MULTILIN C30

Substation Hardened Programmable Logic Controller

The Multilin™ C30 controller system is a substation hardened device designed to perform substation control logic that can also expand the I/O capability of protection devices and replace existing SOE recorders. The C30 provides fast and deterministic execution of programmable logic with I/O capabilities far above an average protection relay.

Graphical programming tools, supported by a library of logic operators, make the C30 simple to use and configure. Using high-speed peer-to-peer communications for inter-device messaging, the C30 can also accept signals and commands from other protection and control devices at a fraction of the cost of hard-wiring these signals.

Key Benefits

- Powerful and deterministic programmable logic suitable for creating most customized automated substation control solutions
- Modular hardware architecture allowing for flexibility in the I/O configuration to support most bay management applications
- Reduced bay or station wiring through the use of high-speed peer-to-peer communication for sending and accepting control commands from other relays
- Simplified system integration and access to information through the use of multiple communication options and protocols not found in industrial grade PLCs
- An integrated large, full color display, provides real-time visualization and control of the protected bay, via a bay mimic as well as annunciator functionality and graphical visualization of phasors
- Advanced IEC 61850 Ed. 1 and Ed. 2 certified implementation, complete settings via SCL files and IEC 61850-9-2 process bus solution ensures interoperability, device managing optimization and reduced cost of ownership
- Routable GOOSE (R-GOOSE) enables GOOSE messages going beyond the substation, which enables wide area protection and control applications
- Increased network availability via failover time reduced to zero through IEC® 62439-3 "PRP" support
- Supports latest edition of waveform capture (COMTRADE 2013) simplifying fault records management

Applications

- Bay control and substation automation
- Programmable logic control
- UR I/O expansion
- Sequence of Events (SOE) recorder replacement

Protection and Control

- Programmable logic, timers, counters
- Distributed logic, remote I/O expansion
- User-definable protection elements
- Up to 120 contact inputs and 72 contact outputs in one device
- Transducer I/Os (RTD, DCmA)
- High density inputs/outputs to support the control of many switchyard assets – all from one powerful device
- Integrated large, full color display, for real-time visualization and control of the protected bay

Advanced Communications

- 3 independent Ethernet ports for simultaneous & dedicated network connections with IEEE 1588 support
- Supported industry protocols: IEC 61850, SFTP, MMS File Transfer Service, DNP 3.0, Modbus Serial/ TCP, IEEE 1588, IEC 60870-5-104 and 103, PRP, SNTP, HTTP, TFTP
- Direct I/O: secure, high-speed exchange of data between UR relays for Direct Transfer Trip and I/O extension applications
- IEC 61850-9-2 process bus support

Cyber Security

- CyberSentry™ provides high-end cyber security aligned to industry standards and services (NERC® CIP, AAA, Radius, RBAC, Syslog)

Monitoring & Metering

- Advanced recording capabilities with high-capacity event recorder, configurable and extended waveform capture and data logger
- Metering: current, voltage, power, energy, frequency, and harmonics

GE VERNOVA

Protection and Control

As part of the UR family of Protection & Control devices, the Multilin C30 offers a high degree of modularity in its design and functionality, providing superior performance while meeting the toughest requirements of the marketplace. Control, automation, I/O expansion and data gathering are ideally suited for the C30 in the following applications:

- Bay control
- Substation automation
- Remote I/O

Advanced Automation

The C30 incorporates advanced automation features including powerful FlexLogic™ programmable logic, peer-to-peer communications and SCADA capabilities that far surpass what is found in the average PLC or controller. The C30 integrates seamlessly with other UR relays to extend the I/O capabilities and perform complete bay management and control.

FlexLogic

FlexLogic is the powerful UR-platform programming logic engine that provides the ability to create customized protection and control schemes minimizing the need and the associated costs of auxiliary components and wiring. The execution of all 1024 lines of FlexLogic is performed every 2ms regardless of the complexity or amount of logic used, providing the determinist operation required for utility power system control schemes.

