vdc/20 – 48 Vac control power
MOD 502	Conformal coating
MOD 504	Removable terminal blocks
MOD 505	Enhanced start protection
MOD 506	Custom (programmable) overload curve
MOD 509	Directional ground sensing with 120 Vac polarizing voltage
MOD 512	1 A ground input
MOD 513	Class 1 Div 2 operation
MOD 517	Australian mines approval

269Plus Motor Protection System

Complete and Accurate Motor Protection for Industrial Motors and Equipment

Key Values

—Most advanced thermal model including multiple RTD inputs for stator thermal protection
—Complete asset monitoring - stator, bearing and ambient temperature
—Improve uptime of auxiliary equipment through I/O monitoring
—Reduce troubleshooting time and maintenance costs - data logger
—Access to information - RS485 Communications port and Modbus RTU Protocol
—Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating
—Installation flexibility - Remote display and remote RTD option

Applications

—Medium size motors

Features and Benefits

—Incorporates protection, control and metering
—Local and remote user interfaces
—Simulation function
—Internal memory
—Diagnostic features - learned data and data logging

Monitoring and Metering

—Current and Thermal Capacity metering
—Data Logger
—Learned and Statistical Data

Protection and Control

—Thermal model biased with RTD and negative sequence current feedback
—Stator winding and bearing overtemperature
—Motor multiple starts
—8 standard overload curves
—User defined overload FlexCurve
—Undercurrent for load loss
—Locked rotor
—Rapid trip/mechanical jam
—Unbalance/single phasing
—Short circuit
—Ground fault
—Phase reversal (meter option)
—Variable lock-out time
—Latched main trip relay, alarm relay
—2 auxiliary relays
—Emergency restart capability
—Pre-trip alarm warnings

Inputs and Outputs

—12 RTDs, programmable
—5 factory programmed digital inputs
—4 output relays
—1 programmable analog output

User Interface and Programming

—Front Panel 5 LEDs, key pad, and backlit LCD display
—RS485 port - up to 2,400 bps
—Modbus RTU Protocol
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Publications and Reference: *See Section 21 for a list of additional product-related publications*

269Plus Motor Protection System

Complete and Accurate Motor Protection for Industrial Motors and Equipment

Ordering

269 * * * * * * * Description

269							269 motor management relay (SEE NOTE)
269PLUS							269 Plus motor management relay
	SV						Standard version
	D/O						Drawout version

	Phase CT[1]	**Ground CT (required for D/O only)**	
1	:5	2000:1	
2	:5	:5	
3	:1	2000:1	
4	:1	:5	

	Relay fail safe code[2] (required for D/O only)			
	Trip	Alarm	Aux1	Aux 2
1	FS	NFS	NFS	FS
2	NFS	FS	NFS	FS
3	FS	FS	NFS	FS
4	NFS	NFS	FS	FS
5	FS	NFS	FS	FS
6	NFS	FS	FS	FS
7	FS	FS	FS	FS
8	NFS	NFS	NFS	FS

	Relay contact arrangement[3] (required for D/O only)		
	Alarm	Aux1	Aux2
1	N.O.	N.O.	N.O.
2	N.O.	N.O.	N.C.
3	N.O.	N.C.	N.O.
4	N.O.	N.C.	N.C.
5	N.C.	N.O.	N.O.
6	N.C.	N.O.	N.C.
7	N.C.	N.C.	N.O.
8	N.C.	N.C.	N.C.

100P	100 Ohm platinum RTD
10C	10 Ohm copper RTD
100—	100 Ohm nickel RTD
120—	120 Ohm nickel RTD

HI	80 – 300 Vdc/65 – 265 Vac control power
LO	20 – 60 Vdc/20 – 48 Vac control power

[1] *For CT ratings greater than 1500:5, consult the factory.*

[2] *FS=Fail safe; A fail safe relay is one that changes state when control power is applied to the 269 Plus. NFS= Non fail safe; A non fail safe relay is one that remains in its shelf state when control power is applied to the 269 Plus.*

[3] *N.O. and N.C. are defined as open and closed contacts of an output relay with control power applied to the 269 Plus and no trips or alarms are present.*

Example:
For a standard 269 Plus: 269PLUS-SV-100P-125DC
For a 269 Plus Drawout: 269PLUS-D/O-3-4-7-100P-120AC

NOTE for 269 model:
1. *No communications*
2. *8 RTDs vs. 10*
3. *No differential input*
4. *No speed switch input*
5. *No RTD bias*
6. *No custom curve*
7. *Limited statistical data*
8. *Limited learned data*

Available Enhancements:
515 blocking and test module
MPM motor protection meter
RS232/RS485 convertor box or F485 communication converter
ERSW emergency restart keyswitch

369 Motor Protection System

Complete Optimum Motor Protection for Maximum Rated Output

Key Values

—Unique and advanced protection features - Back-spin detection, advanced thermal model
—Most advanced thermal model including multiple RTD inputs for stator thermal protection
—Complete asset monitoring - stator, bearing and ambient temperature, optional full metering including demand and energy
—Improve uptime of auxiliary equipment through I/O monitoring
—Reduce troubleshooting time and maintenance costs -Event reports, waveform capture, data logger
—Simplify testing - Built in simulation features
—Multiple communication protocols - Modbus RTU, Profibus, Device Net
—Multiple communication ports - RS232, RS485, and Fiber Optic and Ethernet
—Follow technology evolution - Flash memory for product field upgrade
—Long lasting life when exposed to chemically corrosive and humid environments with optional conformal coating
—Suitable for hazardous locations - Underwriters Laboratory certification for Class 1 Division 2 applications
—Installation flexibility - Remote display and remote RTD option

Applications

—Medium size motors
—"Down Hole" -pump applications
—Direct replacement of 169 and 269 relays

Features and Benefits

—Digital relay
—Incorporates protection, control and metering
—Local and remote user interfaces
—Simulation function
—Internal memory
—Diagnostic features - event recording, oscillography and data logging

Monitoring and Metering

—Full metering: A V W var VA PF Hz Wh varh demand
—Fault diagnosis
—Event record
—Voltage/frequency/power display (M)
—4 analog outputs (M)
—Oscillography and Data Logger

Protection and Control

—Thermal model biased with RTD and negative sequence current feedback
—Phase short circuit
—Undervoltage, overvoltage
—Undercurrent for load loss
—Locked rotor / mechanical jam
—Variable lockout time
—Single phase/unbalance
—Ground fault O/C
—Overtemperature 12 RTDs (R)
—Starts/hour, time between starts
—Phase Reversal (M)

Inputs and Outputs

—12 RTDs, programmable
—5 assignable digital inputs
—4 output relays
—4 programmable analog outputs

User Interface and Programming

—Front Panel 10 LEDs, key pad, and backlit LCD display
—RS232, and RS485 ports - up to 19,200 bps
—Ethernet port, 10 Mbps
—Modbus RTU Protocol, Profibus, DeviceNet
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Publications and Reference: See Section 21 for a list of additional product-related publications

369 Motor Protection System

Complete Optimum Motor Protection for Maximum Rated Output

Ordering

369	*	*	*	*	*	Description
369						Basic unit (no RTD)
	HI					50 – 300 Vdc / 40 – 265 Vac Control Power
	LO					20 – 60 Vdc / 20 – 48 Vac Control Power
		R				Optional 12 RTD inputs (built-in)
		0				No optional RTD inputs
			M			Optional metering package
			B			Optional backspin detection (includes metering)
			0			No optional metering package or backspin detection
				F		Optional fiber optic port
				0		No optional fiber optic port
					P	Optional Profibus protocol interface
					E	Optional ModbusTCP over Ethernet interface
					0	No optional Profibus protocol interface

Note: The 369 is available in a non-drawout version only.

Accessories

369PC Program	Setup and monitoring software provided free with each relay.
RRTD	Remote RTD Module. Connects to the 369 via a fiber optic or RS485 connection. Allows remote metering and programming for up to 12 RTDs.
F485	Converts communications between RS232 and RS485 / fiber optic. Used to interface a computer to the relay.
CT	50, 75, 100, 150, 200, 300, 350, 400, 500, 600, 750, 1000 (1 A or 5 A secondaries)
HGF	Ground CTs used for sensitive earth fault detection on high resistance grounded systems.
515	Blocking and test module. Provides effective trip blocking and relay isolation.
DEMO	Metal carry case in which 369 is mounted.

Available Enhancement

MOD001 - Class 1, Div 2 Compliant

FM2 Feeder Protection System

Integrated Process and Electrical Control with Protection for Low Voltage Feeders

Key Values

—Low cost modular design
—Small footprint and compact design - Fits into standard MCC buckets
—Easy to use - EnerVista compatible
—Remote monitoring - via serial communications, Modbus RTU
—Easy installation and integration - Door mount option
—Replaces of bi-metal overload elements
—Reduced number of devices - integrated timers, relays, meters, switches, indicators

Applications

—Feeder protection and management system for low voltage distribution feeders
—Specifically designed for Motor Control Centre applications

Features and Benefits

—Modbus RTU protocol
—Incorporates protection, control and metering
—Local and remote user interfaces

Monitoring and Metering

—Display phase current, ground current, current imbalance, voltage, power, energy, etc.
—Trip record and pre-trip values
—Maintenance information

Protection and Control

—Thermal overload protection
—Ground fault protection
—Open contactor/Welded contactor
—Under voltage autoreclose
—Outputs: 2 fixed, 1 programmable and 1 emergency shutdown
—Inputs: 6 fixed, 10 programmable

User Interface and Programming

—RS485 Modbus , 1200 - 19,200 bps
—Front Panel 11 LEDs, key pad, and 2x20 LCD display
—Front Panel control push buttons
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

FM2 * - * - * - *	Description
Base Unit FM2	Product Family
Model 712	120 Vac VT and Switch input voltage
722	240 Vac VT and Switch input voltage
PD	Panel mount with Display
C	Chassis mount (Black box)

Note: All models contain three phase thermal overload protection (49/51), earth fault protection (50G), undervoltage reclose, current, voltage, power and energy metering, timers and counters, 6 control inputs (Close A, Close B, Open, Test Mode, Contactor A status, Contactor B Status), plus 10 programmable inputs, two auto output relays, one programmable relay, and ESD (emergency shutdown) relay. The relay unit can be powered up by 120/240 Vac, 50 or 60 Hz. The selection of control voltage shall be made by shifting the slide switch on back of the relay to the desired voltage.

Model

712	VT input and switch inputs are rated for 120V, 50 or 60 Hz AC
722	VT input and switch inputs are rated for 240V, 50 or 60 Hz AC

Mounting

Chassis Mount	"Black box" version of the FM2 mounted inside the PCC panel.
Panel Mount with Display	Mounted on a panel with a 20 x 2 display, LEDs, and keypad.

Accessories

EnerVista FM2 Setup Software	Software package to aid in setting up FM2 operating parameters (free)
RS-232/485	RS232 to RS485 converter box designed for harsh industrial environments
5A Phase CT	50,75,100,150,200,250,300,350,400,500,600,750,1000
1A Phase CT	50,75,100,150,200,250,300,350,400,500,600,750,1000
50:0.025 Earth fault CT	For sensitive earth fault detection on high resistance earthing systems
Collar	For reduced depth mounting
Open Key cover	To prevent accidental pressing of Open key.
Control key cover	Full cover on control keys

Special Order

MOD610	Provides protection in harsh environment

Publications and Reference: *See Section 21 for a list of additional product-related publications*

LM10 Motor Protection System

Modular Low Voltage Motor Protection in a Compact Form Factor

Key Values

—Low cost modular design
—Small footprint and compact design … Fits into standard MCC buckets
—Easy to use … Preconfigured; EnerVista compatible
—SCADA Interface … DeviceNet open protocol
—Easy installation and integration … Matched CTs available; Door mount option

Applications

—Motor protection and management system for low voltage, low horsepower motors
—Specifically designed for Motor Control Centre applications

Features and Benefits

—Device Net protocol
—Incorporates protection, and control
—Local and remote user interfaces

Monitoring and Metering

—Current metering: FLA, Phase, Average, Ground, Unbalance
—Other metering: Voltage, Watts, Power Factor

Protection and Control

—Overload (4 selectable curves)
—Locked rotor/mechanical jam
—Single phase/unbalance
—Ground fault
—Undercurrent - Load Loss
—Overvoltage and Undervoltage
—Run 1/Run 2/Ground/Programmable/Service outputs

User Interface and Programming

—RS232 serial port (RJ11 interface), up to 19,200 bps
—Brad Harrison Port
—Optional programming and display unit (PDU)
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

LM10	LM10-D	*	-	CT	**	-	GF	**	-	C	*	-	XX	Description
Base Unit														Base Unit - Motor Protection Relay
Programmable Display Unit		**X**												No Display Unit
		1												Programmable Display Unit (with cable)
Thermal Overload Current Transformer					**XX**									No Current Transformer
					01									Current Sensor, NEMA Starter Size 1, 3 phase, 30 amp
					02									Current Sensor, NEMA Starter Size 2 and 3, 3 phase, 90 amp
					03									Current Sensor, NEMA Starter Size 4, 3 phase, 200 amp
					04									Current Sensor, NEMA Starter Size 5, 1 phase, 300 amp
					05									Current Sensor, NEMA Starter Size 6, 1 phase, 600 amp
Ground Fault Sensor								**XX**						No Ground Fault Sensor
								01						Ground Fault Sensor - 3 phase, 20 amp, 0.44" window
								02						Ground Fault Sensor - 1 phase, 20 amp, 1.56" window
								03						Ground Fault Sensor - 3 phase, 20 amp, 2.08" window
								04						Ground Fault Sensor - 3 phase, 20 amp, 2.08" window
								05						Ground Fault Sensor - 1 phase, 20 amp, 3.31" window
								06						Ground Fault Sensor - 1 phase, 20 amp, 4.62" window
Cable											**X**			No cable
											1			30" Connection cable from relay to PC
													XX	Future use

MM2 Motor Protection System

Integrated Process and Electrical Control with Protection for Low Voltage Motors

Key Values

—*Low cost modular design*
—*Small footprint and compact design - Fits into standard MCC buckets*
—*Easy to use - Preconfigured; EnerVista compatible*
—*Remote monitoring - via serial communications, Modbus RTU*
—*Easy installation and integration - Door mount option*
—*Ease of use - Preconfigured motor starter types*
—*Replaces of bi-metal overload elements*
—*Reduced number of devices - integrated timers, relays, meters, switches, indicators*

Applications

—*Motor protection and management system for low voltage, low horsepower motors*
—*Specifically designed for Motor Control Centre applications*

Features and Benefits

—*Modbus RTU protocol*
—*Incorporates protection, control and metering*
—*Local and remote user interfaces*

Monitoring and Metering

—*Display phase current, ground current, thermal capacity, analog input, power, energy, etc.*
—*Trip record and pre-trip values*
—*Maintenance information*

Protection and Control

—*Overload*
—*Phase unbalance*
—*Contactor failure*
—*Locked/stalled rotor*
—*Ground fault*
—*Hot winding thermistor*
—*Undervoltage auto restart*
—*Outputs: 2 contactor, 2 programmable*
—*Inputs: 6 fixed, 10 programmable*

User Interface and Programming

—*RS485 Modbus , 1200 - 19,200 bps*
—*Front Panel 11 LEDs, key pad, and 2x20 LCD display*
—*Front Panel control push buttons*
—*EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices*

Ordering

MM2	*	*	*	*	Description
MM2					Basic unit
	PD				Panel mount with display[1]
	C				Chassis mount (black box)
		1			**Option 1** Process control, 10 process inputs, undervoltage auto restart, diagnostics
			2		**Option 2** Enhanced protection, power (kW), thermistor, 2nd contactor control, and 2 process inputs
				120	Control voltage 120 Vac
				240	Control voltage 240 Vac

[1]*Only Available when both options are ordered.*

Accessories

RS232 to RS485 converter box	Designed for harsh industrial environments
5 A Phase CT	50, 75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 750, 1000
1 A Phase CT	50, 75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 750, 1000
50:0.025 Ground CT	For sensitive ground detection on high resistance grounded systems
Collar	For reduced depth mounting

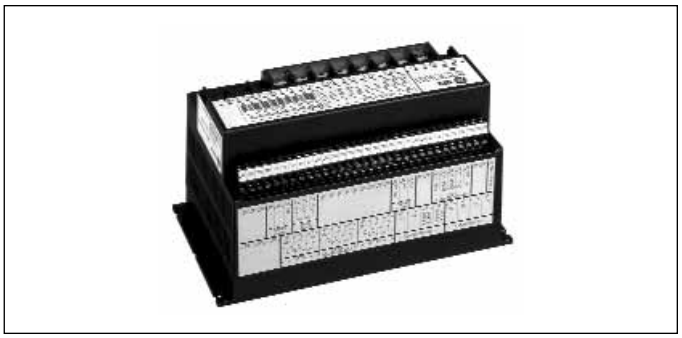
Modifications

MOD601	240 Vac switch inputs – allows the use of external 240 Vac supply to power switch inputs
MOD602	24 – 48 Vdc switch inputs – allows the use of external 24 – 48 Vdc supply to power switch inputs
MOD603	ESD relay – converts AUX 2 relay into an emergency shutdown relay
MOD605	Removable rear terminals – allows terminals 13 – 58 to be unplugged from the MM2
MOD610	Conformal coating
MOD613	240 Vac VT input
MOD614	VT primary setpoint up to 7200 V and variable overload curve setting
MOD615	VT primary setpoint up to 7200 V and backspin timer
MOD616	MM2 with remote display

Publications and Reference: *See Section 21 for a list of additional product-related publications*

MPM Motor Protection Metering System

Additional, Continuous Metering of Motors via the 269 or 269 Plus Motor Management Relay



Key Values

—High accuracy, mid range Power Quality with many advanced features
—Very easy to use, program and set up - comes with free EnerVista setup and metering software
—Open Modbus RTU protocol over RS485 communication capability allows easy integration to EnerVista or third party systems

Applications

—Continuous metering of motors via a 269 Motor Management Relay

Features and Benefits

—AC/DC universal power supply
—Compact size

Monitoring and Metering

Monitoring Data Displayed by 269
—3 phase voltage
—Average voltage
—Power factor
—Real power (kW)
—Reactive power (kvar)
—Power consumption (MWh)
—Frequency (Hz)

Protection and Control

Protection Provided by 269
—kvar limit
—Voltage phase reversal
—Under/overvoltage alarm/trip
—Power factor alarm/trip (lead/lag)
—MPM communication failure alarm Overload (15 selectable curves)

Inputs and Outputs

—Four 0-1 mA (A1 option) or 4-20 mA (A20 option) outputs of:
  —Average current (Amps)
  —3 phase real power (kW)
  —3 phase reactive power (kvar)
  —Power factor
—Failsafe form-C dry contact output relay
—VT wiring configuration selection

User Interface and Programming

—RS485 serial port
—Modbus RTU protocol

Ordering

MPM	*	*	Description
MPM			Basic unit, all current/voltage/power measurements, 1 269/269 Plus comm port, failsafe Form C output relay
	LO		20 – 60 Vdc, 20 – 48 Vac 50/60 Hz
	HI		90 – 300 Vdc, 70 – 265 Vac 50/60 Hz
		A1	Four 0 – 1 mA analog outputs
		A20	Four 4 – 20 mA analog outputs

SPM Synchronous Motor Protection System

Starting Protection, Synchronization and Control for Synchronous Motors

Key Values

—*Complete asset monitoring - Field Winding temperature*
—*Improve uptime of auxiliary equipment through I/O monitoring*
—*Access to information - RS485 Communications port and Modbus RTU Protocol*

Applications

—*Starting, synchronizing and protection of collector-ring or brushless-type synchronous motors*

Features and Benefits

—*Protects motor during start up and in the event of asynchronous operation*
—*Prevents overheating of cage winding*
—*Automatic phase rotation correction*
—*Regulator tuning mode*
—*True RMS metering with DFT filtering*
—*Statistics for improved maintenance*
—*Built-in self-diagnostics*
—*Two modes of pull-out protection*
—*Optional power factor regulator with five adjustable set points*

Monitoring and Metering

—*Motor power factor*
—*Motor run time, number and type of trips*

Protection and Control

—*DC field current loss, exciter current loss, DC field voltage check*
—*PF regulation, reluctance torque synchronizing*

User Interface and Programming

—*RS485 serial port*
—*Modbus RTU protocol*

Ordering

SPM	*	Description
SPM		SPM: standard starting and protection relay with VDN board
	PF	PF: power factor regulation option used on motors with proportional SCR exciter. (not recommended for brushless applications)

Accessories

PG2SPM	External hardware package for overtemperature and current loss protection up to 200 A (includes 1-DCCT200 and 1-CM)
PG4SPM	External hardware package for overtemperature and current loss protection up to 400 A (includes 1-DCCT400 and 1-CM)
MPSPM	Mounting panel to retrofit existing µSPM cutouts for SPM

Publications and Reference: *See Section 21 for a list of additional product-related publications*

M Family—Modular Microprocessor Family

An Economical Choice for Standard Digital Relaying Applications

Key Values

—Ease of use and installation - same front panel programming, common cutout
—Follow technology evolution - Flash memory for product field upgrade
—Low priced scalable options - event reports, waveform capture, recloser, breaker fail
—Reduce troubleshooting and maintenance cost - Event reports, waveform capture
—Design flexibility - Easy to use programming logic
—Asset monitoring - Breaker health, and breaker failure protection
—Access to information - Modbus RTU communications
—AC/DC power supply
—Easy access via front panel keypad or communication links
—Includes EnerVista software - an industry-leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Applications

—Feeder protection, any voltage level
—Main protection for small generators and motors
—Backup/Auxiliary protection for transformers, motors, generators and busbars
—Overload protection
—Automatic transfer equipment
—Load shedding and restoration schemes
—Backup directional overcurrent protection
—Reverse power protection
—Synchrocheck

Features and Benefits

—Incorporates protection, and control
—Local and remote user interfaces
—Internal memory
—Diagnostic features - event recording, and oscillography

Monitoring and Metering

—Current, voltage, frequency, thermal image
—Analog/digital oscillography (optional)
—Event recording up to 32 events
—Self-diagnostics

User Interface and Programming

—Front Panel LEDs, key pad, and 2x16 character LCD display
—6 LED indicators, 4 configurable in function and color
—Front RS232 and rear RS485 ports using Modbus RTU protocol up to 19,200 bps
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

M Family of Products Include:

—Multilin MIFII Digital Feeder Protection Relay
—Multilin MIGII Generator Protection Relay
—Multilin MIVII Voltage/Frequency Relay
—Multilin MIWII Digital Feeder Relay
—Multilin MIB High Impedance Bus Protection

Protection

Multiple Settings Groups

Two separate settings groups are stored in the nonvolatile memory, with only one group active at a given time. Switching between setting groups 1 and 2 can be done by means of a setting, a communication command or contact input activation.
This allows users to have access to main relay functionalities in an extremely simple, user-friendly way by entering only main settings. Access to complete functionality for more complex use is available through advanced settings.