Scalable Hardware

The C30 is available with a multitude of I/O configurations to suit the most demanding application needs. The expandable modular design allows for easy configuration and future upgrades.

- Flexible, modular high density I/O covering a broad range of input signals and tripping schemes
- RTDs and DCmA inputs are available to monitor equipment parameters such as temperature and pressure

IEC 61850 Process Bus

The IEC 61850 Process Bus module is designed to interface with the Multilin HardFiber System, allowing bi-directional IEC 61850 fiber optic communications. The HardFiber System is designed to integrate seamlessly with existing UR applications, including protection functions, FlexLogic, metering and communications.
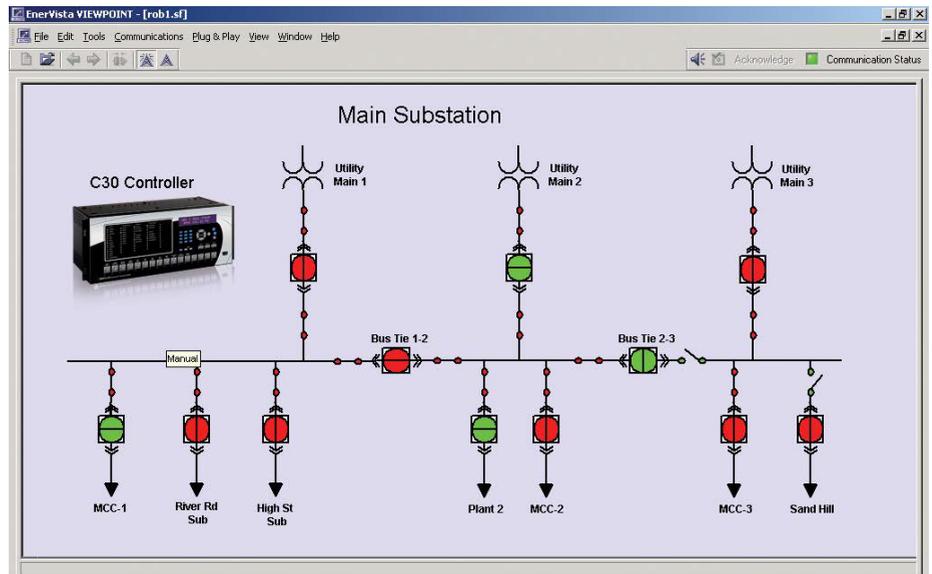
The C30 is a complete solution for controlling and monitoring substation devices and can easily be connected directly into DCS or SCADA monitoring and control systems like Viewpoint Monitoring as shown.

The Multilin HardFiber System offers the following benefits:

- Communicates using open standard IEC 61850 messaging
- Drastically reduces P&C design, installation and testing labor by eliminating individual copper terminations
- Integrates with existing C30's by replacing traditional CT/VT inputs with the IEC 61850 Process Bus module
- Does not introduce new cyber security concerns

Visit the HardFiber System product page on the Grid Solution web site for more details.

Monitoring and Metering

The C30 provides high resolution measuring of the status of external devices wired to its contact inputs. The changing of a contact input status can be measured and time-stamped with a 0.5ms resolution, making the C30 ideal for bay or substation SOE recording.

Fault and Disturbance Recording

The advanced disturbance and event recording features within the C30 can significantly reduce the time needed for postmortem analysis of power system events and the creation of regulatory reports.

Advanced Device Health Diagnostics

The C30 performs comprehensive device health diagnostic tests at startup and continuously during run-time to test its own major functions and critical hardware. These diagnostic tests monitor for conditions that could impact security and availability of protection, and present device status via SCADA communications and front panel display. Providing continuous monitoring and early detection of possible issues help improve system uptime.