Features and Benefits

Event Recording

Events consist of a broad range of change of state occurrences, including pickups, trips, contact operations, alarms and self-test status. MII Family relays store up to 32 events, time tagged to the nearest millisecond. This information is invaluable in determining power system and relay operations. A user can inhibit the logging of selected events to aid in post-event analysis.

Oscillography

MII Family relays capture current waveforms and digital channels at eight samples per cycle. One oscillography record with a maximum length of 32 cycles is stored in memory. Oscillography is triggered either by internal signals or external contacts.

Configurable I/Os

MII Family products have two configurable contact inputs and four configurable contact outputs. The configurable outputs can be latched. These units also have a fixed Trip and Service contact output.

Breaker Failure Protection (optional)

A simple "breaker has not opened" feature is standard. A more complex breaker failure scheme can be easily implemented through the use of a digital input and configurable output logic (logic gates and timers).

Breaker Health (optional)

The breaker health threshold is set by the user to achieve “just in time” maintenance. When the cumulative I2 value exceeds the threshold, an alarm occurs.

Configurable Logic (optional)

Up to four programmable logic schemes can be implemented by means of a set of four logic gates and timers, using the graphical user interface provided. The outputs from programmable logic can operate contact outputs or faceplate LEDs.

Metering

Phase and ground current, voltage, frequency and thermal image are measured with a maximum error of ±3% across the range.

MIFII Feeder Protection System

Three-Phase and Ground, Single Phase or Ground Feeder Protection Relay with Recloser

Key Values

—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout
—Follow technology evolution - Flash memory for product field upgrade
—Low priced scalable options - event reports, waveform capture, recloser, breaker fail
—Design flexibility - Easy to use programming logic
—Reduce troubleshooting time and maintenance costs - Event reports, waveform capture
—Access to information - Modbus RTU communications
—Asset monitoring - Breaker health, and breaker failure protection
—AC/DC power supply

Applications

—Primary circuit protection on distribution networks at any voltage level
—Backup/auxiliary protection for transformers, generators and motors

Features and Benefits

—Configurable logic, curves, I/Os and LEDs
—Flash memory for field upgrades
—Two settings groups
—Password protection for local operation
—Automatic display of last fault information
—AC/DC power supply
—Access via front panel keypad or communication links
—Isolated front RS232 serial port

Monitoring and Metering

—32-event record, analog/digital oscillography
—KI2 counter for breaker maintenance
—Per phase current metering
—Monitoring of the last 5 trips information from the display

Protection and Control

—Option "N" for single phase or ground applications
—IAC time - current curves
—EPTAR-C time - current curves
—Phase, ground TOC and IOC
—Thermal image protection
—Circuit breaker control (open and close)
—Four shot autorecloser
—Cold load pickup function
—Configurable breaker failure to open
—Configurable I/O
—6 outputs; trip, service required, 4 auxiliary

User Interface and Programming

—2x16 character LCD display
—6 LED indicators, 4 configurable in function and color
—Front RS232 and rear RS485 ports using Modbus RTU protocol up to 19,200 bps
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

MIF II *	*	*	*	*	*	*	*	00	Description
	P								3 phase + ground relay
	—								Single phase or ground relay
		A							ANSI curves
		I							IEC curves
		U							IAC curves
		C							EPTAR-C curves (only for single phase model)
			0						MIF II N models
			1						MIF II P models: Phase CT in = 1 A
			5						MIF II P models: Phase CT in = 5 A
				1					Ground CT In = 1 A
				5					Ground CT In = 5 A
				—					Sensitive ground: CT In = 1 A
				L					Very sensitive ground: CT In = 1 A
					E				English language
					F				French language
						0			MIF II Basic Model
						1			MIF II Option 1[1]
						2			MIF II Option 2[2]
							0		Without recloser
							R		With recloser (not available in the Basic Model)
								LO	24-48 Vdc (Range: 19~58 Vdc) Power Supply
								HI	110-250 Vdc (Range: 88~300 Vdc) Power Supply 110-230 Vac (Range: 88~264 Vac) Power Supply

[1] *Configurable I/O/LEDs, event recording, oscillography.*
[2] *Option 1 + cold load pickup, breaker failure to open, breaker health, configurable logic.*

Publications and Reference: *See Section 21 for a list of additional product-related publications*

MIGII Feeder Protection System

Three-Phase and Ground Machine Protection

Key Values

—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout
—Follow technology evolution - Flash memory for product field upgrade
—Low priced scalable options - event reports, waveform capture, recloser, breaker fail
—Design flexibility - Easy to use programming logic
—Reduce troubleshooting time and maintenance costs - Event reports, waveform capture
—Access to information - Modbus RTU communications
—Asset monitoring - Breaker health, and breaker failure protection
—AC/DC power supply

Applications

—Small generators and motors
—Component for bigger generator packages
—Standby/critical power protection main unit

Features and Benefits

—Configurable logic, curves, I/Os and LEDs
—Flash memory for field upgrades
—Two settings groups
—Drawout case
—Password protection for local operation
—Automatic display of last fault information
—DC power supply
—Access via front panel keypad or communication links
—Isolated front RS232 serial port
—RS485 rear port

Monitoring and Metering

—24-event record
—Analog/digital oscillography
—Per phase differential current metering
—Monitoring of the last 5 trips information from the display

Protection and Control

—Thermal image protection
—Unbalance or current reversal
—Phase, ground TOC
—Phase, ground IOC
—4 pre-configured overcurrent curves (ANSI, IEC)
—Undercurrent
—Maximum number of starts

User Interface and Programming

—2x16 character LCD display
—6 LED indicators, 4 configurable in function and color
—Front RS232 and rear RS485 ports using Modbus RTU protocol up to 19,200 bps
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

MIG II	P	*	*	*	E	O	O	*	O	O	Description
MIG II											Digital machine protection relay
	I										Three-phase + ground relay
		A									ANSI curves
		I									IEC curves
			1								Phase CT In = 1A (pickup range: 0.1 – 2.4 A)
			5								Phase CT In = 5A (pickup range: 0.5 – 12 A)
				1							Ground CT In = 1A (pickup range: 0.1 – 2.4 A)
				5							Ground CT In = 5A (pickup range: 0.5 – 12 A)
				—							Sensitive ground CT In = 1 A (pickup range: 0.005 – 0.12 A)
								LO			24 – 48 Vdc auxiliary voltage (range: 19 – 58 Vdc)
								HI			110 – 250 Vdc (range: 88 – 300 Vdc) and 110 – 230 Vac (range: 88 – 264 Vac)
										C	Individual relay
										S	Mounted in an M+ system

Accessories

B1315P1	Depth reducing collar, reduces the mounting depth by 63 mm

MIVII Voltage/Frequency Protection System

Three-Phase and Ground Voltage Protection Relay

Key Values

—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout
—Follow technology evolution - Flash memory for product field upgrade
—Low priced scalable options - event reports, waveform capture, recloser, breaker fail
—Design flexibility - Easy to use programming logic
—Reduce troubleshooting time and maintenance costs - Event reports, waveform capture
—Access to information - Modbus RTU communications
—Asset monitoring - Breaker health, and breaker failure protection
—AC/DC power supply

Applications

—Voltage and/or frequency protection at any voltage in automatic transfer systems, generators, motors, lines and busbars

Features and Benefits

—Configurable logic, curves, I/Os and LEDs
—Flash memory for field upgrades
—Two settings groups
—Password protection for local operation
—Automatic display of last fault information
—AC/DC power supply
—Access via front panel keypad or communication links
—Isolated front RS232 serial port

Monitoring and Metering

—32-event record, analog/digital oscillography
—KI2 counter for breaker maintenance
—Per phase current metering
—Monitoring of the last 5 trips information from the display

Protection and Control

—Three-phase over and undervoltage, ground overvoltage
—Voltage unbalance, over and underfrequency, with the following options:
  —Four independent time delay phase under/overvoltage elements complete with two independent fixed time ground overvoltage elements
  —Four units of frequency protection
  —Both voltage protection and two elements of frequency protection
—Circuit Breaker control (open/close)
—Configurable I/O
—6 outputs, four configurable, plus trip and alarm

User Interface and Programming

—2x16 character LCD display
—6 LED indicators, 4 configurable in function and color
—Front RS232 and rear RS485 ports using Modbus RTU protocol up to 19,200 bps
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

MIVII	*	0	*	0 E 0 00	*	0 0	Description
MIVII							Voltage/frequency relay
	1						Voltage functions
	2						Frequency functions
	3						Voltage and frequency functions
			0				Voltage range: 10-250 V
			1				Voltage range: 2-60 V (only for MIVII models
					LO		Vaux: 24-48 Vdc
					HI		Vaux: 110-250 Vdc 110-230 Vac

Accessories

Depth reducing collar	Reduces the mounting depth in 63 mm

Publications and Reference: *See Section 21 for a list of additional product-related publications*

MIWII Directional Power Protection System

Numerical Reverse, Forward and Low Forward Directional Power, and Loss of Field Protection Relay

Key Values

—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout
—Follow technology evolution - Flash memory for product field upgrade
—Low priced scalable options - event reports, waveform capture, recloser, breaker fail
—Design flexibility - Easy to use programming logic
—Reduce troubleshooting time and maintenance costs - Event reports, waveform capture
—Access to information - Modbus RTU communications
—Asset monitoring - Breaker health, and breaker failure protection
—AC/DC power supply

Applications

—Controlling power flow in alternating current generator applications of any size

Features and Benefits

—Loss of field unit to detect loss of excitation
—Configurable logic, curves, I/Os and LEDs
—Flash memory for field upgrades
—Two settings groups
—Drawout case
—Password protection for local operation
—Automatic display of last fault information
—DC power supply
—Access via front panel keypad or communication links
—Isolated front RS232 serial port
—RS485 rear port

Monitoring and Metering

—Metering values for Ia, voltage values, P, Q, S, V1, V2 and angle.
—24-event record
—Analog/digital oscillography
—Per phase differential current metering
—Monitoring of the last 5 trips information from the display

Protection and Control

—Reverse power (32RP)
—Forward overpower
—Low forward power (32LF)
—Loss of field/excitation (40)
—Fuse failure (60)

User Interface and Programming

—2x16 character LCD display
—6 LED indicators, 4 configurable in function and color
—Front RS232 and rear RS485 ports using Modbus RTU protocol up to 19,200 bps
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

MIWII 1 0 0 0 E 0 0 - 0 0		Description
		Voltage/frequency relay
	HI	24-48 Vdc (Range: 19~58 Vdc)
	LO	110-250 Vdc (Range: 88~300 Vdc) 120-230 Vac (Range: 88~264 Vac)

Note: Specifications subject to change without notice.

MIB High-Impedance Bus Protection

High Impedance Busbar Protection Relay

Key Values

—Improve uptime of auxiliary equipment through I/O monitoring
—Ease of use and installation - same front panel programming, common cutout
—Follow technology evolution - Flash memory for product field upgrade
—Low priced scalable options - event reports, waveform capture, recloser, breaker fail
—Design flexibility - Easy to use programming logic
—Reduce troubleshooting time and maintenance costs - Event reports, waveform capture
—Access to information - Modbus RTU communications
—Asset monitoring - Breaker health, and breaker failure protection
—AC/DC power supply

Applications

—Differential protection for single and split busbar arrangements.
—Zero sequence differential (restricted ground fault) protection for reactors, generators, large motors, and other power apparatus

Features and Benefits

—Configurable logic, curves, I/Os and LEDs
—Flash memory for field upgrades
—Two settings groups
—Drawout case
—Password protection for local operation
—Automatic display of last fault information
—DC power supply
—Access via front panel keypad or communication links
—Isolated front RS232 serial port
—RS485 rear port

Monitoring and Metering

—24-event record
—Analog/digital oscillography
—Per phase differential current metering
—Monitoring of the last 5 trips information from the display

Protection and Control

—High impedance differential protection
—Open CT detection
—Lockout logic
—Configurable I/O
—6 outputs, four configurable, plus trip and alarm

User Interface and Programming

—2x16 character LCD display
—6 LED indicators, 4 configurable in function and color
—Front RS232 and rear RS485 ports using Modbus RTU protocol up to 19,200 bps
—EnerVista software - an industry leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Ordering

MIB	*	0	*	*	C	E	000	00	Description
									Application
	1								1 winding Transf. REF App. 1 High Imp. Differential Element
	2								2 winding Transf. REF App. 2 High Imp. Differential Elements
	3								Busbar App. 3 High Imp. Differential Elements
									Auxiliary Voltage
			L	**O**					LO Power Supply: 24-28 Vdc (range: 19~58 Vdc)
			H	**I**					HI Power Supply: 110-250 Vdc (range: 88~300 Vdc)

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR Family—Universal Relay Family

The Engine for Industrial and Utility Automation

Key Values

—Access to information – multiple SCADA interface options, wide area network integration, multiple communication mediums and protocols
—Flexibility – Most extensive offering of I/O options on the market, easy programming with FlexLogic and FlexElements
—Virtual and expandable I/Os to reduce hardware costs
—Modular design – design flexibility, scalable, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Fewer external devices required – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Reduced troubleshooting time – Event reports, waveform capture, data logger, IRIG-B time synchronization
—Common platform – reduced training time and drafting costs
—Lower maintenance costs – common drawout modules, flash memory for easy upgrades

Applications

—Substation and industrial plant automation of protection, control and metering
—Predictive maintenance through data analysis and trending
—Includes EnerVista software - an industry-leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Monitoring and Metering

—Current, voltage, power, power factor, frequency
—Contact input and output status
—1024 time-tagged event recording, data logging and oscillography

User Interface and Programming

—RS232 port for local PC access and RS485 and Ethernet ports for remote access
—User-programmable LEDs and front panel display and keypad for local access

Communications

—High speed networking capability (Ethernet-fiber, redundancy)
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary information between a number of URs over a dedicated fiber, RS422 or G.703 interface

UR Family of Products Include:

—Multilin B30 Bus Differential System
—Multilin B90 Bus Differential System
—Multilin C30 Controller System
—Multilin C60 Breaker Management System
—Multilin D30 Line Distance System
—Multilin D60 Line Distance System
—Multilin F35 Multiple Feeder Management System
—Multilin F60 Feeder Management System
—Multilin G30 Generator Management System
—Multilin G60 Generator Management System
—Multilin L90 Line Current Differential System
—Multilin M60 Motor Management System
—Multilin T35 Transformer Management System
—Multilin T60 Transformer Management System

UR Family—Universal Relay Family

The Engine for Substation Automation

Overview

The Universal Relay (UR) is a family of leading edge protection and control products built on a common modular platform. All UR products feature high performance protection and high speed peer-to-peer communications combined with modularity, flexibility, and field-programmable FlexLogic control. The UR relays form the basis of simplified power management for the protection of critical assets.

The Universal Relay is managed and programmed through EnerVista software. This powerful package, which is included with each relay, not only allows the setpoints of the relay to be programmed, but also provides the capability to manage setpoint files, automatically access the latest versions of firmware/documentation and provide a window into the substation automation system.

Protection

The UR family has the most complete and advanced protection algorithms on the market. The UR Features chart lists all the protection elements found in each relay.

Multiple Settings Groups

Six separate setting groups may be stored in the UR's non-volatile memory. An easy-to-use and fully programmable mechanism is provided to instantly switch the active settings. Multiple settings groups apply to all the protection elements including line pickup and breaker failure.

Control

Each UR has a wide range of I/O options including configurable inputs that can be used for breaker status, oscillography trigger, and control inputs; Trip rated Form-A relays; and Form-C relays that may be programmed for auxiliary functions

Programming

FlexLogic significantly simplifies the programming and use of the UR and enable powerful but flexible protection and control solutions. FlexLogic minimizes the requirement for auxiliary components and wiring while making complex schemes easy to implement. The logic that determines the interaction of inputs, elements, and outputs is field programmable through the use of logic equations that are sequentially processed. The use of remote inputs and outputs in addition to hardware is available internally and on the communication ports for other relays to use (distributed FlexLogic). The UR contact input/output capability is also expandable.

In addition to state-of-the-art protection functions, the UR contains multiple universal comparators (FlexElement). A FlexElement can be programmed to respond to any quantity measured by the relay (phase, ground and sequence currents and voltages, power, frequency, power factor, etc.). The element may respond to a signal or difference of any two signals. It can be programmed to respond to the level or rate-of-change of its input signal. Application examples include: positive sequence overcurrent, negative sequence overvoltage, overpower, low power factor, temperature differential, frequency rate-of-change, and more. FlexElement allows the user to program the relay to best suit custom requirements.

Monitoring and Metering

Basic Metering Functions

Measured values include:

—Voltage phasors (both magnitude and phase angle)
—Voltage symmetrical components
—Current phasors
—Current symmetrical components
—Current true one-cycle RMS values
—Active, reactive, apparent power
—Power factor (all power values per phase and total)
—Energy and frequency

Basic Recording Functions

The recording capabilities of the UR include:

—Event recorder capable of storing 1024 time-tagged events (one microsecond tagging).
—Oscillography programmable by the trigger, content and sampling rate (maximum of 64 samples per cycle) and capable of storing up to 64 fault records.
—Data logger storing of up to 16 channels and programmable by content and sampling rate (from one second to one hour).

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR B30 Bus Differential System

Digital Bus Protection and Metering for HV and EHV Busbars

Key Values

—Compact design, small footprint
—Simple to configure, commission, and use
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, IRIG-B time synchronization

Applications

—Integrated bus protection and metering for HV and EHV substations
—Stand-alone or component in automated substation control system
—Simple bus applications, up to 6 feeders
—Cost effective alternative to high impedance schemes

Features

Protection and Control

—High-speed tripping, CT saturation immunity and CT trouble detection
—Restrained and instantaneous differential protection
—Phase, Neutral, Ground Instantaneous on time over-current protection
—Phase under-voltage, neutral and auxiliary over-voltage included
—Dynamic bus replica
—Up to 96 digital input and 64 digital outputs)
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Trip circuit monitoring
—Metering - current, voltage, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—User Programmable Fault Reports

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between Urs

UR B30 Bus Differential System

Digital Bus Protection and Metering for HV and EHV Busbars

Ordering

B30 - * 00 - H C/P * - F **	- H **	- L **	- N **	- S **	- U **	- W/X **	For Full Sized Horizontal Mount
B30							Base Unit
E							RS485 + RS485 (Modbus RTU, DNP)
G							RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
H							RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
00							No Software Options
H							Horizontal (19" rack)
C/P							Horizontal (19" rack) with 16 user-programmable pushbuttons
H							125 / 250 Vac/dc
							24 - 48 (Vdc only)
8F		8F		8F			Standard 4CT/4VT
8G		8G		8G			4CT/4VT (1 Sensitive Ground)
8H		8H		8H			Standard 8CT
8J		8J		8J			8CT (2 Sensitive Ground)
	XX	XX	XX	XX	XX		No module
	4A	4A	4A	4A	4A		4 Solid State (No Monitoring) MOSFET Outputs
	4B	4B	4B	4B	4B		4 Solid State (Voltage w/opt Current) MOSFET Outputs
	4C	4C	4C	4C	4C		4 Solid State (Current w/opt Voltage) MOSFET Outputs
	4L	4L	4L	4L	4L		14 Form-A (No Monitoring) Latchable Outputs
	67	67	67	67	67		8 Form-A (No Monitoring) Outputs
	6A	6A	6A	6A	6A		2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
	6B	6B	6B	6B	6B		2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
	6C	6C	6C	6C	6C		8 Form-C Outputs
	6D	6D	6D	6D	6D		16 Digital Inputs
	6E	6E	6E	6E	6E		4 Form-C Outputs, 8 Digital Inputs
	6F	6F	6F	6F	6F		8 Fast Form-C Outputs
	6G	6G	6G	6G	6G		4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
	6H	6H	6H	6H	6H		6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
	6K	6K	6K	6K	6K		4 Form-C & 4 Fast Form-C Outputs
	6L	6L	6L	6L	6L		2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
	6M	6M	6M	6M	6M		2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
	6N	6N	6N	6N	6N		4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
	6P	6P	6P	6P	6P		6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
	6R	6R	6R	6R	6R		2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
	6S	6S	6S	6S	6S		2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
	6T	6T	6T	6T	6T		4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
	6U	6U	6U	6U	6U		6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
	5A	5A	5A	5A	5A		4 dcmA Inputs, 4 dcmA Outputs
	5C	5C	5C	5C	5C		8 RTD Inputs
	5D	5D	5D	5D	5D		4 RTD Inputs, 4 dcmA Outputs
	5E	5E	5E	5E	5E		4 dcmA Inputs, 4 RTD Inputs
	5F	5F	5F	5F	5F		8 dcmA Inputs

Maximum: 4 outputs
Maximum: 24 I/O channels

7A	820 nm, multi-mode, LED, 1 Channel
7B	1300 nm, multi-mode, LED, 1 Channel
7C	1300 nm, single-mode, ELED, 1 Channel
7D	1300 nm, single-mode, LASER, 1 Channel
7H	820 nm, multi-mode, LED, 2 Channels
7I	1300 nm, multi-mode, LED, 2 Channels
7J	1300 nm, single-mode, ELED, 2 Channels
7K	1300 nm, single-mode, LASER, 2 Channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 Channel
7S	G.703, 2 Channels
7T	RS422, 1 Channel
7W	RS422, 2 Channels
72	1550 nm, single-mode, LASER, 1 Channel
73	1550 nm, single-mode, LASER, 2 Channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR B90 Bus Differential System

Digital Busbar and Breaker Fail Protection for LV, HV and EHV Busbars

Key Values

- —Compact design, small footprint
- —Easy to use, setup, and configure
- —Access to information – wide area network integration, multiple communication mediums and protocols
- —Reduced wiring costs – peer-to-peer communication, direct I/O
- —Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
- —Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
- —Flexibility – multiple I/O options, programming (FlexLogic)
- —Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, IRIG-B time synchronization

Applications

- —Re-configurable multi-section busbar with up to 24 feeders (8, 16, 24 feeder configurations available)
- —Single Bus, Double Bus (with transfer schemes), Triple Bus configurations

Features

Protection and Control

- —Multi-zone bus differential protection with restrained (percent, biased) and unrestrained (unbiased, instantaneous) function
- —Sub-cycle tripping time
- —Fast and reliable CT saturation detection
- —Check-zone functionality
- —Dynamic Bus Replica
- —Breaker failure protection
- —End fault protection
- —IOC and TOC
- —Voltage supervision
- —Up to 96 digital input and 64 digital outputs)
- —Transducer I/Os (RTD, dcmA)

Monitoring and Metering

- —Isolator monitoring (up to 48) and alarming
- —Metering - current, voltage, frequency
- —Oscillography – 64 samples/cycle, up to 64 records
- —Event Recorder – 1024 time tagged events, 1 microsecond resolution
- —User Programmable Fault Reports

User Interface and Programming

- —Front panel display and keypad for local access; RS232 port for local PC access
- —User programmable local display, LEDs and pushbuttons
- —Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
- —Includes EnerVista LaunchPad – Simplified relay setup and programming
- —Multi-language – French, Chinese, Russian option

Communications

- —Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
- —Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
- —Direct I/O - exchange of binary data between URs

UR B90 Bus Differential System

Digital Busbar and Breaker Fail Protection for LV, HV and EHV Busbars

Ordering

B90 - * 00 - H C/P * - F ** - H ** - L ** - N ** - S ** - U ** - W/X **	For Full Sized Horizontal Mount
B90	Base Unit
E	RS485 + RS485 (Modbus RTU, DNP)
G	RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
H	RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
0*	Without Breaker Failure
1*	With Breaker Failure
*0	4-zone, 8-feeder protection
*1	4-zone, 16-feeder protection
*2	4-zone, 24-feeder protection
*3	1-zone, 24-feeder protection
H	Horizontal (19" rack)
P	Horizontal (19" rack) with 16 user-programmable pushbuttons
H	125 / 250 Vac/dc
L	24 - 48 (Vdc only)
8F	Standard 4CT/4VT
8H	Standard 8CT
8K	Standard 7CT/1VT
XX	No module
4A	4 Solid State (No Monitoring) MOSFET Outputs
4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	14 Form-A (No Monitoring) Latchable Outputs
67	8 Form-A (No Monitoring) Outputs
6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	8 Form-C Outputs
6D	16 Digital Inputs
6E	4 Form-C Outputs, 8 Digital Inputs
6F	8 Fast Form-C Outputs
6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	4 Form-C & 4 Fast Form-C Outputs
6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	4 dcmA Inputs, 4 dcmA Outputs
5C	8 RTD Inputs
5D	4 RTD Inputs, 4 dcmA Outputs
5E	4 dcmA Inputs, 4 RTD Inputs
5F	8 dcmA Inputs
	Maximum: 4 outputs Maximum: 24 I/O channels
7H	820 nm, multi-mode, LED, 2 Channels

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR C30 Controller System

Digital Controller for Bay Control and Substation Automation

Key Values

—Provides functionality of a programmable logic controller (PLC)
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Bay control and substation automation
—Stand-alone or component in automated substation control system

Features

Protection and Control

—User-definable protection functions
—Programmable logic, timers, counters
—Distributed logic, remote I/O expansion
—Up to 96 digital input and 64 digital outputs)
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR C30 Controller System

Digital Controller for Bay Control and Substation Automation

Ordering

C30 -	*	00 -	H C/P	* -	F ** -	H ** -	M ** -	P ** -	U ** -	W/X **	**For Full Sized Horizontal Mount**
C30 -	*	00 -	V F	* -	F ** -	H ** -	M **			R *	**For Reduced Size Vertical Mount**
C30											Base Unit
	E										RS485 + RS485 (Modbus RTU, DNP)
	G										RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
	H										RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
		00									No Software Options
		01									Ethernet Global Data (EGD)
			H C								Horizontal (19" rack)
			H P								Horizontal (19" rack) with 16 user-programmable pushbuttons
			V F								Vertical (3/4 size)
				H							125 / 250 Vac/dc
				L							24 - 48 (Vdc only)
					XX	XX	XX	XX	XX	XX	No module
					4A	4A	4A	4A	4A	4A	4 Solid State (No Monitoring) MOSFET Outputs
					4B	4B	4B	4B	4B	4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
					4C	4C	4C	4C	4C	4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
					4L	4L	4L	4L	4L	4L	14 Form-A (No Monitoring) Latchable Outputs
					67	67	67	67	67	67	8 Form-A (No Monitoring) Outputs
					6A	6A	6A	6A	6A	6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
					6B	6B	6B	6B	6B	6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
					6C	6C	6C	6C	6C	6C	8 Form-C Outputs
					6D	6D	6D	6D	6D	6D	16 Digital Inputs
					6E	6E	6E	6E	6E	6E	4 Form-C Outputs, 8 Digital Inputs
					6F	6F	6F	6F	6F	6F	8 Fast Form-C Outputs
					6G	6G	6G	6G	6G	6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
					6H	6H	6H	6H	6H	6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
					6K	6K	6K	6K	6K	6K	4 Form-C & 4 Fast Form-C Outputs
					6L	6L	6L	6L	6L	6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
					6M	6M	6M	6M	6M	6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
					6N	6N	6N	6N	6N	6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
					6P	6P	6P	6P	6P	6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
					6R	6R	6R	6R	6R	6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
					6S	6S	6S	6S	6S	6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
					6T	6T	6T	6T	6T	6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
					6U	6U	6U	6U	6U	6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
					5A	5A	5A	5A	5A	5A	4 dcmA Inputs, 4 dcmA Outputs
					5C	5C	5C	5C	5C	5C	8 RTD Inputs
					5D	5D	5D	5D	5D	5D	4 RTD Inputs, 4 dcmA Outputs
					5E	5E	5E	5E	5E	5E	4 dcmA Inputs, 4 RTD Inputs
					5F	5F	5F	5F	5F	5F	8 dcmA Inputs
										7A	820 nm, multi-mode, LED, 1 Channel
										7B	1300 nm, multi-mode, LED, 1 Channel
										7C	1300 nm, single-mode, ELED, 1 Channel
										7D	1300 nm, single-mode, LASER, 1 Channel
										7H	820 nm, multi-mode, LED, 2 Channels
										7I	1300 nm, multi-mode, LED, 2 Channels
										7J	1300 nm, single-mode, ELED, 2 Channels
										7K	1300 nm, single-mode, LASER, 2 Channels
										7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
										7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
										7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
										7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
										7R	G.703, 1 Channel
										7S	G.703, 2 Channels
										7T	RS422, 1 Channel
										7W	RS422, 2 Channels
										72	1550 nm, single-mode, LASER, 1 Channel
										73	1550 nm, single-mode, LASER, 2 Channels
										74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
										76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
										77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

For 5A–5F: Maximum: 4 outputs; Maximum: 24 I/O channels

Publications and Reference: *See Section 21*
for a list of additional product-related publications

UR C60 Breaker Protection System

Integrated Breaker Monitoring and Control for Substation Automation

Key Values

- *Expand available device inputs and outputs, add Direct I/O communications to non-Direct I/O devices*
- *Access to information – wide area network integration, multiple communication mediums and protocols*
- *Reduced wiring costs – peer-to-peer communication, direct I/O*
- *Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs*
- *Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs*
- *Flexibility – multiple I/O options, programming (FlexLogic)*
- *Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization*

Applications

- *Integrated breaker monitoring and control in stand-alone applications*
- *Component in an automated substation control system*

Features

Protection and Control

- *Phase undervoltage, auxiliary over and undervoltage protection*
- *Basic phase, sensitive ground, or ground and neutral overcurrent protection*
- *Breaker failure*
- *Autoreclosure*
- *Synchronism check, dual breaker control*
- *Up to 96 digital input and 64 digital outputs)*
- *Transducer I/Os (RTD, dcmA)*

Monitoring and Metering

- *VT fuse failure*
- *Trip circuit supervision*
- *Breaker pole discrepancy and contact arcing current*
- *Metering - current, voltage, power, energy, frequency, demand (current, power)*
- *Oscillography – 64 samples/cycle, up to 64 records*
- *Event Recorder – 1024 time tagged events, 1 microsecond resolution*
- *DataLogger – Up to 16 channels with user selectable sampling rate*
- *Fault Locator*

User Interface and Programming

- *Front panel display and keypad for local access; RS232 port for local PC access*
- *User programmable local display, LEDs and pushbuttons*
- *Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements*
- *Includes EnerVista LaunchPad – Simplified relay setup and programming*
- *Multi-language – French, Chinese, Russian option*

Communications

- *Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94*
- *Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)*
- *Direct I/O - exchange of binary data between URs*

UR C60 Breaker Protection System

Integrated Breaker Monitoring and Control
for Substation Automation

Ordering

C60	* 00 -	V CP	* - F	** - H	** - M	** - P	** - U	** - W/X	**			For Full Sized Horizontal Mount
C60	* 00 -	H F	* - F	** - H	** - M	**			R	**		For Reduced Size Vertical Mount
C60												Base Unit
	E											RS485 + RS485 (Modbus RTU, DNP)
	G											RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
	H											RS485+Redundant 10BaseF (MMS/UCA2,Modbus TCP/IP, DNP)
		00										No Software Options
		01										Ethernet Global Data (EGD)
			H									Horizontal (19" rack)
			H									Horizontal (19" rack) with 16 user-programmable pushbuttons
			V									Vertical (3/4 size)
				H								125 / 250 Vac/dc
				L								24 - 48 (Vdc only)
					8F		8F					Standard 4CT/4VT
					8G		8G					4CT/4VT (1 Sensitive Ground)
					8H		8H					Standard 8CT
					8J		8J					8CT (2 Sensitive Ground)
						XX	XX	XX	XX	XX		No module
						4A	4A	4A	4A	4A		4 Solid State (No Monitoring) MOSFET Outputs
						4B	4B	4B	4B	4B		4 Solid State (Voltage w/opt Current) MOSFET Outputs
						4C	4C	4C	4C	4C		4 Solid State (Current w/opt Voltage) MOSFET Outputs
						4L	4L	4L	4L	4L		14 Form-A (No Monitoring) Latchable Outputs
						67	67	67	67	67		8 Form-A (No Monitoring) Outputs
						6A	6A	6A	6A	6A		2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
						6B	6B	6B	6B	6B		2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
						6C	6C	6C	6C	6C		8 Form-C Outputs
						6D	6D	6D	6D	6D		16 Digital Inputs
						6E	6E	6E	6E	6E		4 Form-C Outputs, 8 Digital Inputs
						6F	6F	6F	6F	6F		8 Fast Form-C Outputs
						6G	6G	6G	6G	6G		4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
						6H	6H	6H	6H	6H		6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
						6K	6K	6K	6K	6K		4 Form-C & 4 Fast Form-C Outputs
						6L	6L	6L	6L	6L		2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
						6M	6M	6M	6M	6M		2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
						6N	6N	6N	6N	6N		4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
						6P	6P	6P	6P	6P		6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
						6R	6R	6R	6R	6R		2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
						6S	6S	6S	6S	6S		2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
						6T	6T	6T	6T	6T		4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
						6U	6U	6U	6U	6U		6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
						5A	5A	5A	5A	5A		4 dcmA Inputs, 4 dcmA Outputs
						5C	5C	5C	5C	5C		8 RTD Inputs
						5D	5D	5D	5D	5D		4 RTD Inputs, 4 dcmA Outputs
						5E	5E	5E	5E	5E		4 dcmA Inputs, 4 RTD Inputs
						5F	5F	5F	5F	5F		8 dcmA Inputs
										7A		820 nm, multi-mode, LED, 1 Channel
										7B		1300 nm, multi-mode, LED, 1 Channel
										7C		1300 nm, single-mode, ELED, 1 Channel
										7D		1300 nm, single-mode, LASER, 1 Channel
										7H		820 nm, multi-mode, LED, 2 Channels
										7I		1300 nm, multi-mode, LED, 2 Channels
										7J		1300 nm, single-mode, ELED, 2 Channels
										7K		1300 nm, single-mode, LASER, 2 Channels
										7L		Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
										7M		Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
										7N		Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
										7P		Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
										7R		G.703, 1 Channel
										7S		G.703, 2 Channels
										7T		RS422, 1 Channel
										7W		RS422, 2 Channels
										72		1550 nm, single-mode, LASER, 1 Channel
										73		1550 nm, single-mode, LASER, 2 Channels
										74		Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
										76		IEEE C37.94, 820 nm, multimode, LED, 1 Channel
										77		IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Maximum: 4 outputs
Maximum: 24 I/O channels

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR D30 Line Distance Protection System

Cost Effective High-Speed Three-Phase Primary and Backup Protection

Key Values

—Cost effective, featured focused distance protection
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, IRIG-B time synchronization

Applications

—Primary distance protection for subtransmission lines
—Backup protection of transmission lines, generators and transformers

Features

Protection and Control

—3 zones phase and ground distance – Mho or Quad
—Step distance protection
—Out-of-step tripping and power swing blocking
—Up to 96 digital input and 64 digital outputs)
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Metering - current, voltage, power, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—Fault Locator

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104
—Direct I/O - exchange of binary data between Urs

UR D30 Line Distance Protection System

Cost Effective High-Speed Three-Phase Primary and Backup Protection

Ordering

D30 * 00 H C/P * F** H** M** P** U** W/X**	For Full Sized Horizontal Mount
D30 * 00 V F * F** H** M** P**	For Reduced Size Vertical Mount
D30	Base unit
A	RS485 + RS485 (Modbus RTU, DNP)
C	RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
D	RS485 + redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
00	No software options
H	Horizontal mount (19" rack)
C	Horizontal mount (19" rack) with 12 user-programmable pushbuttons
H	Horizontal mount (19" rack)
P	Horizontal mount (19" rack) with 12 user-programmable pushbuttons
F	Vertical (3/4 size)
H	125 / 250 Vac/dc power supply
L	24 - 48 (Vdc only) power supply
8A	Standard 4CT/4VT
8B	Sensitive ground 4CT/4VT
XX	No module
6A	2 Form A (voltage w/ opt current) and 2 Form C outputs, 8 digital inputs
6B	2 Form A (voltage w/ opt current) and 4 Form C outputs, 4 digital inputs
6C	8 Form C outputs
6D	16 digital inputs
6E	4 Form C outputs, 8 digital inputs
6F	8 Fast Form C outputs
6G	4 Form A (voltage w/ opt current) outputs, 8 digital inputs
6H	6 Form A (voltage w/ opt current) outputs, 4 digital inputs
6K	4 Form C and 4 Fast Form C Outputs
6L	2 Form A (current w/ opt voltage) and 2 Form C outputs, 8 digital inputs
6M	2 Form A (current w/ opt voltage) and 4 Form C outputs, 4 digital inputs
6N	4 Form A (current w/ opt voltage) outputs, 8 digital inputs
6P	6 Form A (current w/ opt voltage) outputs, 4 digital inputs
6R	2 Form A (no monitoring) and 2 Form C outputs, 8 digital inputs
6S	2 Form A (no monitoring) and 4 Form C outputs, 4 digital inputs
6T	4 Form A (no monitoring) outputs, 8 digital inputs
6U	6 Form A (no monitoring) outputs, 4 digital inputs
63	8 Form A (voltage w/ opt current) outputs
64	8 Form A (current w/ opt voltage) outputs
5C	8 RTD inputs } select a maximum of 4
5E	4 DCmA inputs, 4 RTD Inputs } select a maximum of 4
5F	8 DCmA inputs } select a maximum of 4
7A	820 nm, multi-mode, LED, 1 channel
7B	1300 nm, multi-mode, LED, 1 channel
7C	1300 nm, single-mode, ELED, 1 channel
7D	1300 nm, single-mode, LASER, 1 channel
7H	820 nm, multi-mode, LED, 2 channels
7I	1300 nm, multi-mode, LED, 2 channels
7J	1300 nm, single-mode, ELED, 2 channels
7K	1300 nm, single-mode, LASER, 2 channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 channel
7S	G.703, 2 channels
7T	RS422, 1 channel
7W	RS422, 2 channels
72	1550 nm, single-mode, LASER, 1 channel
73	1550 nm, single-mode, LASER, 2 channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR D60 Line Distance Protection System