Cyber Security – CyberSentry UR

CyberSentry™ is a software option that delivers wide range of cyber security features that help customers to comply with NERC CIP, NIST® IR 7628, IEC 62351 and IEC 62443 cyber security requirements and standards. Additionally secure FW upgrade is granted through UR Setup's digital signature validation capabilities. This software option delivers the following core features:

AAA Server Support (Radius/LDAP)

Enables integration with centrally managed authentication and accounting of all user activities and uses modern industry best practices and standards that meet and exceed NERC CIP requirements for authentication and password management.

Role Based Access Control (RBAC)

Efficiently administrate users and roles within UR devices. The new and advanced access functions allow users to configure up to five roles for up to eight configurable users with independent passwords. The standard "Remote Authentication Dial In User Service" (Radius) is used for authentication.

Event Recorder (Syslog for SEM)

Capture all cyber security related events within a SOE element (login, logout, invalid password attempts, remote/local access, user in session, settings change, FW update, etc), and then serve and classify data by security level using standard Syslog data format. This will enable integration with established SEM (Security Event Management) systems.

Communications

The C30 provides advanced communications technologies for remote data and engineering access, making it easy and flexible to use and integrate into new and existing infrastructures. Direct support for fiber optic Ethernet provides high-bandwidth communications allowing for low-latency controls and high-speed file transfers of relay fault and event record information. The available three independent Ethernet ports, redundant Ethernet option and the embedded managed Ethernet switch provide the means to create fault tolerant communication architectures in an easy, cost-effective manner without the need for intermediary communication hardware.

The C30 supports the most popular industry standard protocols enabling easy, direct integration into DCS and SCADA systems.

- IEC 61850 Ed. 1 and Ed. 2 with 61850-9-2 and 61850-90-5 support
- DNP 3.0 (serial & TCP/IP)
- Ethernet Global Data (EGD)
- IEC 60870-5-103 and IEC 60870-5-104
- Modbus RTU, Modbus TCP/IP
- HTTP, TFTP, SFTP and MMS file transfer
- IEEE1588 and redundant SNTP for time synchronization
- PRP as per IEC 62439-3
- IEC61850 GOOSE, Routable GOOSE and legacy UCA fixed GOOSE

Interoperability with Embedded IEC 61850 Ed. 1 and Ed. 2

The new IEC 61850 implementation in the UR Family positions GE Vernova as an industry leader in this standard:

- Implements, user selectable, Ed. 1 and Ed. 2 of the standard across the entire UR Family
- Provides full relay setting management via standard SCL files (ICD, CID and IID)
- Enables automated relay setting management using 3rd party tools through standard file transfer services (MMS and SFTP)
- Increases the number of Logical Devices and data mapped to them, GOOSE messages from up to 64 remote devices, and reports to support different organizational needs for data transfer and reduce dependency on generic logical nodes
- Configures GE Vernova Systems based on IEC 61850 using universal 3rd party tools
- R-GOOSE enable customer to send GOOSE messages beyond the substation, which enables WAPC and more cost effective communication architectures for wide area applications

Direct I/O Messaging

Direct I/O allows for the sharing of high-speed digital information between multiple UR relays via direct back-to-back connections or multiplexed through a standard DS0 multiplexer channel bank. Regardless of the connection method, direct I/O provides continuous real-time channel monitoring that supplies diagnostics information on channel health.

Direct I/O provides superior relay-to-relay communications that can be used in advanced interlocking, generation rejection and other special protection schemes.