High-Speed Transmission Line Protection for Three-Phase and Single-Pole Tripping

Key Values

—Multiple breaker applications (eg. Breaker-and-a-half)
—Increased power system stability and availability - high speed single and three phase tripping, reclosing
—Reliable operation on Series Compensated Lines
—High Performance – certified by Utilities globally
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Three-phase and single-pole tripping applications for transmission lines of any voltage level
—Single or three phase reclosing
—Series compensated lines

Features

Protection and Control

—Pilot schemes and step distance backup
—Line pickup
—Out-of-step tripping and power swing blocking
—Breaker failure
—Autoreclose – one and three phase
—Single and three phase tripping
—Breaker-and-a-half
—Five phase and ground distance zones of protection

Monitoring and Metering

—Trip circuit monitoring
—Metering - current, voltage, power, energy, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—Fault Locator

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104
—Direct I/O - exchange of binary data between URs

UR D60 Line Distance Protection System

High-Speed Transmission Line Protection for Three-Phase and Single-Pole Tripping

Ordering

D60 - * 00 - H C/P * - F ** - H ** - M ** - P ** - U ** - W/X **	For Full Sized Horizontal Mount
D60 - * 00 - V F * - F ** - H ** - M ** R *	For Reduced Size Vertical Mount
D60	Base Unit
E	RS485 + RS485 (Modbus RTU, DNP)
G	RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
H	RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
00	No Software Options
02	Breaker and Half software (requires 2nd DSP in M slot)
H	Horizontal (19" rack)
H	Horizontal (19" rack) with 16 user-programmable pushbuttons
V	Vertical (3/4 size)
H	125 / 250 Vac/dc
L	24 - 48 (Vdc only)
8F	Standard 4CT/4VT
8G	4CT/4VT (1 Sensitive Ground)

H	M	P	U	W	Description
XX	XX	XX	XX	XX	No module
4A	4A	4A	4A	4A	4 Solid State (No Monitoring) MOSFET Outputs
4B	4B	4B	4B	4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	4C	4C	4C	4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	4L	4L	4L	4L	14 Form-A (No Monitoring) Latchable Outputs
67	67	67	67	67	8 Form-A (No Monitoring) Outputs
6A	6A	6A	6A	6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	6B	6B	6B	6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	6C	6C	6C	6C	8 Form-C Outputs
6D	6D	6D	6D	6D	16 Digital Inputs
6E	6E	6E	6E	6E	4 Form-C Outputs, 8 Digital Inputs
6F	6F	6F	6F	6F	8 Fast Form-C Outputs
6G	6G	6G	6G	6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	6H	6H	6H	6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	6K	6K	6K	6K	4 Form-C & 4 Fast Form-C Outputs
6L	6L	6L	6L	6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	6M	6M	6M	6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	6N	6N	6N	6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	6P	6P	6P	6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	6R	6R	6R	6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	6S	6S	6S	6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	6T	6T	6T	6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	6U	6U	6U	6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	5A	5A	5A	5A	4 dcmA Inputs, 4 dcmA Outputs
5C	5C	5C	5C	5C	8 RTD Inputs
5D	5D	5D	5D	5D	4 RTD Inputs, 4 dcmA Outputs
5E	5E	5E	5E	5E	4 dcmA Inputs, 4 RTD Inputs
5F	5F	5F	5F	5F	8 dcmA Inputs

Maximum: 4 outputs
Maximum: 24 I/O channels

W	Description
7A	820 nm, multi-mode, LED, 1 Channel
7B	1300 nm, multi-mode, LED, 1 Channel
7C	1300 nm, single-mode, ELED, 1 Channel
7D	1300 nm, single-mode, LASER, 1 Channel
7H	820 nm, multi-mode, LED, 2 Channels
7I	1300 nm, multi-mode, LED, 2 Channels
7J	1300 nm, single-mode, ELED, 2 Channels
7K	1300 nm, single-mode, LASER, 2 Channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 Channel
7S	G.703, 2 Channels
7T	RS422, 1 Channel
7W	RS422, 2 Channels
72	1550 nm, single-mode, LASER, 1 Channel
73	1550 nm, single-mode, LASER, 2 Channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR F35 Multiple Feeder Protection System

Protection, Control, Monitoring and Metering for Multiple Feeder Applications

Key Values

—Cost effective and small footprint - up to 6 feeder protection, integrated control, monitoring, and communications in a single package
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Basic primary protection for distribution networks (protects up to 6 feeders)
—Stand-alone or component in automated substation control system

Features

Protection and Control

—Phase, neutral, ground or sensitive ground and negative sequence IOCs and TOCs
—Voltage and frequency elements
—Four-shot configurable recloser
—Up to 96 digital input and 64 digital outputs
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Trip circuit monitoring
—Metering - current, voltage, power, energy, voltage harmonics, frequency, demand (current, power)
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—Fault Locator

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR F35 Multiple Feeder Protection System

Protection, Control, Monitoring and Metering
for Multiple Feeder Applications

Ordering

F35 - * 00 - H C/P * - F ** - H ** - M ** - P ** - U ** - W/X **	For Full Sized Horizontal Mount
F35 - * 00 - V F * - F ** - H ** - M ** R **	For Reduced Size Vertical Mount
F35	Base Unit
E	RS485 + RS485 (Modbus RTU, DNP)
G	RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
H	RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
00	No Software Options
01	Ethernet Global Data (EGD)
H	Horizontal (19" rack)
C	Horizontal (19" rack) with 16 user-programmable pushbuttons
P	Vertical (3/4 size)
F	
H	125 / 250 Vac/dc
L	24 - 48 (Vdc only)
8F	Standard 4CT/4VT
8G	4CT/4VT (1 Sensitive Ground)
8H	Standard 8CT
8J	8CT (2 Sensitive Ground)

H	M	P	U	W/X	
XX	XX	XX	XX	XX	No Module
4A	4A	4A	4A	4A	4 Solid State (No Monitoring) MOSFET Outputs
4B	4B	4B	4B	4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	4C	4C	4C	4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	4L	4L	4L	4L	14 Form-A (No Monitoring) Latchable Outputs
67	67	67	67	67	8 Form-A (No Monitoring) Outputs
6A	6A	6A	6A	6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	6B	6B	6B	6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	6C	6C	6C	6C	8 Form-C Outputs
6D	6D	6D	6D	6D	16 Digital Inputs
6E	6E	6E	6E	6E	4 Form-C Outputs, 8 Digital Inputs
6F	6F	6F	6F	6F	8 Fast Form-C Outputs
6G	6G	6G	6G	6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	6H	6H	6H	6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	6K	6K	6K	6K	4 Form-C & 4 Fast Form-C Outputs
6L	6L	6L	6L	6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	6M	6M	6M	6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	6N	6N	6N	6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	6P	6P	6P	6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	6R	6R	6R	6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	6S	6S	6S	6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	6T	6T	6T	6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	6U	6U	6U	6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	5A	5A	5A	5A	4 dcmA Inputs, 4 dcmA Outputs
5C	5C	5C	5C	5C	8 RTD Inputs
5D	5D	5D	5D	5D	4 RTD Inputs, 4 dcmA Outputs
5E	5E	5E	5E	5E	4 dcmA Inputs, 4 RTD Inputs
5F	5F	5F	5F	5F	8 dcmA Inputs

} Maximum: 4 outputs
Maximum: 24 I/O channels

W/X	
7A	820 nm, multi-mode, LED, 1 Channel
7B	1300 nm, multi-mode, LED, 1 Channel
7C	1300 nm, single-mode, ELED, 1 Channel
7D	1300 nm, single-mode, LASER, 1 Channel
7H	820 nm, multi-mode, LED, 2 Channels
7I	1300 nm, multi-mode, LED, 2 Channels
7J	1300 nm, single-mode, ELED, 2 Channels
7K	1300 nm, single-mode, LASER, 2 Channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 Channel
7S	G.703, 2 Channels
7T	RS422, 1 Channel
7W	RS422, 2 Channels
72	1550 nm, single-mode, LASER, 1 Channel
73	1550 nm, single-mode, LASER, 2 Channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR F60 Feeder Protection System

Feeder Protection, Control, Monitoring and Metering in One Integrated Package

Key Values

—Unparalleled security/safety – HI-Z algorithm to detect downed Conductors
—Reliable Distributed Generation interconnection
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Primary protection for distribution networks
—Stand-alone or component in automated substation control system

Features

Protection and Control

—High impedance fault detection (HI-Z)
—Phase, neutral, ground or sensitive ground and negative sequence IOCs and TOCs
—Phase, neutral and negative sequence directional elements
—Sensitive directional power
—Autoreclosure
—Breaker Failure
—Synchrocheck

Monitoring and Metering

—Downed Conductor (Hi-Z)
—Metering - current, voltage, power, energy, frequency, voltage and current harmonics, demand (current, power)
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—Fault Locator

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR F60 Feeder Protection System

Feeder Protection, Control, Monitoring and Metering in One Integrated Package

Ordering

F60 - * 00 - H C/P * - F ** - H ** - M ** - P ** - U ** - W/X **	
F60 - * 00 - V F * - F ** - H ** - M ** R **	
F60	Base Unit
E	RS485 + RS485 (Modbus RTU, DNP)
G	RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
H	RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
00	No Software Options
01	Ethernet Global Data (EGD)
H	Horizontal (19" rack)
HV	Horizontal (19" rack) with 16 user-programmable pushbuttons
CPF	Vertical (3/4 size)
H	125 / 250 Vac/dc
L	24 - 48 (Vdc only)
8F	Standard 4CT/4VT
8G	4CT/4VT (1 Sensitive Ground)
8H	Standard 8CT
8J	8CT (2 Sensitive Ground)
8Z	HI-Z 4CT (required for the HI-Z Element)
XX	No module
4A	4 Solid State (No Monitoring) MOSFET Outputs
4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	14 Form-A (No Monitoring) Latchable Outputs
67	8 Form-A (No Monitoring) Outputs
6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	8 Form-C Outputs
6D	16 Digital Inputs
6E	4 Form-C Outputs, 8 Digital Inputs
6F	8 Fast Form-C Outputs
6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	4 Form-C & 4 Fast Form-C Outputs
6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	4 dcmA Inputs, 4 dcmA Outputs
5C	8 RTD Inputs
5D	4 RTD Inputs, 4 dcmA Outputs
5E	4 dcmA Inputs, 4 RTD Inputs
5F	8 dcmA Inputs

Maximum: 4 outputs
Maximum: 24 I/O channels

7A	820 nm, multi-mode, LED, 1 Channel
7B	1300 nm, multi-mode, LED, 1 Channel
7C	1300 nm, single-mode, ELED, 1 Channel
7D	1300 nm, single-mode, LASER, 1 Channel
7H	820 nm, multi-mode, LED, 2 Channels
7I	1300 nm, multi-mode, LED, 2 Channels
7J	1300 nm, single-mode, ELED, 2 Channels
7K	1300 nm, single-mode, LASER, 2 Channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 Channel
7S	G.703, 2 Channels
7T	RS422, 1 Channel
7W	RS422, 2 Channels
72	1550 nm, single-mode, LASER, 1 Channel
73	1550 nm, single-mode, LASER, 2 Channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR G30 Generator Protection System

Cost Effective Protection for Small to Medium Generators... with Unit Transformer Protection

Key Values

—Lower overall system costs and fewer drivers – integrated unit transformer protection
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Small to medium Generators or G60 backup
—Combined Generator and Transformer Protection
—Stand-alone or component in automated substation control system
—Supports multiple system configurations

Features

Protection and Control

—Unit Transformer protection
—Synchronism Check
—Restricted Ground Fault
—Split Phase protection
—Loss of excitation, Overexcitation
—Reverse and low forward power
—Current unbalance
—Up to 96 digital input and 64 digital outputs
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Metering - current, voltage, power, energy, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—User Programmable Fault Reports

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR G30 Generator Protection System

Cost Effective Protection for Small to Medium Generators... with Unit Transformer Protection

Ordering

G30 - * 00 - H C/P * - F ** - H ** - M ** - P ** - U ** - W/X**	G30 - * 00 - V F * - F ** - H ** - M ** - R **	
G30		Base Unit
E		RS485 + RS485
G		RS485 + 10BaseF (MMS/UCA2 and Modbus TCP/IP)
H		RS485 + Redundant 10BaseF (MMS/UCA2 and Modbus TCP/IP)
00		No Software Options
01		Ethernet Global Data (EGD)
H		Horizontal
H		Horizontal (19" rack) with 16 user-programmable pushbuttons
V		Faceplate with Keypad & Display
C		
P		
F		
H		125 / 250 Vac/dc
L		24 - 48 (Vdc only)
8F	8F	Standard 4CT/4VT
8G	8G	4CT/4VT (1 Sensitive Ground)
8H	8H	Standard 8CT
8J	8J	8CT (2 Sensitive Ground)
XX	XX	No module
4A	4A	4 Solid State (No Monitoring) MOSFET Outputs
4B	4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	4L	14 Form-A (No Monitoring) Latchable Outputs
67	67	8 Form-A (No Monitoring) Outputs
6A	6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	6C	8 Form-C Outputs
6D	6D	16 Digital Inputs
6E	6E	4 Form-C Outputs, 8 Digital Inputs
6F	6F	8 Fast Form-C Outputs
6G	6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	6K	4 Form-C & 4 Fast Form-C Outputs
6L	6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	5A	4 dcmA Inputs, 4 dcmA Outputs
5C	5C	8 RTD Inputs
5D	5D	4 RTD Inputs, 4 dcmA Outputs
5E	5E	4 dcmA Inputs, 4 RTD Inputs
5F	5F	8 dcmA Inputs
		7A 820 nm, multi-mode, LED, 1 Channel
		7B 1300 nm, multi-mode, LED, 1 Channel
		7C 1300 nm, single-mode, ELED, 1 Channel
		7D 1300 nm, single-mode, LASER, 1 Channel
		7H 820 nm, multi-mode, LED, 2 Channels
		7I 1300 nm, multi-mode, LED, 2 Channels
		7J 1300 nm, single-mode, ELED, 2 Channels
		7K 1300 nm, single-mode, LASER, 2 Channels
		7L Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
		7M Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
		7N Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
		7P Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
		7R G.703, 1 Channel
		7S G.703, 2 Channels
		7T RS422, 1 Channel
		7W RS422, 2 Channels
		72 1550 nm, single-mode, LASER, 1 Channel
		73 1550 nm, single-mode, LASER, 2 Channels
		74 Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
		76 IEEE C37.94, 820 nm, multimode, LED, 1 Channel
		77 IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Maximum: 4 outputs
Maximum: 24 I/O channels

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR G60 Generator Protection System

Versatile Relay for the Protection of AC Generators

Key Values

—Increase uptime - dual power supply option
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Any size of AC generator driven by steam, gas and hydraulic turbine
—Stand-alone or component in automated substation control system

Features

Protection and Control

—Stator differential
—100% stator ground differential
—Backup distance
—Power swing blocking and tripping
—Synchronism Check
—Restricted Ground Fault
—Loss of excitation, Overexcitation
—Reverse and low forward power
—Current unbalance

Monitoring and Metering

—Metering - current, voltage, power, energy, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—User Programmable Fault Reports

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR G60 Generator Protection System

Versatile Relay for the Protection of AC Generators

Ordering

G60 - * 00 - H C/P * - F ** - H ** - M ** - P ** - U ** - W/X For Full Sized Horizontal Mount**
G60 - * 00 - V F * - F ** - H ** - M ** R ** For Reduced Size Vertical Mount

Base	*	00	H/V	C/P/F	*	F **	H **	M **	P **	U **	W/X/R **	Description
G60												Base Unit
	E											RS485 + RS485
	G											RS485 + 10BaseF (MMS/UCA2 and Modbus TCP/IP)
	H											RS485 + Redundant 10BaseF (MMS/UCA2 and Modbus TCP/IP)
		00										No Software Options
		01										Ethernet Global Data (EGD)
			H	C								Horizontal
			H	P								Horizontal (19" rack) with 16 user-programmable pushbuttons
			V	F								Faceplate with Keypad & Display
					H							125 / 250 Vac/dc
					L							24 - 48 (Vdc only)
						8F		8F				Standard 4CT/4VT
						8G		8G				4CT/4VT (1 Sensitive Ground)
						8H		8H				Standard 8CT
						8J		8J				8CT (2 Sensitive Ground)
							XX	XX	XX	XX	XX	No module
							4A	4A	4A	4A	4A	4 Solid State (No Monitoring) MOSFET Outputs
							4B	4B	4B	4B	4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
							4C	4C	4C	4C	4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
							4L	4L	4L	4L	4L	14 Form-A (No Monitoring) Latchable Outputs
							67	67	67	67	67	8 Form-A (No Monitoring) Outputs
							6A	6A	6A	6A	6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
							6B	6B	6B	6B	6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
							6C	6C	6C	6C	6C	8 Form-C Outputs
							6D	6D	6D	6D	6D	16 Digital Inputs
							6E	6E	6E	6E	6E	4 Form-C Outputs, 8 Digital Inputs
							6F	6F	6F	6F	6F	8 Fast Form-C Outputs
							6G	6G	6G	6G	6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
							6H	6H	6H	6H	6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
							6K	6K	6K	6K	6K	4 Form-C & 4 Fast Form-C Outputs
							6L	6L	6L	6L	6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
							6M	6M	6M	6M	6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
							6N	6N	6N	6N	6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
							6P	6P	6P	6P	6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
							6R	6R	6R	6R	6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
							6S	6S	6S	6S	6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
							6T	6T	6T	6T	6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
							6U	6U	6U	6U	6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
							5A	5A	5A	5A	5A	4 dcmA Inputs, 4 dcmA Outputs
							5C	5C	5C	5C	5C	8 RTD Inputs
							5D	5D	5D	5D	5D	4 RTD Inputs, 4 dcmA Outputs } Maximum: 4 outputs
							5E	5E	5E	5E	5E	4 dcmA Inputs, 4 RTD Inputs } Maximum: 24 I/O channels
							5F	5F	5F	5F	5F	8 dcmA Inputs
											7A	820 nm, multi-mode, LED, 1 Channel
											7B	1300 nm, multi-mode, LED, 1 Channel
											7C	1300 nm, single-mode, ELED, 1 Channel
											7D	1300 nm, single-mode, LASER, 1 Channel
											7H	820 nm, multi-mode, LED, 2 Channels
											7I	1300 nm, multi-mode, LED, 2 Channels
											7J	1300 nm, single-mode, ELED, 2 Channels
											7K	1300 nm, single-mode, LASER, 2 Channels
											7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
											7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
											7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
											7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
											7R	G.703, 1 Channel
											7S	G.703, 2 Channels
											7T	RS422, 1 Channel
											7W	RS422, 2 Channels
											72	1550 nm, single-mode, LASER, 1 Channel
											73	1550 nm, single-mode, LASER, 2 Channels
											74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
											76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
											77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

***Publications and Reference:** See Section 21*
for a list of additional product-related publications

UR L60 Line Phase Comparison System

Flexible Phase Comparison Protection for HV and EHV Transmission Lines

Key Values

—Single-phase comparison, dual-phase comparison, 3-terminal line phase comparison are included in one Element
—State-of-the-art oscillography capturing all Phase-Comparison specific signals
—Fast tripping - typically _ of the cycle.
—1-pole/3-pole 2 breakers control autoreclosure
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—HV and EHV transmission
—Single-Pole and 3-Pole tripping are fully supported.
—Breaker-and-the-half Applications with internal summations of two currents treating currents separately for phase-comparison and breaker failure functions.
—Stand-alone or component in automated substation control system

Features

Protection and Control

—Phase comparison protection
—Instantaneous, time, directional overcurrent
—3 zone phase and ground distance protection
—Breaker failure
—Undervoltage, overvoltage
—Synchrocheck
—Autoreclosure
—CT failure, VT fuse failure
—Breaker arc current
—Disturbance detector

Monitoring and Metering

—Metering - current, voltage, power, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104
—Direct I/O - exchange of binary data between URs

UR L60 Line Phase Comparison System

Flexible Phase Comparison Protection
for HV and EHV Transmission Lines

Ordering

L60	* 00	HC	*	F **	H **	L **	N **	S **	U **	W **	For Full Sized Horizontal Mount
L60	* 00	VF	*	F **	H **	L **	N **			R **	For Reduced Size Vertical Mount
L60											Base unit
	A										RS485 + RS485 (Modbus RTU, DNP)
	C										RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
	D										RS485 + redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
	00										No software options
		HC									Horizontal mount (19" rack)
		VF									Vertical mount (3/4 size)
			H								125/250 Vac/dc
			L								24 - 48 (Vdc only)
				8A							Standard 4CT/4VT
				8C							Standard 8CT
						XX	XX	XX	XX		No module
					6A	6A	6A	6A	6A		2 Form A (voltage w/ opt current) and 2 Form C outputs, 8 digital inputs
					6B	6B	6B	6B	6B		2 Form A (voltage w/ opt current) and 4 Form C outputs, 4 digital inputs
					6C	6C	6C	6C	6C		8 Form C outputs
					6D	6D	6D	6D	6D		16 digital inputs
					6E	6E	6E	6E	6E		4 Form C outputs, 8 digital inputs
					6F	6F	6F	6F	6F		8 fast Form C outputs
					6G	6G	6G	6G	6G		4 Form A (voltage w/ opt current) outputs, 8 digital inputs
					6H	6H	6H	6H	6H		6 Form A (voltage w/ opt current) outputs, 4 digital inputs
					6K	6K	6K	6K	6K		4 Form C and 4 fast Form C outputs
					6L	6L	6L	6L	6L		2 Form A (current w/ opt voltage) and 2 Form C outputs, 8 digital inputs
					6M	6M	6M	6M	6M		2 Form A (current w/ opt voltage) and 4 Form C outputs, 4 digital inputs
					6N	6N	6N	6N	6N		4 Form A (current w/ opt voltage) outputs, 8 digital inputs
					6P	6P	6P	6P	6P		6 Form A (current w/ opt voltage) outputs, 4 digital inputs
					6R	6R	6R	6R	6R		2 Form A (no monitoring) and 2 Form C outputs, 8 digital inputs
					6S	6S	6S	6S	6S		2 Form A (no monitoring) and 4 Form C outputs, 4 digital inputs
					6T	6T	6T	6T	6T		4 Form A (no monitoring) outputs, 8 digital inputs
					6U	6U	6U	6U	6U		6 Form A (no monitoring) outputs, 4 digital inputs
					5C	5C	5C	5C	5C		8 RTD inputs
					5E	5E	5E	5E	5E		8 DCmA inputs, 4 RTD inputs
					5F	5F	5F	5F	5F		8 DCmA inputs
										7Y	125 V input, 5 V output, 20 mA channel interface
										7Z	5 V input, 5 V output, 20 mA channel interface
										7V	48/60 V, 20 mA input/output channel interface
										7U	110/125 V, 20 mA input/output channel interface

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR L90 Line Differential System

High-Speed Current Differential Protection of Transmission Lines for Single or Three-Phase Tripping

Key Values

- *Increased power system stability and availability - high speed single and three phase tripping, single and three phase reclosing*
- *Reliable operation on short lines, underground HV cables, and series compensated lines*
- *Multiple breaker applications (eg. Breaker-and-a-half)*
- *Performance – certified by Utilities globally*
- *Access to information – wide area network integration, multiple communication mediums and protocols*
- *Reduced wiring costs – peer-to-peer communication, direct I/O*
- *Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs*
- *Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs*
- *Flexibility – multiple I/O options, programming (FlexLogic)*
- *Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization*

Applications

- *Overhead and underground AC transmission lines of any voltage level, including series compensated lines*
- *Stand-alone or component in automated substation control system*

Features

Protection and Control

- *Current differential protection, Direct Transfer Trip (DTT)*
- *Three zones of backup distance protection*
- *Multiple current and voltage elements*
- *Directional phase, neutral, and negative sequence*
- *Single-pole dual-breaker auto-reclosure*
- *Breaker-failure*
- *Breaker-and-a-half*

Monitoring and Metering

- *Actual remote, local and differential per phase current*
- *Metering - current, voltage, power, power factor, energy, frequency*
- *Oscillography – 64 samples/cycle, up to 64 records*
- *Event Recorder – 1024 time tagged events, 1 microsecond resolution*
- *DataLogger – Up to 16 channels with user selectable sampling rate*
- *Fault Locator*

User Interface and Programming

- *Front panel display and keypad for local access; RS232 port for local PC access*
- *User programmable local display, LEDs and pushbuttons*
- *Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements*
- *Includes EnerVista LaunchPad – Simplified relay setup and programming*
- *Multi-language – French, Chinese, Russian option*

Communications

- *Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94*
- *Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104*
- *Direct I/O - exchange of binary data between URs*

UR L90 Line Differential System

High-Speed Current Differential Protection of Transmission Lines for Single or Three-Phase Tripping

Ordering

L90 - * 00 - H C/P * - F** - H ** - L ** - N ** - S ** - U **	W/X **	
L90 - * 00 - V F * - F** - H ** - L ** - N **	R **	**For Reduced Size Vertical Mount**
L90		Base Unit
E		RS485 + RS485 (Modbus RTU, DNP)
G		RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
H		RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
00		No Software Options
02		Breaker and a Half software (requires 2nd DSP in L slot)
H		Horizontal (19" rack)
C		Horizontal (19" rack) with 16 user-programmable pushbuttons
V		Vertical (3/4 size)
F		Vertical (3/4 size)
H		125 / 250 Vac/dc
L		24 - 48 (Vdc only)
8F		Standard 4CT/4VT
8H		Standard 8CT
XX		No Module
4A		4 Solid State (No Monitoring) MOSFET Outputs
4B		4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C		4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L		14 Form-A (No Monitoring) Latchable Outputs
67		8 Form-A (No Monitoring) Outputs
6A		2 Form-A (voltage w/ opt current) & 2 Form-C outputs, 8 digital inputs
6B		2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C		8 Form-C Outputs
6D		16 Digital Inputs
6E		4 Form-C Outputs, 8 Digital Inputs
6F		8 Fast Form-C Outputs
6G		4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H		6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K		4 Form-C & 4 Fast Form-C Outputs
6L		2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M		2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N		4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P		6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R		2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S		2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T		4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U		6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A		4 dcmA Inputs, 4 dcmA Outputs
5C		8 RTD Inputs
5D		4 RTD Inputs, 4 dcmA Outputs
5E		4 dcmA Inputs, 4 RTD Inputs
5F		8 dcmA Inputs
	7A	820 nm, multi-mode, LED, 1 Channel
	7B	1300 nm, multi-mode, LED, 1 Channel
	7C	1300 nm, single-mode, ELED, 1 Channel
	7D	1300 nm, single-mode, LASER, 1 Channel
	7H	820 nm, multi-mode, LED, 2 Channels
	7I	1300 nm, multi-mode, LED, 2 Channels
	7J	1300 nm, single-mode, ELED, 2 Channels
	7K	1300 nm, single-mode, LASER, 2 Channels
	7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
	7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
	7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
	7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
	7R	G.703, 1 Channel
	7S	G.703, 2 Channels
	7T	RS422, 1 Channel
	7W	RS422, 2 Channels
	72	1550 nm, single-mode, LASER, 1 Channel
	73	1550 nm, single-mode, LASER, 2 Channels
	74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
	76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
	77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Maximum: 4 outputs
Maximum: 24 I/O channels

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR M60 Motor Protection System

Motor Protection, Control, Monitoring and Metering in One Integrated Package

Key Values

—Integrated energy management
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Any size of AC induction or synchronous motor
—Stand-alone or component in automated control system

Features

Protection and Control

—Phase and neutral directional overcurrent function
—Thermal overload, overvoltage, undervoltage and reverse phase sequence
—Stator-restrained differential
—VT fuse failure, breaker failure protection function
—Configurable TOC curves with FlexCurves
—Thermal model RTD bias function
—Up to 96 digital input and 64 digital outputs)
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Stator temperatures
—Metering - current, voltage, power, energy, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—User Programmable Fault Reports

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR M60 Motor Protection System

Motor Protection, Control, Monitoring and Metering in One Integrated Package

Ordering

M60 - * 00 - H C/P * - F ** - H ** - M ** - P ** - U ** - W/X **	
M60 - * 00 - V F * - F ** - H ** - M **	
For Full Sized Horizontal Mount	
For Reduced Size Vertical Mount	
M60	Base Unit
E	RS485 + RS485
G	RS485 + 10BaseF (MMS/UCA2 and Modbus TCP/IP)
H	RS485 + Redundant 10BaseF (MMS/UCA2 and Modbus TCP/IP)
00	No Software Options
01	Ethernet Global Data (EGD)
H	Horizontal
HV	Horizontal (19" rack) with 16 user-programmable pushbuttons
CPF	Faceplate with Keypad & Display
H	125 / 250 Vac/dc
L	24 - 48 (Vdc only)
8F	Standard 4CT/4V
8G	4CT/4VT (1 Sensitive Ground)
8H	Standard 8CT
8J	8CT (2 Sensitive Ground)

XX	**XX**	**XX**	**XX**	**XX**	No module
4A	**4A**	**4A**	**4A**	**4A**	4 Solid State (No Monitoring) MOSFET Outputs
4B	**4B**	**4B**	**4B**	**4B**	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	**4C**	**4C**	**4C**	**4C**	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	**4L**	**4L**	**4L**	**4L**	14 Form-A (No Monitoring) Latchable Outputs
67	**67**	**67**	**67**	**67**	8 Form-A (No Monitoring) Outputs
6A	**6A**	**6A**	**6A**	**6A**	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	**6B**	**6B**	**6B**	**6B**	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	**6C**	**6C**	**6C**	**6C**	8 Form-C Outputs
6D	**6D**	**6D**	**6D**	**6D**	16 Digital Inputs
6E	**6E**	**6E**	**6E**	**6E**	4 Form-C Outputs, 8 Digital Inputs
6F	**6F**	**6F**	**6F**	**6F**	8 Fast Form-C Outputs
6G	**6G**	**6G**	**6G**	**6G**	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	**6H**	**6H**	**6H**	**6H**	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	**6K**	**6K**	**6K**	**6K**	4 Form-C & 4 Fast Form-C Outputs
6L	**6L**	**6L**	**6L**	**6L**	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	**6M**	**6M**	**6M**	**6M**	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	**6N**	**6N**	**6N**	**6N**	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	**6P**	**6P**	**6P**	**6P**	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	**6R**	**6R**	**6R**	**6R**	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	**6S**	**6S**	**6S**	**6S**	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	**6T**	**6T**	**6T**	**6T**	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	**6U**	**6U**	**6U**	**6U**	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	**5A**	**5A**	**5A**	**5A**	4 dcmA Inputs, 4 dcmA Outputs
5C	**5C**	**5C**	**5C**	**5C**	8 RTD Inputs
5D	**5D**	**5D**	**5D**	**5D**	4 RTD Inputs, 4 dcmA Outputs
5E	**5E**	**5E**	**5E**	**5E**	4 dcmA Inputs, 4 RTD Inputs
5F	**5F**	**5F**	**5F**	**5F**	8 dcmA Inputs

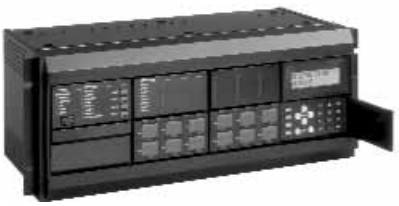
Maximum: 4 outputs
Maximum: 24 I/O channels

7A	820 nm, multi-mode, LED, 1 Channel
7B	1300 nm, multi-mode, LED, 1 Channel
7C	1300 nm, single-mode, ELED, 1 Channel
7D	1300 nm, single-mode, LASER, 1 Channel
7H	820 nm, multi-mode, LED, 2 Channels
7I	1300 nm, multi-mode, LED, 2 Channels
7J	1300 nm, single-mode, ELED, 2 Channels
7K	1300 nm, single-mode, LASER, 2 Channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 Channel
7S	G.703, 2 Channels
7T	RS422, 1 Channel
7W	RS422, 2 Channels
72	1550 nm, single-mode, LASER, 1 Channel
73	1550 nm, single-mode, LASER, 2 Channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR T35 Transformer Protection System

High-Speed, Three-Phase, Multiple Winding Transformer Relay



Key Values

—Unique Transformer protection relay with capabilities to monitor analog and RTD inputs
—Cost effective and small footprint – up to 6 restrain/windings, and integrated control, monitoring/metering and communication
—Access to information – wide area network integration, multiple communication mediums and protocols
—Reduced wiring costs – peer-to-peer communication, direct I/O
—Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
—Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
—Flexibility – multiple I/O options, programming (FlexLogic)
—Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

—Primary and backup protection of power transformers with up to six windings/restraints
—Stand-alone or component in automated substation control system

Features

Protection and Control

—Dual slope, dual breakpoint differential restraint characteristic
—Percent and Instantaneous differential protection
—Up to 96 digital input and 64 digital outputs)
—Transducer I/Os (RTD, dcmA)

Monitoring and Metering

—Metering - current, voltage, power, frequency
—Oscillography – 64 samples/cycle, up to 64 records
—Event Recorder – 1024 time tagged events, 1 microsecond resolution
—DataLogger – Up to 16 channels with user selectable sampling rate
—User Programmable Fault Reports

User Interface and Programming

—Front panel display and keypad for local access; RS232 port for local PC access
—User programmable local display, LEDs and pushbuttons
—Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
—Includes EnerVista LaunchPad – Simplified relay setup and programming
—Multi-language – French, Chinese, Russian option

Communications

—Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
—Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
—Direct I/O - exchange of binary data between URs

UR T35 Transformer Protection System

High-Speed, Three-Phase, Multiple Winding Transformer Relay

Ordering

T35 - * 00 - H C/P * - F** - H** - M** - P** - U** - W/X**	For Full Sized Horizontal Mount
T35	Base Unit
E	RS485 + RS485
G	RS485 + 10BaseF (MMS/UCA2 and Modbus TCP/IP)
H	RS485 + Redundant 10BaseF (MMS/UCA2 and Modbus TCP/IP)
00	No Software Options
01	Ethernet Global Data (EGD)
H	Horizontal mount (19" rack)
C	Horizontal (19" rack) with 16 user-programmable pushbuttons
P	
H	125 / 250 Vac/dc
L	24 - 48 (Vdc only)
8F	Standard 4CT/4VT
8G	4CT/4VT (1 Sensitive Ground)
8H	Standard 8CT
8J	8CT (2 Sensitive Ground)
XX	No module
4A	4 Solid State (No Monitoring) MOSFET Outputs
4B	4 Solid State (Voltage w/opt Current) MOSFET Outputs
4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
4L	14 Form-A (No Monitoring) Latchable Outputs
67	8 Form-A (No Monitoring) Outputs
6A	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
6B	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
6C	8 Form-C Outputs
6D	16 Digital Inputs
6E	4 Form-C Outputs, 8 Digital Inputs
6F	8 Fast Form-C Outputs
6G	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
6H	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
6K	4 Form-C & 4 Fast Form-C Outputs
6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
6U	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
5A	4 dcmA Inputs, 4 dcmA Outputs
5C	8 RTD Inputs
5D	4 RTD Inputs, 4 dcmA Outputs
5E	4 dcmA Inputs, 4 RTD Inputs
5F	8 dcmA Inputs
	Maximum: 4 outputs Maximum: 24 I/O channels
7A	820 nm, multi-mode, LED, 1 Channel
7B	1300 nm, multi-mode, LED, 1 Channel
7C	1300 nm, single-mode, ELED, 1 Channel
7D	1300 nm, single-mode, LASER, 1 Channel
7H	820 nm, multi-mode, LED, 2 Channels
7I	1300 nm, multi-mode, LED, 2 Channels
7J	1300 nm, single-mode, ELED, 2 Channels
7K	1300 nm, single-mode, LASER, 2 Channels
7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
7R	G.703, 1 Channel
7S	G.703, 2 Channels
7T	RS422, 1 Channel
7W	RS422, 2 Channels
72	1550 nm, single-mode, LASER, 1 Channel
73	1550 nm, single-mode, LASER, 2 Channels
74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Publications and Reference: *See Section 21 for a list of additional product-related publications*

UR T60 Transformer Protection System

High-Speed, Three-Phase, Multiple Winding Transformer Relay

Key Values

- Unique Transformer protection relay with capabilities to monitor analog and RTD inputs
- Access to information – wide area network integration, multiple communication mediums and protocols
- Reduced wiring costs – peer-to-peer communication, direct I/O
- Modular – design flexibility, reduced stock of spare parts, field upgradeable, lower maintenance and replacement costs
- Reduced number of devices – integrated control functions, pushbuttons, and communication interfaces; programmable LEDs
- Flexibility – multiple I/O options, programming (FlexLogic)
- Reduced troubleshooting time and maintenance costs – Event reports, waveform capture, data logger, IRIG-B time synchronization

Applications

- Reliable primary and backup protection for small to large three-phase transformers
- Protection for transformers with windings in a ring bus or breaker-and-a-half configuration
- Stand-alone or component in automated substation control system

Features

Protection and Control

- Dual slope, dual breakpoint percent differential characteristic with second and fifth harmonic restraint
- Instantaneous differential protection
- Overexcitation
- Restricted ground fault
- Up to 96 digital input and 64 digital outputs)
- Transducer I/Os (RTD, dcmA)

Monitoring and Metering

- Differential and restrained currents
- 2nd to 25th harmonic on phase currents and THD
- Metering - current, voltage, power, power factor, energy, frequency, current harmonics
- Oscillography – 64 samples/cycle, up to 64 records
- Event Recorder – 1024 time tagged events, 1 microsecond resolution
- DataLogger – Up to 16 channels with user selectable sampling rate
- User Programmable Fault Reports

User Interface and Programming

- Front panel display and keypad for local access; RS232 port for local PC access
- User programmable local display, LEDs and pushbuttons
- Customize protection and control functions with FlexLogic, FlexCurves, and FlexElements
- Includes EnerVista LaunchPad – Simplified relay setup and programming
- Multi-language – French, Chinese, Russian option

Communications

- Networking options – Ethernet-fiber (optional redundancy), RS422, RS485, G.703, C37.94
- Multiple protocols - IEC 61850, UCA 2.0, DNP 3.0, Modbus, IEC-104, Ethernet Global Data (EGD)
- Direct I/O - exchange of binary data between URs