- Communication with up to 16 UR relays in single or redundant rings rather than strictly limited to simplistic point-to-point configurations between two devices
- Connect to standard DS0 channel banks through standard RS422, G.703 or IEEE C37.94 interfaces or via direct fiber optic connections
- No external or handheld tester required to provide channel diagnostic information

LAN Redundancy

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

Multi-Language

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

EnerVista Software

The EnerVista suite is an industry-leading set of software programs that simplifies every aspect of using the C30 relay. The EnerVista suite provides all the tools to monitor the status of the protected asset, maintain the relay, and integrate information measured by the C30 into DCS or SCADA monitoring systems. Convenient COMTRADE and SOE viewers are an integral part of the UR setup software included with every UR relay, to carry out postmortem event analysis and ensure proper protection system operation. UR Setup also provides an export/import setting file tool which allows customer to transfer specific settings from one file to another. This tool also provides comprehensive setting file comparison. These features, together with UR single setting file, help users to simplify their setting file management experience.

EnerVista Launchpad

EnerVista Launchpad is a powerful software package that provides users with all of the setup and support tools needed for configuring and maintaining Multilin products. The setup software within Launchpad allows for the configuration of devices in real-time by communicating using serial, Ethernet, or modem connections, or offline by creating setting files to be sent to devices at a later time.

Included in Launchpad is a document archiving and management system that ensures critical documentation is up-to-date and available when needed. Documents made available include:

- Manuals
- Application Notes
- Guideform Specifications
- Brochures
- Wiring Diagrams
- FAQs
- Service Bulletins

Viewpoint Monitoring

Viewpoint Monitoring is a simple-to-use and full-featured monitoring and data recording software package for small systems. Viewpoint Monitoring provides a complete HMI package with the following functionality:

- Plug-&-Play Device Monitoring
- System Single-Line Monitoring & Control
- Annunciator Alarm Screens
- Trending Reports
- Automatic Event Retrieval
- Automatic Waveform Retrieval

The Viewpoint Monitoring software can merge the events logged by the C30 with those logged in other Multilin relays to create a station-wide SOE record.

User Interface

The C30 front panel provides extensive local HMI capabilities. The local display is used for monitoring, status messaging, fault diagnosis, and device configuration. User-configurable messages that combine text with live data can be displayed when user-defined conditions are met.

A 7" color, graphic HMI is optionally available that allows users to have customizable bay diagrams with local monitoring of status, values and control functionality. The alarm annunciator panel provides the configuration of up to 96 signals (alarms and status) with full text description.

LED indicators   7" large color graphic HMI

8 user programmable pushbuttons

Up to 40 side-screen pushbuttons

Typical Wiring

C30 Controller System

CONTACTS ARE SHOWN WITH NO CONTROL POWER

Optional

Modules must be grounded if terminal is provided
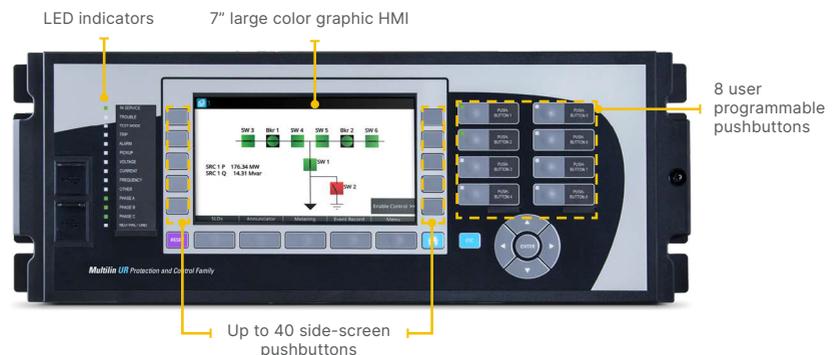
Ordering

	C30 -	*	**	- H	*	*	- F**	- H**	- M**	- P**	- U**	- W**	For Full Sized Horizontal Mount
C30													Base Unit
CPU		T											RS485 + three multimode SFP LC 100BaseFX.
		U											RS485 + two multimode SFP LC 100BaseFX + one SFP RJ45 100BaseT.
		V											RS485 + three SFP RJ45 100BaseT.
		W											RS485 + two 100BaseFx Eth, Multimode ST + one 10/100BaseT Eth, RJ-45[3]
Software Options[1]			00										No Software Options
			01										Ethernet Global Data
			03										IEC 61850
			04										Ethernet Global Data (EGD) + IEC 61850
			A0										CyberSentry UR Lvl 1
			B0										IEEE 1588
			C0										PRP
			D0										IEEE 1588 + CyberSentry UR
Mount/Coating				H									Horizontal (19" rack) - Standard
				A									Horizontal (19" rack) - Harsh Chemical Environment Option
				V									Vertical (3/4 size) - Standard
				B									Vertical (3/4 size) - Harsh Chemical Environment Option
User Interface					E								7" Graphical display, USB front port & programmable pushbuttons - Multi-Language (FW 7.6x or higher)
					F								Vertical Front Panel with English Display
					I								Enhanced German Front Panel
					J								Enhanced German Front Panel with User-Programmable Pushbuttons
					K								Enhanced English Front Panel
					L								Enhanced English Front Panel with User-Programmable Pushbuttons
					M								Enhanced French Front Panel
					N								Enhanced French Front Panel with User-Programmable Pushbuttons
					Q								Enhanced Russian Front Panel
					T								Enhanced Russian Front Panel with User-Programmable Pushbuttons
					U								Enhanced Chinese Front Panel
					V								Enhanced Chinese Front Panel with User-Programmable Pushbuttons
					W								Enhanced Turkish Front Panel
					Y								Enhanced Turkish Front Panel with User-Programmable Pushbuttons
					H								Enhanced Polish Front Panel[3]
					O								Enhanced Polish Front Panel with User-Programmable Pushbuttons[3]
					Z								Enhanced Japanese Front Panel[3]
					X								Enhanced Japanese Front Panel with User-Programmable Pushbuttons[3]
Power Supply[2]						H							125 / 250 V AC/DC
						H						RH	125/250 V AC/DC with redundant 125/250 V AC/DC power supply
						L							24 - 48 V (DC only)
IEC 61850 Process Bus							81						8 Port IEC 61850 Process Bus Module
Digital I/O							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
							4D	4D	4D	4D	4D	4D	16 Digital Inputs with Auto-Burnish
							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
							6V	6V	6V	6V	6V	6V	2 Form-A (Cur w/opt Volt) 1 Form-C Output, 2 Latching Outputs, 8 Digital Inputs
							6W	6W	6W	6W	6W	6W	30 Contact Inputs - Pin Terminals[3]
							6X	6X	6X	6X	6X	6X	18 Form-A (No Monitoring) Outputs - Pin Terminals[3]
Transducer I/O							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
Inter-Relay Communications												2A	C37.94SM, 1300nm singlemode, ELED, 1 Channel singlemode
												2B	C37.94SM, 1300nm singlemode, ELED, 2 Channel singlemode
												2I	Channel 1 - IEEE C37.94, 820nm, multimode fiber, 64/128 kbps; Channel 2 - 1300 nm, singlemode, LASER
												2J	IEEE C37.94, 820 nm, multimode, LED, 2 Channels
												7B	1300 nm, multimode, LED, 1 Channel
												7C	1300 nm, singlemode, ELED, 1 Channel
												7H	820 nm, multimode, LED, 2 Channels
												7I	1300 nm, multimode, LED, 2 Channels
												7J	1300 nm, singlemode, ELED, 2 Channels
												7S	G.703, 2 Channels
												7W	RS422, 2 Channels
												76	IEEE C37.94, 820 nm, multimode, LED, 1 Channel
												77	IEEE C37.94, 820 nm, multimode, LED, 2 Channels

Ordering Notes:

1. To view all the options available for C30, please visit GE Vernova's On-Line Store at
   https://store.gegridsolutions.com/ViewProduct.aspx?model=C30

2. Redundant power supply only available in horizontal unit. If redundant is chosen, must be same type. Maximum 2 per chassis

3. Option available soon

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

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