UR T60 Transformer Protection System

High-Speed, Three-Phase, Multiple Winding Transformer Relay

Ordering

T60 -	*****	**00 -**	**H**	**C/P**	*** -**	**F ** -**	**H ** -**	**M ** -**	**P ** -**	**U ** -**	**W/X****	**For Full Sized Horizontal Mount**
T60 -	*****	**00 -**	**V**	**F**	*** -**	**F ** -**	**H ** -**	**M ****			**R**	**For Reduced Size Vertical Mount**
T60												Base Unit
	E											RS485 + RS485 (Modbus RTU, DNP)
	G											RS485 + 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
	H											RS485 + Redundant 10BaseF (MMS/UCA2, Modbus TCP/IP, DNP)
		00										No Software Options
		01										Ethernet Global Data (EGD)
			H	**C**								Horizontal mount (19" rack)
			H	**P**								Horizontal (19" rack) with 16 user-programmable pushbuttons
			V	**F**								Vertical mount (3/4 size)
					H							125 / 250 Vac/dc power supply
					L							24 - 48 (Vdc only)
						8F		**8F**				Standard 4CT/4VT
						8G		**8G**				4CT/4VT (1 Sensitive Ground)
						8H		**8H**				Standard 8CT
						8J		**8J**				8CT (2 Sensitive Ground)
							XX	**XX**	**XX**	**XX**	**XX**	No Module
							4A	**4A**	**4A**	**4A**	**4A**	4 Solid State (No Monitoring) MOSFET Outputs
							4B	**4B**	**4B**	**4B**	**4B**	4 Solid State (Voltage w/opt Current) MOSFET Outputs
							4C	**4C**	**4C**	**4C**	**4C**	4 Solid State (Current w/opt Voltage) MOSFET Outputs
							4L	**4L**	**4L**	**4L**	**4L**	14 Form-A (No Monitoring) Latchable Outputs
							67	**67**	**67**	**67**	**67**	8 Form-A (No Monitoring) Outputs
							6A	**6A**	**6A**	**6A**	**6A**	2 Form-A (Voltage w/ opt Current) & 2 Form-C Outputs, 8 Digital Inputs
							6B	**6B**	**6B**	**6B**	**6B**	2 Form-A (Voltage w/ opt Current) & 4 Form-C Outputs, 4 Digital Inputs
							6C	**6C**	**6C**	**6C**	**6C**	8 Form-C Outputs
							6D	**6D**	**6D**	**6D**	**6D**	16 Digital Inputs
							6E	**6E**	**6E**	**6E**	**6E**	4 Form-C Outputs, 8 Digital Inputs
							6F	**6F**	**6F**	**6F**	**6F**	8 Fast Form-C Outputs
							6G	**6G**	**6G**	**6G**	**6G**	4 Form-A (Voltage w/ opt Current) Outputs, 8 Digital Inputs
							6H	**6H**	**6H**	**6H**	**6H**	6 Form-A (Voltage w/ opt Current) Outputs, 4 Digital Inputs
							6K	**6K**	**6K**	**6K**	**6K**	4 Form-C & 4 Fast Form-C Outputs
							6L	**6L**	**6L**	**6L**	**6L**	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
							6M	**6M**	**6M**	**6M**	**6M**	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
							6N	**6N**	**6N**	**6N**	**6N**	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
							6P	**6P**	**6P**	**6P**	**6P**	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
							6R	**6R**	**6R**	**6R**	**6R**	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
							6S	**6S**	**6S**	**6S**	**6S**	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
							6T	**6T**	**6T**	**6T**	**6T**	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
							6U	**6U**	**6U**	**6U**	**6U**	6 Form-A (No Monitoring) Outputs, 4 Digital Inputs
							5A	**5A**	**5A**	**5A**	**5A**	4 dcmA Inputs, 4 dcmA Outputs
							5C	**5C**	**5C**	**5C**	**5C**	8 RTD Inputs
							5D	**5D**	**5D**	**5D**	**5D**	4 RTD Inputs, 4 dcmA Outputs
							5E	**5E**	**5E**	**5E**	**5E**	4 dcmA Inputs, 4 RTD Inputs
							5F	**5F**	**5F**	**5F**	**5F**	8 dcmA Inputs
											7A	820 nm, multi-mode, LED, 1 Channel
											7B	1300 nm, multi-mode, LED, 1 Channel
											7C	1300 nm, single-mode, ELED, 1 Channel
											7D	1300 nm, single-mode, LASER, 1 Channel
											7H	820 nm, multi-mode, LED, 2 Channels
											7I	1300 nm, multi-mode, LED, 2 Channels
											7J	1300 nm, single-mode, ELED, 2 Channels
											7K	1300 nm, single-mode, LASER, 2 Channels
											7L	Channel 1 - RS422; Channel 2 - 820 nm, multi-mode, LED
											7M	Channel 1 - RS422; Channel 2 - 1300 nm, multi-mode, LED
											7N	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, ELED
											7P	Channel 1 - RS422; Channel 2 - 1300 nm, single-mode, LASER
											7R	G.703, 1 Channel
											7S	G.703, 2 Channels
											7T	RS422, 1 Channel
											7W	RS422, 2 Channels
											72	1550 nm, single-mode, LASER, 1 Channel
											73	1550 nm, single-mode, LASER, 2 Channels
											74	Channel 1 - RS422; Channel 2 - 1550 nm, single-mode, LASER
											76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
											77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Note for the 5A–5F modules (4 dcmA Inputs, 4 dcmA Outputs through 8 dcmA Inputs): Maximum: 4 outputs; Maximum: 24 I/O channels

Publications and Reference: *See Section 21 for a list of additional product-related publications*

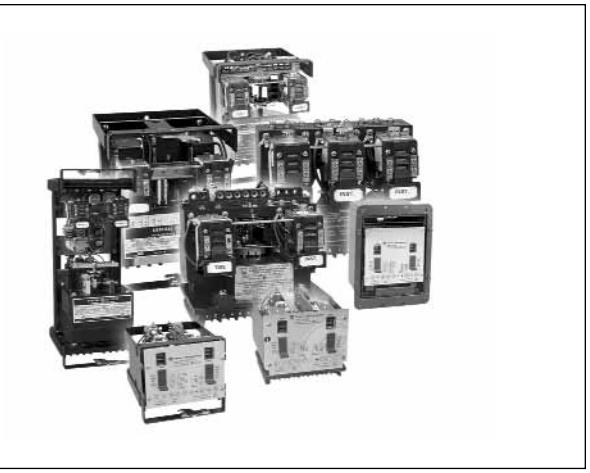
Electromechnical Relays

Electromechanical Relays

Most of these relays have been providing protection for many decades and continue to be applied for both primary and back-up protection.

- ***Overcurrent relays:*** *IFC, IAC, DIAC/DIFC/DSFC, PJC, CHC, IFCV, HFC*
- ***Synchronizing relays:*** *MLJ, IJS*
- ***Voltage and frequency relays:*** *MFF, TOV, MOV, IAV, IFV, ICR, SFF, CFVB, NBV*
- ***Differential and timing relays:*** *BDD, STD, CFD, PVD, IJD, SAM, SBD*
- ***Directional relays:*** *TCW, JBC/JBCG*
- ***Generator relays:*** *CEH, GGP, CEX, SGC*
- ***Auxiliary relays:*** *HEA, HAA, HFA, HGA, HAS, HMA, RDB86, NGA*
- ***Other Single Functions relays:*** *HGA18, JBCV, GSY, CEB, CEYG, CEY, NAA, SBC, Phase Voltage Relay, Ground Fault Relay, Capictor Trip Device*

Refer to GE Multilin website for more detailed information and product specifications.
www.GEMultilin.com



EPM Family—Electronic Power Meter Family

Energy/Demand Data Logging Meters

Key Values

—Complete Line of High-Performance Meters for Power, Energy and Power Quality
—Monitor Power, Energy and Power Quality for Commercial, Utilities, Municipal, IPPs etc.
—Record Faults/Time Protective Equipment - Identify and Respond to PQ Events Quickly
—Monitor Reliability of Breakers and Relays - Improve Operational Efficiencies
—Shed or Shift Loads Quickly
—Identify and Manage Peak Demand
—Enhance Levels of Communication and Data Transmission
—Provide Real-Time Data on the Web
—Built-in RTU Functionality with I/Os

Applications

—View Energy Usage and Generate Bills
—Efficiently Control/Manage Energy Consumption
—Increase Power Distribution Reliability
—Real-Time PQ Monitoring and Analysis
—Improve Substation Automation Solutions

Monitoring and Metering

—Current, voltage, real and reactive power, energy use, cost of power, power factor and frequency
—Revenue Class metering with data logging
—Harmonic Analysis to 255th Order with Flicker and waveform recording

Control

—Fully Programmable set-points for alarms and relay activation
—90msec. High-Speed Updates for Control
—Built-in PLC and RTU Functionality

User Interface and Programming

—On-board RS-485, Ethernet TCP/IP and Web capability
—Built-in communication ports using open architecture protocols
—Choice of LED and LCD Touch Screen Display
—Analog and Digital Inputs and Outputs

EPM Family of Products Include:

—PQMII Power Quality Meter
—EPM 1000 Sub Metering
—EPM 4000 Sub Metering
—EPM 2000 Three-Phase Multi-function Power Monitor
—EPM 5200Three-Phase Multi-function Energy Meter
—EPM 5300/5350 Basic Metering
—EPM 6000 Revenue Grade
—EPM 9000 Advanced Power Quality Meter

Publications and Reference: See Section 21 for a list of additional product-related publications

PQMII Power Quality Metering System

Continuous Metering of Three-Phase Systems

Key Values

—High accuracy, mid range Power Quality with many advanced features.
—Waveform capture using set-points for PQ analysis. Waveform can be triggered by external equipment (motors) through digital inputs for capturing start-up current etc….
—Control Relays can open and close at the pre-programmed (min, max etc) set-points for alarms and notifications.
—Analog outputs for power information to PLCs, RTU and other non digital communication devices.
—VERY EASY to use , program and set-up – comes with free set-up and monitoring software (launch pad).
—Large Multi-line alpha numeric display
—Open Modbus protocol over RS 485 with multi port communication capability allows easy integration to EnerVista or third party systems

Applications

—Continuous metering of distribution feeders, transformers, capacitor banks, generators and motors
—Medium and low voltage systems
—Includes EnerVista software - an industry-leading suite of software tools that simplifies every aspect of working with GE Multilin devices

Monitoring and Metering

—Current, voltage, real and reactive power, energy use, cost of power, power factor and frequency
—Harmonic analysis

Protection and Control

—Basic alarm on overcurrent, undercurrent or voltage unbalance

User Interface and Programming

—RS232 and RS485 ports

Ordering

PQM II	*	*	*	Description (Order code for all options: **PQM-T20-C-A**)
Basic Unit				Basic unit with display, all current/voltage/power measurements, one (1) RS485 communication port, one (1) RS232 communication port
Transducer Option	T20			and 4-20 mA assignable to all measured parameters, 4-20 mA analog input, 2nd RS485 communication port
	T1			Four (4) isolated analog outputs, 0-1 mA assignable to all measured parameters, 4-20 mA analog input, 2nd RS485 communication port
Control Option		C		Three (3) additional programmable output relays (for a total of 4), 4 programmable switch inputs
Power Analysis Option			A	A Harmonic analysis, triggered trace memory,waveform capture, event recorder, data logger, voltage disturbance recorder*

Modifications

MOD 500	Portable test/carrying case
MOD 501	20 – 60 Vdc/20 – 48 Vac control power
MOD 502	Tropicalization
MOD 504	Removable terminal blocks
MOD 505	Detachable faceplate
MOD 506	4-step capacitor bank switching
MOD 507	-40 to +60° C temperature operation
MOD 508	269 communication protocol
MOD 513	Class 1, division 2 operation
MOD 516	PQM remote: base unit only
MOD 517	PQM remote: detachable faceplate only

Accessories

PQMPC Windows software[1]
RS232 to RS485 converter[2]
2.25" collar for limited depth mounting
RS485 terminating network
PQM mounting plate to replace MTM Plus

[1]*Free upon request.*
[2]*Required to connect a computer to the PQM RS485 ports.*

Control Power

90 – 300 Vdc/70 – 265 Vac standard
20 – 60 Vdc/20 – 48 Vac (MOD 501)

EPM 1000 Single-Point Submetering System

Engineered for Retrofit and New Construction

Key Values

—Revenue classifiable metering
—Meets ANSI C12.1 and C12.16 accuracy
—Wall mountable easy-to-install enclosure
—Local LCD viewing
—Packaged with Current Transformers
—Easy to use energy/demand data logging meter, suitable for new construction or retrofit application
—Low cost, wall mount simple to use. Provides all basic information required for billing purposes.
—Standard Power Line Communication (PLC) over the existing power lines. No additional wiring installation is necessary
—ANSI standard accuracy tested for revenue class certification
—EPM 1000 single P/N provides a complete package that includes CTs
—Save installation costs – Its rugged metal enclosure is designed for fast installation as well as tamper resistance
—Use with Multilin Energy Aggregator package or with third part software using open Modbus protocol over standard RS 485 (optional)

Applications

—Ideal for commercial, residential and industrial sub-metering applications

Monitoring and Metering

—Real-time per-phase viewing of voltage, current, power factor, phase angle, watts, VARs, VA, and frequency
—Event reporting with time and date stamps regarding power consumption, demand resets, power-ups/power downs, and is available via LCD for viewing

User Interface and Programming

—Modbus RS-485 (optional)
—Up to 4 pulse inputs (optional)
—IEC optical front panel interface for programming

Ordering

PL 1000	*	CT	*	Description
System Voltage	**208**			120/208 Volts Connection
	480			277/480 Volt Connection
CTs Required		**SP101**		Split Core, 100 A CTs - Set of 3
		SP201		Split Core, 200 A CTs - Set of 3
		SP401		Split Core, 400 A CTs - Set of 3
		SP801		Split Core, 800 A CTs - Set of 3
		SP162		Split Core, 1600 A CTs - Set of 3
		SP322		Split Core, 3200 A CTs - Set of 3
		SL050		Solid Core, 50 A CTs - Set of 3
		SC101		Solid Core, 100 A CTs - Set of 3
		SC201		Solid Core, 200 A CTs - Set of 3
		SC401		Solid Core, 400 A CTs - Set of 3
Demand Version			**K**	KWh Version
			D	Demand Version

To see Modifications and Accessories, please visit www. GEMultilin.com.

Publications and Reference: *See Section 21 for a list of additional product-related publications*

EPM 4000 Multi-Point Submetering System

Engineered for Retrofit and New Construction

Key Values

—Revenue classifiable metering
—Meets ANSI C12.1 and C12.16 accuracy
—Wall mountable easy-to-install enclosure
—Local LCD viewing
—Packaged with Current Transformers
—Easy to use energy/demand data logging meter, suitable for new construction or retrofit application
—Low cost, wall mount simple to use. Provides all basic information required for billing purposes.
—Standard Power Line Communication (PLC) over the existing power lines. No additional wiring installation is necessary
—ANSI standard accuracy tested for revenue class certification.
—Single EPM 4000 can simultaneously monitor up to 12 users.
—Save installation costs – Its rugged metal enclosure is designed for fast installation as well as tamper resistance
—Use with Multilin Energy Aggregator package or with third part software using open Modbus protocol over standard RS 485 (optional)

Applications

—Ideal for commercial, residential and industrial sub-metering applications requiring multi-point energy data logging—includes multi-tenant high rise, garden style apartment, condos, or office suites

Monitoring and Metering

—Real-time per-phase viewing of voltage, current, power factor, phase angle, watts, VARs, VA, and frequency
—Event reporting with time and date stamps regarding power consumption, demand resets, power-ups /power downs, and is available via LCD for viewing

User Interface and Programming

—Modbus RS-485 (optional)
—Up to 48 pulse inputs (optional)
—IEC optical front panel interface for programming

Ordering—EPM 4000 Residential (R)

Single-phase 120/208 or 120/240 Volts connections
Residential use measures kWh only (no demand measurement)

PL 4000	*	*	*	*	Description
Application Type	R				Residential - 120/208 or 120/240 Volts single phase
No. of Metering Points for 120/208 Volts System		03			3 Single Phase Metering Points - 120/208 V
		06			6 Single Phase Metering Points - 120/208 V
		09			9 Single Phase Metering Points - 120/208 V
		12			12 Single Phase Metering Points - 120/208 V
for 120/240 Volts System					
		12			12 Single Phase Metering Points - 120/240 V
		18			18 Single Phase Metering Points - 120/240 V
		24			24 Single Phase Metering Points - 120/240 V
CTs			L		0.1 amps CT Secondary input
			H		5 amps CT Secondary input
Voltage				120	120/208 Volts Connection Single Phase Only
				240	240 Volts - Single phase Only

Ordering—EPM 4000 Commercial (C)

Three-phase 120/208, 277/480, or 347/600 Volts connections. Delta optional.
Commercial use measures kWh and kW Demand

PL 4000	*	*	*	*	Description
Application Type	C				Commercial - 120/208, 277/480 or 347/600 Volts three phase
No. of Metering Points		06			6, Three Phase Metering Points
		08			8, Three Phase Metering Points
CTs			L		0.1 amps CT Secondary input
			H		5 amps CT Secondary input
Voltage				120	120/208 Volts Connection 3 Phase Only
				277	277/480 Volts - 3 Phase Only
				347	347/600 Volts - 3 Phase Only

To see Modifications and Accessories, please visit www. GEMultilin.com.

EPM 2000 Power Metering System

Full Featured Metering with Advanced Power Measurement

Key Values

—*Low cost, simple to use meter that provides all basic metering values.*
—*One single part number (PL2000) provides a standard meter with universal system voltage, control power and communication – great for stocking distributor*
—*Open Modbus protocol over standard RS 485 allows easy integration to third party systems*
—*Monitoring of Panels, Main Feeds, Branch Circuits, Gensets and equipment with communications*
—*True RMS measurement of up to 50 electrical parameters*
—*Universal operation - 50 / 60 Hz, user programmable for high, medium or low voltage circuits*
—*DIN Standard 96 x 96 mm size for easy installation in new and retrofit Panels*

Applications

—*Continuous metering of electrical loads such as generator panels, feeders, switchgear etc.*
—*Provides remote status when used with EnerVista suite of software*
—*Low and Medium voltage applications*

Monitoring and Metering

—*Measures 3-phase real-time amps, volts, power, energy, power factor and frequency*
—*Monitors equipment "run hours", "on hours" and interruptions (outages)*

User Interface and Programming

—*Brilliant 3 line LED Display*
—*User selectable Auto Scrolling*
—*Standard RS-485 Modbus communications*

Ordering

PL 2000	**Description**
System Voltage	80 - 270 Vac 100 - 270 Vdc
Input Voltage	48 - 270 VLN 80 - 500 VLL
Communication	Modbus RS 485

Publications and Reference: *See Section 21 for a list of additional product-related publications*

EPM 5200 Power Metering System

Low Cost Multi-Function Power Monitors

Key Values

—Multifunction power meter with high accuracy
—Rugged metal enclosure utility grade construction for panel mounting - fits in standard ANSI cut out
—Large, bright three line LED display visible even in complete darkness
—Economical design, small footprint easy to program and simple to install
—Low cost, simple to use meter that provides all basic metering values.
—Open Modbus protocol over standard RS 485 allows easy integration to third party systems

Applications

—Continuous metering of electrical loads such as generator panels, feeders, switchgear etc.
—Provides remote status when used with EnerVista suite of software
—Low and Medium voltage applications

Monitoring and Metering

—True RMS measurement of up to 80 electrical parameters with ANSI accuracy standards
—Measures 3-phase real-time amps, volts, power, energy, power factor and frequency

User Interface and Programming

—User selectable Modbus or DNP 3.0 protocol communication over RS-485
—KYZ pulse output for PLC and other device interface

Ordering

PL 5200	*	*	*	*	0 0 0 0 0	Description
Voltage Input	**0**					120/208 Volt, 3 Element, 3 voltages, 3 currents, Wye
	1					277/480 Volt, 3 Element, 3 voltages, 3 currents, Wye
	2					120 Volt, 2 Element, 2 voltages, 2 or 3 currents, Open Delta
	3					347/600 Volt, 3 Element, 3 voltages, 3 currents, Wye
Control Power		**A**				95-135 Volt AC Power Supply
		B				100-150 Volt AC/DC Power Supply
		C				24-48 Volt DC Power Supply
Relays			**0**			No Relay Outputs
			1			Three kyz Pulse Outputs
Communication				**A**		No Communications Output
				B		RS-485 Digital Communication w/ Modbus RTU/ASCII, DNP 3.0 Protocol

Accessories

PL 35MNTKT	EPM 5000 Series Mounting Kit

EPM 5300/5350 Basic Power Metering System

Full Featured Metering with Advanced Power Measurement

Key Values

- —3-phase true RMS measurements of voltage, current and power
- —Power quality (THD and K Factor) to 31st order for facility wide power quality monitoring
- —Bidirectional energy measurement with min/max on all electrical parameters
- —Advanced control features for relay activation at user definable set points
- —Communication over RS 485 or built-in Ethernet TCP/IP
- —Rugged metal enclosure utility grade construction for panel mounting - fits in standard ANSI cut out.
- —Large, bright three line (.56" character height) LED display visible even in complete darkness
- —Control Relays can open and close at the pre-programmed (min, max etc) set-points for alarms and notifications.
- —KYZ pulse outputs for energy information to PLCs, RTU and other non digital communication devices.
- —Standard ANSI cutouts for easy installation.
- —Large LED display for great visibility from a distance and low light conditions.
- —Open Modbus protocol over RS 485 or over built in Ethernet TCP/IP allows easy integration to EnerVista or third party systems

Applications

- —Ideal circuit monitoring for main feeds, branch circuits, gensets and equipment
- —Programmable set-point for alarms and control
- —Pulse energy outputs to PLCs for load shedding
- —Panel mount low and medium voltage applications

Monitoring and Metering

- —True RMS measurement of over 80 electrical parameters with ANSI accuracy standards.
- —Measures 3-phase real-time amps, volts, power, energy, power factor and frequency

User Interface and Programming

- —EPM 5300: User programmable Modbus or DNP 3.0 communication over RS-485
- —EPM 5350: Modbus over Ethernet TCP/IP
- —Form C control relays with programmable set-points
- —KYZ pulse output for PLC and other device interfaces
- —Provides remote status when used with EnerVista suite of software

Ordering—EPM 5300 - 3-phase multi-function advanced meter

PL 5300	*	*	*	*	*	0 0 0 0	Description
Voltage Input	0						120/208 Volt, 3 Element, 3 voltages, 3 currents, Wye
	1						277/480 Volt, 3 Element, 3 voltages, 3 currents, Wye
	2						120 Volt, 2 Element, 2 voltages, 2 or 3 currents, Open Delta
	3						347/600 Volt, 3 Element, 3 voltages, 3 currents, Wye
Control Power		A					95-135 Volt AC Power Supply
		B					100-150 Volt AC/DC Power Supply
		C					24-48 Volt DC Power Supply
Relays			0				No Relay Outputs
			1				Two Relay Outputs and One kyz Pulse Output
Communication				A			No Communications Output
				B			RS-485 Digital Communication w/ Modbus RTU/ASCII, DNP3.0 Protocol
Labeling					0		Labeling – Volts V, Amps A, Power kW
					1		Labeling – Volts kV, Amps A, Power MW

Ordering—EPM 5350 - 3-phase multi-function advanced meter with built in Ethernet

PL 5350	*	*	*	A	*	0 0 0 0	Description
Voltage Input	0						120/208 Volt, 3 Element, 3 voltages, 3 currents, Wye
	1						277/480 Volt, 3 Element, 3 voltages, 3 currents, Wye
	2						120 Volt, 2 Element, 2 voltages, 2 or 3 currents, Open Delta
	3						347/600 Volt, 3 Element, 3 voltages, 3 currents, Wye
Control Power		A					95-135 Volt AC Power Supply
		B					100-150 Volt AC/DC Power Supply
		C					24-48 Volt DC Power Supply
Relays			0				No Relay Outputs
			1				Two Relay Outputs and One kyz Pulse Output
Communication				A			Modbus TCP/IP Communication
Labeling					0		Labeling – Volts V, Amps A, Power kW
					1		Labeling – Volts kV, Amps A, Power MW

Accessories

PL 35MNTKT	EPM 5000 Series Mounting Kit

Publications and Reference: *See Section 21 for a list of additional product-related publications*

EPM 6000 Power Metering System

Multi-function Power and Energy Meter

Key Values

—Industry Leading Technology
—High End Meter Performance
—Low End Economical Pricing
—Our Easiest to Use Meter Ever
—0.2% Class Revenue Certifiable Energy and Demand Metering
—Ultra Compact, Easy to Install
—Fits Both ANSI and DIN Cut-Outs

Applications

—Utility Metering
—Commercial Metering
—Substations
—Industrial Metering
—Power Generation
—Campus Metering
—Analog Meter Replacement

Monitoring and Metering

—Multifunction Measurements including Voltage, Current, Power, Freq., Energy, etc.
—Meets ANSI C12.20 (0.2%) and IEC 687 (0.2%) Accuracy Classes
—V-Switch Technology - Field Upgrade without Removing Installed Meter
—% of Load Bar for Analog Meter Perception

User Interface and Programming

—RS485 Modbus Protocol - 57.6K Baud
—3 Line .56" Bright Red LED Display
—IRDA Port for Remote Read

Ordering—EPM 6000

Standard unit with display, all current/voltage/power/frequency/energy counters measurement, % load bar, RS 485 and Irda communication ports

PL 6000	*	Description
Frequency	5	50 Hz AC Frequency System
	6	60 Hz AC Frequency System

Example—EPM 6000 for 60 Hz system with communications: PL60006

EPM 9000 Advanced Power Quality Metering System

High Performance Power Meter and Data Acquisition Node

Key Values

—*High-performance power quality and revenue class metering for critical power applications*
—*EN50160 flicker with up to 512 waveform samples per cycle and high-speed transient recording for complete power quality monitoring*
—*Provides heighten response time to PQ events for diagnostics and maintenance*
—*Built-in GPS clock sync capability for accurate time stamping of events and alarms for complete synchronized system monitoring*
—*Exceeds all ANSI C-12 and IEC 687 specifications for accuracy with auto temperature compensation calibration*
—*Built-in RTU functionality with multiple I/O modules for control*
—*Built-in web server capability to view energy usage and power quality through the web*
—*High Speed Waveform Recording - With up to 16 to 512 samples per cycle resolution. The unit records magnitude and duration of events including the captured waveform. All information is stored in the on-board mass memory.*
—*Software and Hardware Triggers - The meters provides both software and hardware triggers to record waveform events. This allows the unit to be used for fault analysis, system apparatus monitoring and many other applications.*
—*Extensive Harmonics Analysis – This meter provides a real- time harmonic analysis to the 128th order for every channel. This advanced harmonic recording capability has been traditionally available only in high-end power quality recorders. Records THD to the 255th order peak.*
—*Real-Time Phasor Analyzer - The unit monitors phase angles between the voltage and the currents.*
—*Web Server Capability – Data from meters is viewable over the web. Data from the Modbus devices connected to the meter can also be viewed.*
—*Expandable I/O Modules for Analysis and Control*
  —*Add up to 256 I/O points (digital, analog etc) for control and monitoring*

Applications

—*Revenue class metering and load aggregation to efficiently control and manage energy consumption*
—*Transformer loss compensation*
—*High-performance power quality monitoring of critical loads*

Monitoring and Metering

—*Current, voltage, real and reactive power, energy use, cost of power, power factor and frequency*
—*Laboratory grade 0.04% Watt-Hour accuracy harmonic analysis to 255th order*
—*Flicker and waveform recording*
—*Real-time PQ monitoring and analysis*

User Interface and Programming

—*On-board ethernet and web server capability*
—*High-speed RS-485 and RS-232 Com Ports*
—*Multiple protocols including Modbus and DNP 3.0 level 2*
—*Built-in modem with dial-out capability*
—*Multiple analog, digital and relay inputs/outputs*

Ordering—EPM 9450 - High-performance power meter and data acquisition node

PL 9450	*	*	*	A	*	0 0 0 0	Description
Features Options	0						60 Hz
	1						50 Hz
System Voltage		A					120/208 volts connection
		B					270/480 volts connection
Control Power			0				90-276 volts AC/DC power supply
			1				18-60 volts DC power supply
Features Options				A			Basic unit with 512 K memory, 8 digital inputs. 8 cycle of waveform (up to 512 samples/cycle), 176 days data log.
Communications					0		4 communication port. User-selectable RS 485 Modbus and DNP–no modem or Ethernet connection
					1		Web server with TCP/IP Ethernet connection and gateway capability
					2		Internal 56k modem connection with pass-through port

Ordering—EPM 9650 - High-performance power meter and data acquisition node with memory

PL 9650	*	*	*	A	*	0 0 0 0	Description
Features Options	0						60 Hz
	1						50 Hz
System Voltage		A					120/208 volts connection
		B					270/480 volts connection
Control Power			0				90-276 volts AC/DC power supply
			1				18-60 volts DC power supply
Features Options				A			Advance unit = basic unit + 2 MB memory, 288 days data logging, 64 cycles of waveform recording
				B			Flicker = Advance unit plus Flicker, 4 MB memory, 602 days of data logging, 96 waveform event recording
Communications					0		4 communication port. User-selectable RS 485 Modbus and DNP–no modem or Ethernet connection
					1		Web server with TCP/IP Ethernet connection and gateway capability
					2		Internal 56k modem connection with pass-through port

Publications and Reference: *See Section 21 for a list of additional product-related publications*

EPM 9800 Advanced Power Metering System

Precision Measurement, Advanced Communication, Basic PQ and Alarm Reporting, Economical Recording Meter

Key Values

—*Socket-Type High-performance power quality and revenue class metering for critical power applications with MV 90 capability*
—*EN50160 flicker with up to 512 waveform samples per cycle and high-speed transient recording for complete power quality monitoring*
—*Provides heighten response time to PQ events for diagnostics and maintenance*
—*Built-in GPS clock sync capability for accurate time stamping of events and alarms for complete synchronized system monitoring*
—*Revenue class accuracy with auto temperature compensation calibration*
—*Built-in RTU functionality with multiple I/O modules for control*
—*Web server capability to view energy usage and power quality over the web*
—*Multiple communication paths through modem and ehternet with DNP and Modubus.*

Applications

—*Sub station automation using standard utility type socket configuration meter*
—*Revenue class metering and load aggregation to efficiently control and manage energy consumption*
—*High-performance power quality monitoring of critical loads*

Monitoring and Metering

—*Current, voltage, real and reactive power, energy use, cost of power, power factor and frequency*
—*Laboratory grade 0.06% Watt-Hour accuracy harmonic analysis to 255th order*
—*Flicker and waveform recording*
—*Real-time PQ monitoring and analysis*

Protection and Control

—*Fully programmable set-points for alarms and 90 millisec relay activation for highspeed updates and control*
—*Built-in PLC and RTU functionality with complete range of expandable external I/Os*

User Interface and Programming

—*On-board ethernet and web server capability*
—*High-speed RS-485 Port*
—*Multiple protocols including Modbus and DNP 3.0 level 2*
—*Built-in modem with dial-out capability*
—*Multiple analog, digital and relay inputs/outputs*

Ordering

To order please go to www.GEMultilin.com

Accessories

Complete Line of Instrument Transformers

Key Values

—Complete line of both low and medium voltage instrument transformers up to 34.5KV
—In-house custom design, application and manufacturing to meet specific needs
—Cores made from cold rolled, high permeability grain orientated silicon steel, with grain oriented in direction of magnetic flux to ensure low losses and high accuracy
—All 5 to 34.5 KV instrument transformers are partial discharge tested to ensure long insulation life
—All transformers are tested in accordance with industry standards such as IEEE, IEC, UL, BS, CSA and JIS
—On line e-catalog to simplify product selection www.GEMultilin.com
—Complementary line of protection relays, digital meters, switches and terminal blocks also available from GE Multilin.

Product Summary and Applications

—Current Transformers
—Split Core Current Transformers
—Auxiliary Current Transformers
—Three Phase Current Transformers
—Bushing Current Transformers
—Ground Fault Sensors
—Voltage Transformers
—Control Power Transformers
—Control and Test Switches
—Single function relays

Split Core Current Transformers

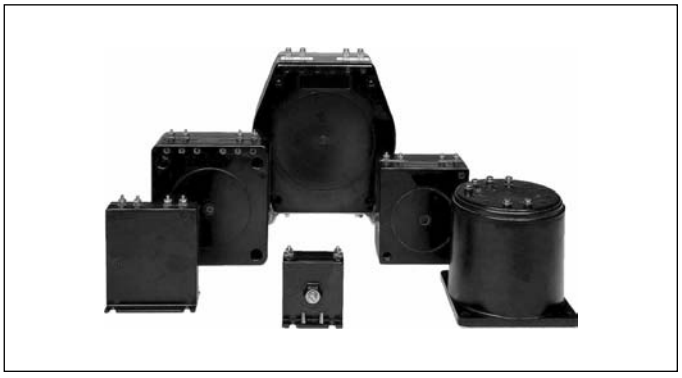
Applications

—Energy management
—Load surveys
—Sub metering

Features

—Window sizes from 0.75 x 0.75 to 12 x 30 inches
—Ratios from 100:5A to 10,000:5A
—Voltage output available
—Weather proof model available
—UL Recognized and CSA Approved

Auxiliary Current Transformers



Applications

—Designed for use in the secondary of main current transformers to change the ratio for metering applications

Features

—Several models available
—Wound primary up to 50A
—ANSI metering and relay class
—Summation CT's up to six secondaries
—UL Recognized and CSA Approved

Publications and Reference: See Section 21 for a list of additional product-related publications

Accessories

Complete Line of Instrument Transformers

Three Phase Current Transformers

Applications

—Three phase metering and motor overload protection

Features

—Several models available
—Saves space and reduces installation time
—Zero sequence core in the same package available for most models
—Ratios from 50:5A to 4000:5A
—UL Recognized and CSA Approved

Current Transformers

Applications

—For use with ammeters in panelboards, control panels and engine generators

Features

—Wide range of window sizes
— Ratios 50:5A to 2000:5A
—IA secondaries are available
—Supplied with leads or terminals
—Integral feet or mounting brackets available
—UL Listed and CSA Approved

Current Transformers

Applications

—For metering and relaying applications in low voltage switchboards, switchgear and motor control

Features

—Wide range of window sizes
—Ratios 50:5A to 6000:5A
—IA secondaries are available
—Supplied with leads or terminals
—Multi ratios model available
—Designed to meet IEEE C57. 13 - 1993
—UL listed and CSA Approved

Current Transformers

Applications

—Designed for specific mount applications in medium voltage switchgear

Features

—Wide range of window sizes
—Ratios 50:5A to 6000:5A
—1 Amp secondaries are available
—Multi ratios model available
—Designed to meet IEEE C57. 13 - 1993
—UL listed and CSA Approved

Accessories

Complete Line of Instrument Transformers

Molded Cast Current Transformers

Applications

—Designed for indoor service for current measurements with ammeters, wattmeter, varmeter and power factor meter

Features

—IEC accuracy class 0.5 , 1.0 and 3.0
—5A or IA inputs available
—Primary rating 50A to 3000A
—Molded polycarbonate case
—CE Marked

Ground Fault Sensors

Applications

—To sense zero sequence ground fault currents

Features

—Window sizes up to 30x 10 inches are available
—Ratios 50:5A and 100:5A
—Special ratios and physical sizes built to customer specifications
—UL Recognized and CSA Approved

Ground Fault Sensors Type HGF

Applications

—Designed to match the ground fault input of GE Multilin Motor Management Relays

Features

—Window sizes 3.75" , 5.75" or 8.13"
—Ratios 50:0.025A 60 Hz
—IEC versions also available
—UL and cUL
—Other modules for zero sequence applications are available

Voltage Transformers

Applications

—For single phase voltage measurement in AC power system

Features

—Molded plastic cases
—Integral fuses available on some models
—Designed to meet IEEE C57.13 -1993
—50Hz design available
—UL Recognized and CSA Approved

Publications and Reference: *See Section 21 for a list of additional product-related publications*

Accessories

Complete Line of Instrument Transformers

Voltage Transformers

Applications

—For three phase voltage measure in AC power system

Features

—Molded plastic cases
—Integral fuses available on some models
—Designed to meet IEEE C57.13 -1993
—50Hz design available
—UL Recognized and CSA Approved

JVA Voltage Transformers

Applications

—Designed for outdoor service , generating meter instruments and relays
—Utility metering

Features

—Housed in a plastic case
—Compression type terminals
—50Hz design available
—Transparent plastic terminal covers
—Engraved aluminum nameplate
—Designed to meet IEEE C57.13 -1993

Current Transformers

Applications

—Designed for pad mount application used for operation of meters and instruments
—Utility metering

Features

—Designed for outdoor use
—Housed in molded plastic case
—Compression type terminals
—Window size 4.50" x 3.50"
—Ratio's 100:5A to 3000:5A

Current Transformers

Applications

—Designed for operation of meters and instruments
—Utility metering

Features

—Designed for outdoor service
—Encapsulated in polyurethane resin
—Compression type terminals
—Rations from 100:5A to 800:5A
—Dual ratio models available
—Engraved aluminum nameplate

Accessories

Complete Line of Instrument Transformers

Current Transformers

Applications

—Designed for operation of meters and instruments
—Utility metering

Features

—Designed for outdoor service
—Housed in a molded plastic case
—Compression type terminals
—Ratios from 200:5A to 4000:5A
—Dual ratio models available
—Engraved aluminum name plate

Cast Resin Unit

Applications

—For use over bushings of power transformers and dead tank circuit breakers
—For metering and relaying applications

Features

—Indoor or outdoor service
—600 class to IEEE C57.13 - 1993
—Ratios 600:5A to 3000:5A
—Single and multi ratios available
—Stainless steel nameplate
—Optional ground shield available

Taped Unit

Applications

—Designed to customers specifications for metering and relaying applications
—High voltage circuit breakers and power transformers

Features

—600 class to IEEE C57.13 - 1993
—Single and multi ratios designs available
—Leads or terminals available
—Designs for use in oil are available

Board Mounted Unit

Applications

—Designed for mounting and stacking over the bushings of large generators
—For metering and relaying applications

Features

—Ratios from 5000:5A to 40,000:5A
—1 Amp secondaries and IEC design available
—Board mounted and cast units available
—600V class 50 or 60Hz
—Shield winding available over 10,000A

Publications and Reference: See Section 21 for a list of additional product-related publications

Accessories

Complete Line of Instrument Transformers

Voltage Transformers

Applications

—Indoor voltage transformer for metering and relaying applications in AC power systems

Features

—Vacuum cast using polyurethane resin
—Designed to meet IEEE C57.13 - 1993
—5KV to 34.5KV with BIL rating up to 200KV
—UL Recognized and CSA Approved

Current Transformers

Applications

—Indoor current transformer for metering and relaying applications in AC power systems

Features

—Vacuum cast using polyurethane resin
—Designed to meet IEEE C57.13 - 1993
—5KV to 34.5KV with BIL rating up to 200KV
—UL Recognized and CSA Approved

Cast Coil Transformers

Applications

—To provide control power in medium voltage switchgear and control
—Generator neutral grounding transformer

Features

—Vacuum cast using epoxy resin
—Single and three phase rating 0.5 to 225KVA
—Voltage rating 5 to 34.KV and BIL Rating to 170KV
—Horizontal and vertical mounting options on some models

Accessories

Complete Line of Control Switches

Series 95 Heavy Duty Rotary Switches

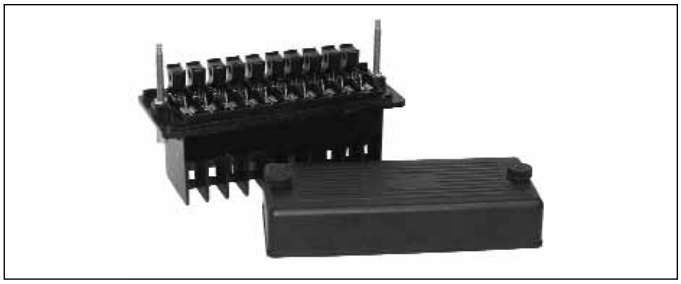
Applications

—Circuit breaker control switches
—Ammeter/voltmeter selector switches
—Lock-out relays

Features

—Self cleaning silver plated contacts
—Standard 3 - hole mounting
—Pull -to - lock mechanism available
—Continuous 600v 30A rating
—UL Recognized and cUL

FT Test Switch



Applications

—Multi-circuit testing of switchboard relays, meters and Instruments

Features

—Semi-flush panel mounting
—Mounting base and cover
—Up To 10 Individual knife blade switches
—Clear cover and colored handles available
—UL Recognized and cUL

SB-1 Control and Transfer Switches

Applications

—Control of electrically operated circuit breakers, valves, motors, etc.

Features

—Transfer current and potential to instruments and relays
—Standard mounts on panels up to 3/16" (up to 2" available)
—Up to 16 stages (32 contacts)
—Tandem mechanisms available
—Yale lock or locking handle available
—Silver to silver positive wiping action contacts
—Rated 600 V, 20 A continuous (250 A for three seconds)
—Palladium contacts for low levelinstrument circuits available
—Pull-to-lock and pull-to-turn actions available
—Up to 12 positions, 360° rotation
—Four types of escutcheons (switch face plates)
—Eight types of fixed handles (black only)
—Three types of removable handles
—Maintained or spring return switch action
—NEMA 1 cover
—UL recognized

SB-9 Master Control Switches

Applications

—Steel mills, petroleum/chemical plants, power plants, heavy industries
—Repetitive positive positioning operation (thousands/week)

Features

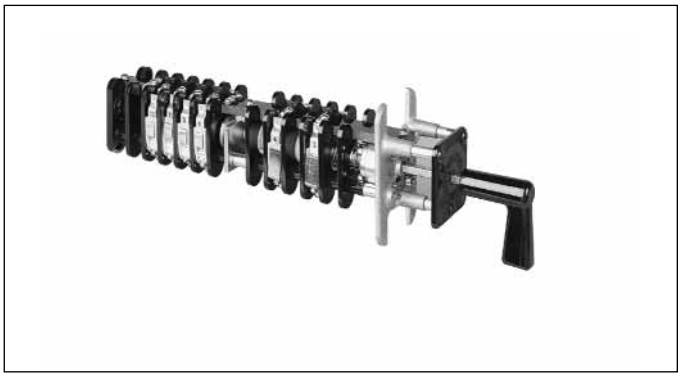
—Standard mounts on panels up to 3/16" (up to 2" available)
—Up to 16 stages (32 contacts)
—Tandem mechanisms available
—Yale lock or locking handle available
—Silver to silver positive wiping action contacts
—Rated 600 V, 20 A continuous (250 A for three seconds)
—Palladium contacts for low level instrument circuits available
—Pull-to-lock and pull-to-turn actions available
—More positive positioning than SB-1
—Better insulation to ground than SB-1
—More substantial bearings than SB-1
—Up to 12 positions, 360° rotation
—Four types of escutcheons (switch face plates)
—Eight types of fixed handles
—Three types of removable handles
—Maintained or spring return switch action
—NEMA 1 cover
—UL recognized

Publications and Reference: *See Section 21 for a list of additional product-related publications*

Accessories

Complete Line of Switches

SB-10 Control and Transfer Switches



Applications

—Control of electrically-operated circuit breakers, valves, motors, etc.
—Transfer current and potential to instruments and relays

Features

—Lateral action eliminates second separate switch
—Two electrically separate and mechanically independent switches in one device
—Standard mounts on panels up to 3/16" (up to 2" available)
—Up to 12 stages (24 contacts) of rotary contacts (includes lateral and rotary)
—Up to four stages (eight contacts) of lateral contacts (in-out action)
—Lateral action interlock with rotary position available
—Tandem mechanisms available
—Yale lock above handle available
—Silver to silver positive wiping action contacts
—Rated 600 V, 20 A continuous (250 A for three seconds)
—Palladium contacts for low level instrument circuits available
—Up to 12 rotary positions, 360° rotation
—Three escutcheons types (switch face plates)
—Seven types of fixed handles
—Maintained or spring return switch action
—NEMA 1 cover
—UL recognized

SBM Control and Transfer Switches

Applications

—Control of electric-operated circuit breakers, valves, motors, etc.
—Transfer current and potential to instruments and relays

Features

—Limited space applications
—Compact design
—Up to 10 stages (20 contacts)
—Double surface cams (one cam per contact)
—Add-a-stage feature for adding up to two stages
—Electrically separate and mechanically independent double-break contacts
—Standard mounts on panels up to 1/4" (up to 1.5" available)
—Rated 600 V, 20 A continuous
—Silver to silver positive wiping action contacts
—Pull-to-lock action available
—Up to eight positions, 360° rotation
—Three types of escutcheons (switch face plates)
—Eight types of fixed handles
—Three types of removable handles
—Handles to match SB-1 available
—Maintained or spring return switch action
—UL recognized

Accessories

Test Equipment
Terminal Blocks
Indicating Lights

Test Equipment

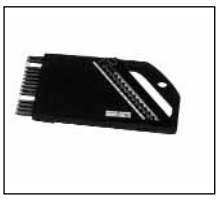
515 Blocking and test module
—Provides an effective means of trip blocking, relay isolation, and testing of protective relays

PK-2 Test blocks and plugs
—Facilitates the testing of AC instruments, meters and relays

XCA Test probes and plugs
—Test probes and plugs for C-case drawout relays

XLA Test plugs
—Test plugs for drawout relays

XTM Test plugs, card extenders and bracket kits
—Test and mounting accessories for modular relays and communication sets



Terminal Blocks

116B407 Pullout fuse blocks
—Class J pullout blocks, available in two or three-fuse modes

EB-25, EB-26, EB-27, IKU Terminal blocks for connecting leads
—EB-25 is equipped with washerhead binding screws
—EB-26 has clamp type connectors
—EB-27 has short circuit strips instead of a marking strip

EB-1 Terminal block
—Used where a high current rated block is required
—Rated for 600 V – 100 A circuits

EB-2 Terminal block
—Used where a high current rated block is required
—Rated for 600 V – 100 A circuits

EB-4 Terminal board
—Provided with 2, 4 or 6 points
—Rated for 600 V – 30 A circuits

Indicating Lights

ET-16 Incandescent indicating light
—Various voltages and color caps available

ET-17 Neon indicating light
—Various voltages and color caps available

ET-16 LED Light emitting diodes (LEDs)
—Various voltages, LED colors and color caps available

Publications and Reference: *See Section 21 for a list of additional product-related publications*

Communications

Communication Multiplexers

A full suite of optical networking solution capabilities the include substation teleprotection, telemetry, security, control for applications including utility, transportation and oil and gas, multiplexer communications, control and general telecommunications. VistaNET, manages the complete solution from optical transmission to individual application services.

Teleprotection products include:
—JungleMUX SONET Multiplexer System
—TN1U SDH Multiplexer System
—TN1Ue SDH Multiplexer System

Other Communication Devices

MultiInet Serial-to-Ethernet Converter
—Serial-to-Ethernet Converter
—Ethernet communications made simple for any GE Multilin IED

FAC 1000/2000 Fiber Multiplexer
—Multiplexer with RS232 or fiber optic input.
—Multiplexer with RS232 or fiber optic input, for fiber optic communication with up to 24 devices.

F485 Communication Converter
—Isolated RS232 to RS485 to fiber optic converter.
—The F485 is a self-contained device for converting between RS232, RS485 and fiber optic signals.

EnerVista Software and Automation Projects

EnerVista Software

GE Multilin offers a full line of Device Configuration, System Monitoring, Communications, and Reporting Software to simplify every aspect of using GE Multilin Devices.

Automation Projects

GE Multilin offers complete solutions that use our team of specialized integrators to install and configure all of our hardware and software offerings into a complete Power Automation System.

Publications and Reference: *See Section 21 for a list of additional product-related publications*

EnerVista Software

Industry-leading Suite of Software Tools to Manage Your Relays and Meters

The EnerVista suite simplifies every aspect of working with GE Multilin relays and meters or other third party devices. The software suite consists of tools that aid in streamlining processes such as creating and validating settings files, integrating GE Multilin or other devices into Automation systems, and monitoring and controlling protected equipment.

Use EnerVista to Simplify Your Workflow Processes

Software Suite

The EnerVista software suite includes:

Launchpad
Setup and
Document Management

Viewpoint
Premium Monitoring
and Engineering Toolsets

Integrator
Powerful
OPC/DDE Server

Aggregator
Energy Cost Allocation
and Billing Application

EnerVista Software—Launchpad

Software for Simple Relay and Meter Setup and Document Management

EnerVista Launchpad provides a full set of powerful relay and meter setup and support tools. Also included are document management and automatic updating features that notify you of important releases. EnerVista Launchpad aids in increasing productivity by keeping your support documents and application software tools up-to-date and at your fingertips.

What's Included

—Set up any GE Multilin Device from one application
- —Intuitive Graphical Interface
- —Quick Connect Communications
- —Off-line Settings Management
- —Copy and Paste Settings Files
- —On screen Phasor Diagrams

—Manage your support document and software tools–all of your support documents in a single desktop library
- —Manuals
- —Drawings
- —Application Notes
- —Service Bulletins
- —Firmware Updates
- —FAQs
- —Guideform Specs
- —Brochures

Receive Automatic Notification and Software Tools

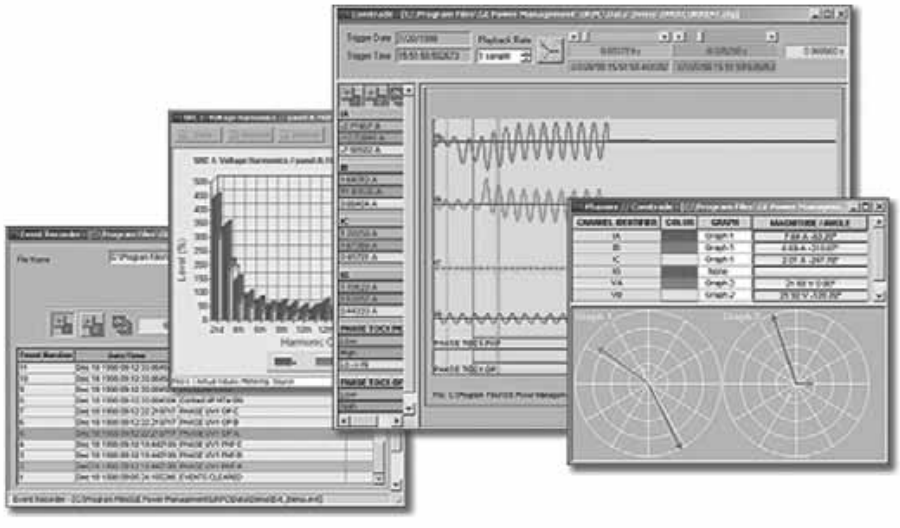
—Alerts of new releases as soon as they become available
—E-mail Notification
—Automatic Downloads

Analyze Device Data to Diagnose Faults

EnerVista's software allows you to download and analyze captured waveforms, phasors diagrams and sequence of events and perform harmonic analysis for all relays.

Single Point of Entry to Protection, Control, and Metering Devices

Easily upload and download entire setting files directly to all your devices



Publications and Reference: *See Section 21 for a list of additional product-related publications*

EnerVista Software—Viewpoint

Premium Monitoring and Engineering Toolsets

A Premium Workflow Toolset for your GE Multilin Devices.

EnerVista Viewpoint can simplify each step of using GE Multilin Devices from designing the protection and control logic to commissioning the relays and real-time monitoring and troubleshooting of your relays or system.

Two EnerVista Viewpoint Packages to Streamline Your Job Function

Viewpoint has two options available that contain tools that are tailored directly for the different job functions using GE Multilin products. Each software package performs different roles that will empower Engineers, Maintenance Staff and Operators to perform their everyday tasks more efficiently.

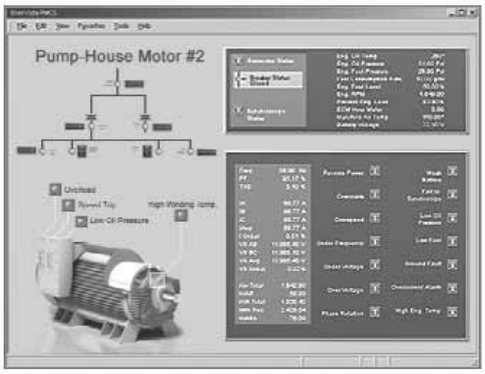
EnerVista Viewpoint Monitoring
Easy to Use Monitoring and Data Recording for Small Systems

- —Create Single-Line Diagrams, Annunciator Panels, and Trending reports in minutes
- —Automatic retrieval of Waveforms and Events
- —Pre-Configured Monitoring Screens (Metering, Breaker Status, Power Analysis etc.)
- —Monitor 25 devices with up to 3000 points
- —Full library of all GE Multilin Devices, EPM Meters and MicroVersa Trip Units

Note: Full list of all supported devices can be viewed at: www.multilin.com/enervista/SupportedDevices

EnerVista Viewpoint Monitoring Selection Guide

Description	Product Number
Single License	VP-1
Five Pack License	VP-5
Ten Pack License	VP-10
Upgrades	VP-S-1



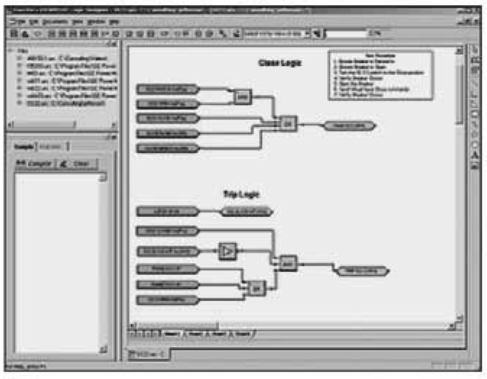
Viewpoint Monitoring

EnerVista Viewpoint Engineer
Tool for Control Logic Creation, Simulation Testing, and Commissioning

- —Graphical FlexLogic Designer simplifies creating complex UR Control Schemes
- —Global COMTRADE Viewer allows analysis of waveforms captured in any GE Multilin Device
- —Protection Simulation tools predict the outcome of commissioning tests
- —Engineering Reports verify that settings will perform as desired:
  - —Element Report
  - —Peer-to-Peer Connectivity Report

EnerVista Viewpoint Engineer Selection Guide

Description	Product Number
Single License	VPE-1
Five Pack License	VPE-5
Ten Pack License	VPE-10
Upgrades	VPE-S-1



Viewpoint Engineer

EnerVista Software—Integrator

Powerful OPC/DDE Server Makes Device Integration Into Your System Easy

EnerVista Integrator enables you to seamlessly integrate data from your GE device into a new or existing automation system. With EnerVista Integrator, you receive pre-configured memory maps and mnemonics for all GE Multilin devices[1], reducing the time and effort required to import essential data into your applications.

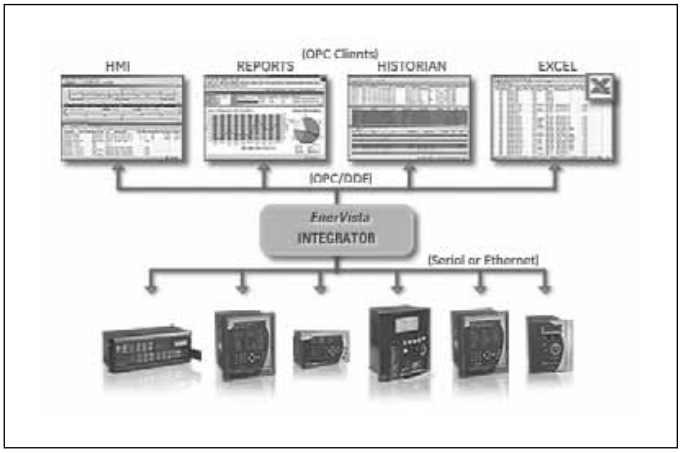
[1]*Full list of all supported devices can be viewed at: www.multilin.com/enervista/SupportedDevices*

EnerVista Integrator can bridge GE Multilin device data into the following applications:

—*HMI/SCADA (Cimplicity, WonderWare, PanelMate – Cutler Hammer, RSView, Rockwell etc.)*
—*DCS systems (PlantScape, DeltaV, Symphony)*
—*Database Historians (Aspen, PI Historian)*
—*Reporting Software (MS Office Tools)*

Quickly Connect Multiple Applications to Your Devices

The server connects and manages multiple devices using one or more communication channels. Each read and write command to the devices is optimized for maximum throughput. This approach allows multiple clients to connect and effectively use the resources of the server.



This software simplifies the integration of both Ethernet or Modbus RTU devices into your system with the following functionality:

—*Retrieving data from any Modbus compatible device (Current, Volts, Energy, Demand etc.)*
—*Sending real-time commands to any device in your system (Close/Open Breaker)*
—*Automatically download all events and waveforms from any GE device. Full list of all supported devices can be viewed at: www.multilin.com/enervista/SupportedDevices*
—*Ability to communicate with up to 400 devices simultaneously*
—*Capability of adding customized memory maps of other Modbus compatible devices*

EnerVista Integrator Software Selection Guide

Description	Product Number
1000 Point License OPC/DDE Server, Waveform and Event Server	EVI-1000
5000 Point License OPC/DDE Server, Waveform and Event Server	EVI-5000
30000 Point License OPC/DDE Server, Waveform and Event Server	EVI-30000

EnerVista Integrator Add-on Packages

Description	Product Number
30000 Point Integrator License Cimplicity Development License	PLCMPLWIZG01
30000 Point Integrator License Cimplicity Runtime License	PLCMPMODBRTG01
Cimplicity HMI Runtime Viewer	PLCMPLVIEWERG01
Cimplicity Webview Single User License	PLCMPWEBVIEW01
Cimplicity Webview 5 Pack User License	PLCMPWEBVIEW05
Cimplicity Webview 10 Pack User License	PLCMPWEBVIEW10

Publications and Reference: *See Section 21 for a list of additional product-related publications*

EnerVista Software—Energy Aggregator

Energy Cost Allocation and Billing Application

EnerVista Energy Aggregator will monitor, log, and profile the energy consumption for all of the different locations in your facility. Once the data is collected, Energy Aggregator will calculate the total cost of energy to your business on an individual location basis or an accumulated site or grouped area. The rate structure applied to the consumed energy is fully programmable by the user.

With Energy Aggregator You Can:

- —Monitor and Track energy consumption for all parts of your facility
- —Assign a rate structure and calculate cost of energy for different departments or tenants
- —Compare calculated energy costs with billing received from the utility
- —Perform load profiles on all of the different locations or equipment within your facility

How It Works

1. Meters generate data on energy consumed

2. EnerVista Energy Aggregator collects and stores data from meters

3. EnerVista Energy Aggregator generates reports on energy consumption and totalizes energy costs

For a complete list of supported meters see: www.multilin.com/enervista/SupportedDevices

Configurable Billing and Report Generation

- —Apply customized Simple or Complex rate structures to captured energy data
- —Provide energy bills for the various departments or tenants in your facility
- —Automatically generate energy cost and usage reports for any customized time periods

EnerVista Energy Aggregator Selection Guide

Description	Product Number
Energy Aggregator with 5 User Licenses	PLENANG-599
Energy Aggregator with 20 User Licenses	PLENANG-2099

EnerVista Automation Projects

Complete Solutions Customized to Your Power Management System

GE Multilin offers complete Automation Systems for all of your Power Monitoring, Control, Energy Budgeting, and Data Acquisition needs. Our experts identify your specific system requirements and install and integrate all of the necessary hardware and software for you into a completely customized power management system.

Save Time and Resources, by Benefiting from Our Expert Automation System Offerings

Automation Projects include:

—A dedicated Project Manager who understands your needs and ensures all of your specified requirements are met on schedule

—Factory Trained Engineers will install and configure all necessary hardware, and customize all of your Single-Line Diagrams, Alarming Functions, and Power System Controls

—All your requirements interfaced into an easy-to-use system that will simplify all of your Power Automation needs

—Training on system architecture, hardware devices, and operating procedures of the system application

Complete Automation Systems that GE Multilin offers include:

Power Management Control Systems

—Integrated complete automation system tailored specifically to your individual control and power analysis needs

—Complete Monitoring and Control of a facility Power System such as load shedding and automatic transfer schemes

—Customized Alarming, entire Site Mounting, Animated Graphical Displays, Automatic Data Collection, Power Quality Analysis and much more

—Automation of facilities protected and monitored by up to 400 meters and relays with up to 35,000 points of information

Energy Cost Allocation System

—Monitor, aggregate and track costs associated with your facility's energy consumption

—Load profile energy consumption

—Compare utility billing with actual energy used

—Track direct energy costs for individual departments or tenants

—Installation of all necessary metering devices

—System configured to provide reports indicating your energy consumption and energy costs for customized time periods

Compact Monitoring System

—Power Monitoring and Data Collection System

—Customized Single-Line Monitoring, System Alarming, Trending Reports and Automated Device Event and Waveform Collection

—Graphical, easy-to-navigate system tailored to monitor, log and alarm all important energy data

—Typical compact systems contain up to 25 relays and meters with up to 3000 points of information

All systems build upon each other and be upgraded very easily with no loss of capital investment.

Publications and Reference: *See Section 21 for a list of additional product-related publications*

NOTES: