GE
Grid Solutions

Multilin B30

Low Impedance Biased Bus Differential Protection

The Multilin™ B30 bus differential system provides secure and sub-cycle low impedance bus protection for busbar schemes for up to twenty-four feeders and six bus zones. The B30 can be deployed as centralized or distributed busbar protection scheme. Distributed schemes are aligned to digital substation architecture, so B30 supports either standard IEC 61850-9-2LE or IEC 61869 Merging Units, like GE MU320, or GE HardFiber's Brick. The B30 is ideally suited in applications where high impedance schemes were typically used. Overall system costs can be reduced with the B30, since there is no need for dedicated, or interposing, CTs.

The B30 comes with advanced features, such as breaker failure, CT trouble detection, under-voltage supervision, and dynamic bus replica. With its extreme flexibility, which includes a CT ratio mismatch of up to 32:1 between terminals, the B30 is the ideal solution in a wide variety of bus differential applications.

Key Benefits

- High-speed protection algorithm for enhanced stability with trip times of 0.75 power cycle
- Superior CT saturation detector capable of detecting CT saturation even with only 2 msec of saturation free current for enhanced stability during fault conditions
- Cost-effective alternative to high impedance schemes protection
- Advanced automation capabilities for providing customized protection and control solutions
- 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 comprehensive process bus support (IEC 61850-9-2LE or IEC 61869 or IEC 61850-9-2 Hardfiber) ensures interoperability, device managing optimization and reduced cost of ownership
- Routable GOOSE (R-GOOSE) enables customer to send GOOSE messages beyond the substation, which enables WAPC and more cost effective communication architectures for wide area applications
- Increased network availability via failover time reduced to zero through IEC® 62439-3 "PRP" support
- Supports IEEE C37.111-1999/2013, IEC 60255-24 Ed 2.0 COMTRADE standard
- Sensitive bus differential element improves sensitivity for non-solidly grounded systems and GIS

Applications

- Re-configurable and pre-defined bus arrangements for bus applications schemes of up to 24 feeders and 6 differential zones with breaker failure
- Centralized or distributed busbar schemes
- Integrated bus protection and metering for HV and EHV substations

Protection and Control

- Differential protection with restrained and unrestrained function
- Fast and reliable CT saturation detection & CT ratio mismatch compensation
- Breaker fail protection, external check zone, and dynamic bus replica, and Undervoltage function for supervision
- Protection and control functionality in one box, reducing the number of devices
- 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

- Support industry standard protocols with 3 independent Ethernet ports for simultaneous & dedicated connection with IEEE 1588 support
- IEC 61850-9-2LE/IEC 61869 networked or IEC61850-9-2 Hardfiber process bus support
- 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

- Isolator monitoring and alarming
- CT trouble monitoring & VT supervision
- Advanced recording capabilities with high-capacity event recorder, configurable and extended waveform capture and data logger
- Metering: current, voltage, power, energy, frequency, and harmonics

Protection and Control

As part of the UR family of Protection & Control devices, the B30 offers a high degree of modularity in its design and functionality, providing superior performance while meeting the toughest requirements of the marketplace. Advanced protection and control features of this advanced relay includes:

Bus Differential Protection

The B30 can be deployed as either centralized or distributed phase segregated scheme. As centralized Bus Bar Protection, it does not rely on extensive communications between IEDs, an approach that increases overall reliability. As distributed Bus Bar protection, the B30 uses either "61850-9-2LE/61869 merging units" or "61850-9-2 Brick" as bay units. This type of scheme is superior when expecting future busbar expansions and protecting large busses.

The B30 provides fast and secure low impedance bus protection with sub-cycle tripping times averaging 0.75 cycles. The primary protection is based on differential and directional protection principles, and uses a dedicated CT saturation mechanism for additional through-fault stability. This mechanism is capable of detecting saturation of CTs as quickly as two milliseconds into an external fault. The overall system costs can be reduced with the B30 since there is no need for dedicated, or interposing, external CTs. The two differential zones can handle two small buses, split bus, or single bus bar with supervision zone. A sensitive bus differential element detects and isolates single-phase to ground faults in impedance grounded systems, or high impedance faults in solidly grounded systems.

Dynamic Bus Replica

The B30 provides a dynamic bus replica for each zone of differential protection. Built-in programmable logic removes the need for external auxiliary relays, and provides the ability to include or exclude currents dynamically from the differential zones. This allows the B30 to follow the actual busbar configuration with no external switching of CT circuits required. The B30 also avoids blind and overtripping spots in simple bus configurations. Reliability is increased and costs reduced by eliminating auxiliary relays that would otherwise be used for switching physical currents. The ability to monitor auxiliary switches and a contact discrepancy alarm also provides increased security.

B30 - Protection, Metering, Monitoring and Control
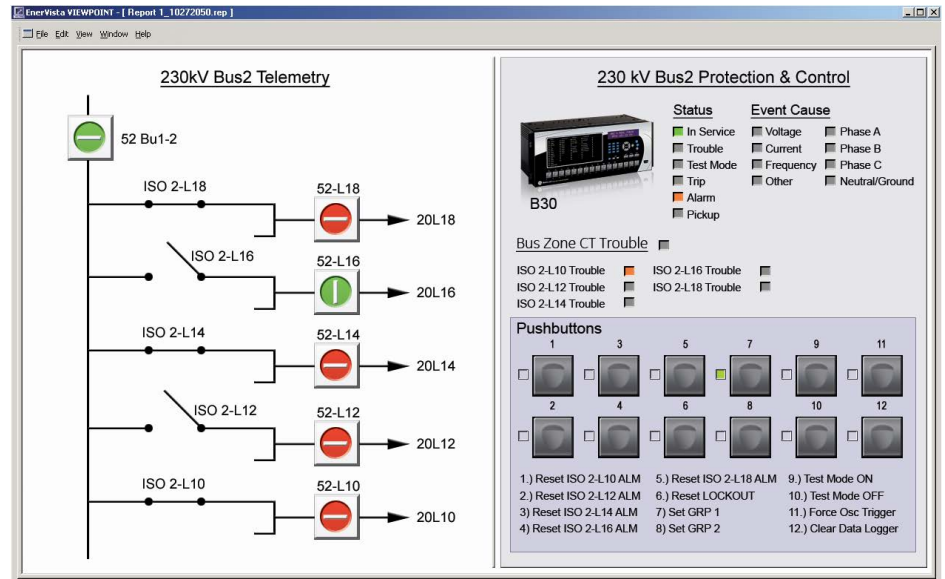
The B30 is the single point for protection, control, metering, and monitoring in one integrated device that can easily be connected directly into DCS or SCADA monitoring and control systems like Viewpoint Monitoring.

Functional Block Diagram

B30 Bus Differential Protection System
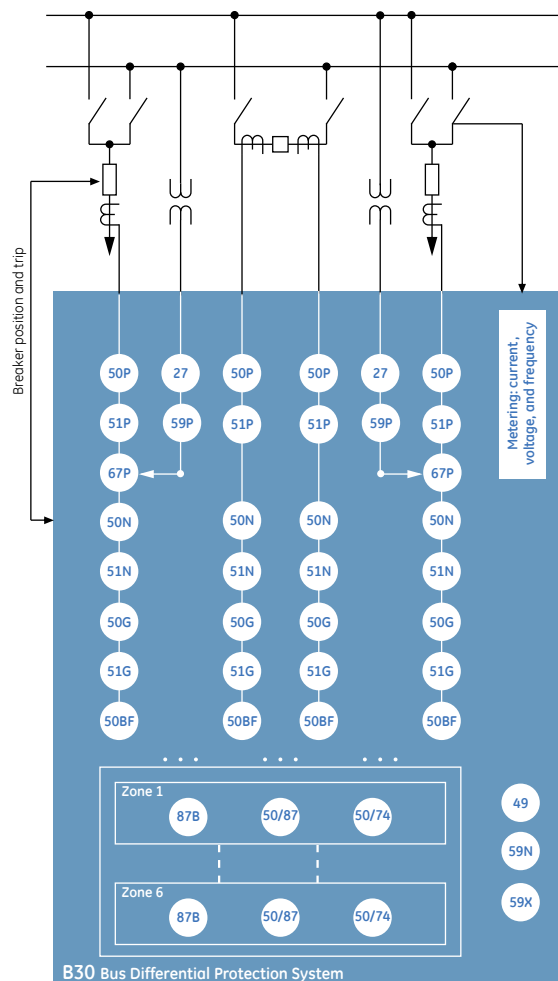
ANSI® Device Numbers & Functions

DEVICE NUMBER	FUNCTION
25	Synchrocheck
27P	Phase undervoltage
27X	Auxiliary undervoltage
49	Thermal overload protection
50BF	Breaker failure
50DD	Disturbance detector
50EF	End fault protection
50G	Ground instantaneous overcurrent
50N	Neutral instantaneous overcurrent
50P	Phase instantaneous overcurrent
50/74	CT trouble
50/87	Unrestrained bus differential
51G	Ground time overcurrent
51N	Neutral time overcurrent
51P	Phase time overcurrent
59N	Neutral overvoltage
59P	Phase overvoltage
59X	Auxiliary overvoltage
67N	Neutral directional overcurrent
67P	Phase directional overcurrent
79	Autoreclose
81U	Underfrequency
87B	Restrained bus differential

Built-in Advanced Disturbance Recording

The built-in advanced disturbance recording function allows users to view the COMTRADE files and troubleshoot bus faults. The internal operation of the B30 elements, logic, and outputs can be monitored in real-time to simplify commissioning and troubleshooting procedures. Two cases are shown here:
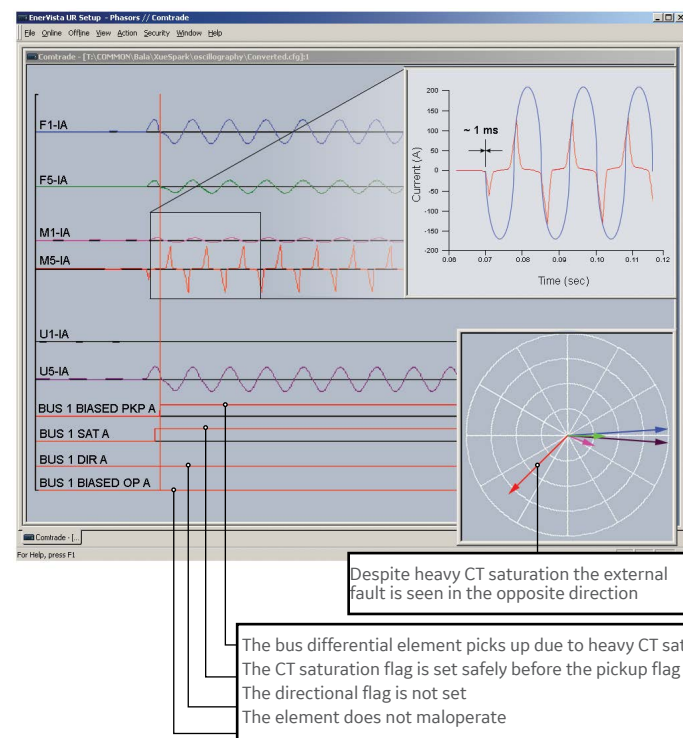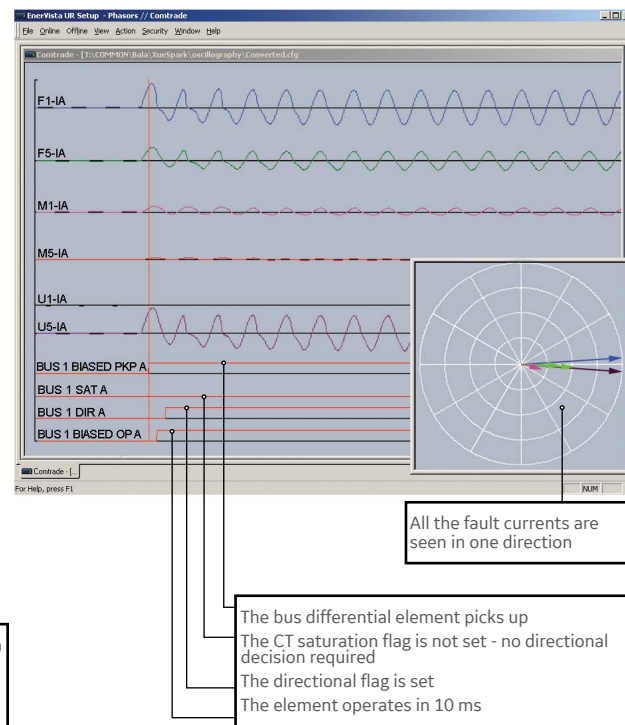
External Fault:
Even with heavy CT saturation and with only 1 msec of saturation free current, B30 is stable for through faults. See the directional comparison element output, which adds additional security to the bus differential function.

Internal Fault:
For internal faults the CT saturation flag is not set and the directional element output is safely ignored, resulting in an operating time of less than 10 msec.

Despite heavy CT saturation the external fault is seen in the opposite direction

The bus differential element picks up due to heavy CT saturation
The CT saturation flag is set safely before the pickup flag
The directional flag is not set
The element does not maloperate

All the fault currents are seen in one direction

The bus differential element picks up
The CT saturation flag is not set - no directional decision required
The directional flag is set
The element operates in 10 ms

Breaker Failure Protection

Three-pole breaker failure (BF) protection is available. The B30 system provides for up to 6 BF elements that can respond to currents and/ or auxiliary contacts. The current supervision provides fast reset time and separate settings for low-set and hi-set implementations. The BF can be initiated internally from the busbar protection or externally via input contacts or communications.

Backup Protection

Backup protection is available with instantaneous and time overcurrent functions for each current input of the B30 system. For supervision purposes, an undervoltage function is also provided for each voltage input of the B30 system.

• IOC Functions: Two separate IOC functions are available for trip supervision or other user-configurable applications

• TOC: One TOC function is incorporated for each CT input of the relay. Up to 6 TOCs

are available for backup protection. The TOC function can use standard or user-programmable curves

• Voltage Supervision: up to two undervoltage elements are available per each VT input of the relay. This function may be used to supervise the current-based protection functions for extra security.

External Check-Zone

An optional external check-zone can be used to prevent operation of the differential protection due to CT troubles. If one B30 current input is left unused and an alternative set of current signals is available from independent CTs, the currents can be combined externally and connected to the relay. Two phase overcurrent elements are available to check the level of this independently formed differential current to supervise the main differential protection.

IEC 61869 and 61850-9-2LE Process Bus

Three UR process bus modules enable communicating to Merging Units "MU" that

comply to either IEC 61869 standard or IEC 61850-9-2LE technical report. MUs connect to the primary asset and translate analog signals and digital status/commands to standard sample values "SV" data and GOOSE messages.

Flexibility for connecting to different network size and topology is granted through 100Mbps and/or 1Gbps Ethernet port support, plus IEC 62439 PRP or HSR standard redundancy, plus Star, Ring and Point-to-point network support.

For time synchronization purposes, this Process bus module can become an IEEE 1588 slave clock (61850-9-3 profile) or a 1588 Grand Master clock which removes the need of external time sources connected to the process bus network.

Customers who may not be using GE MU devices, could use MU from other vendors. Interoperability with MU from other vendors is expected when they comply to the mentioned standards.

IEC 61850-9-2 HardFiber Process Bus

The IEC 61850 Process Bus module is designed to interface with the GE 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 GE 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 B30's by replacing traditional CT/VT inputs with the IEC 61850 Process Bus module and enables CT polarity reversal

- No new cyber security concerns

Visit the HardFiber System product page on the GE Multilin web site for more details.

Advanced Automation

The B30 incorporates advanced automation features including powerful FlexLogic programmable logic, communication, and SCADA capabilities that far surpass what is found in the average bus relay. The B30 integrates seamlessly with other UR relays for complete system protection.

FlexLogic

FlexLogic is the powerful UR-platform programming logic engine that provides the ability to create directional comparison customized protection and control schemes, minimizing the need and associated costs of auxiliary components and wiring. With 1024 lines of FlexLogic, the B30 can be programmed to provide required tripping logic along with custom scheme logic for breaker control, transfer tripping schemes for remote breakers and dynamic setting group changes.

Scalable Hardware

The B30 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.

- Multiple CT/VT configurations allow for the implementation of many different schemes

Topologies:
PRP Star
Hot-Standby

Topologies:
HSR Ring
PRP Star
P-2-P Process

Merging units

Conventional or Optical CT/VTs

Station Bus

Integrated Station and Process bus (available)

Process Bus:
IEC 61850 -9-2LE or 61869* SV
IEEE 1588 Grand Master or slave 61850-8-1 GOOSE

Custom Programmable Logic Designer
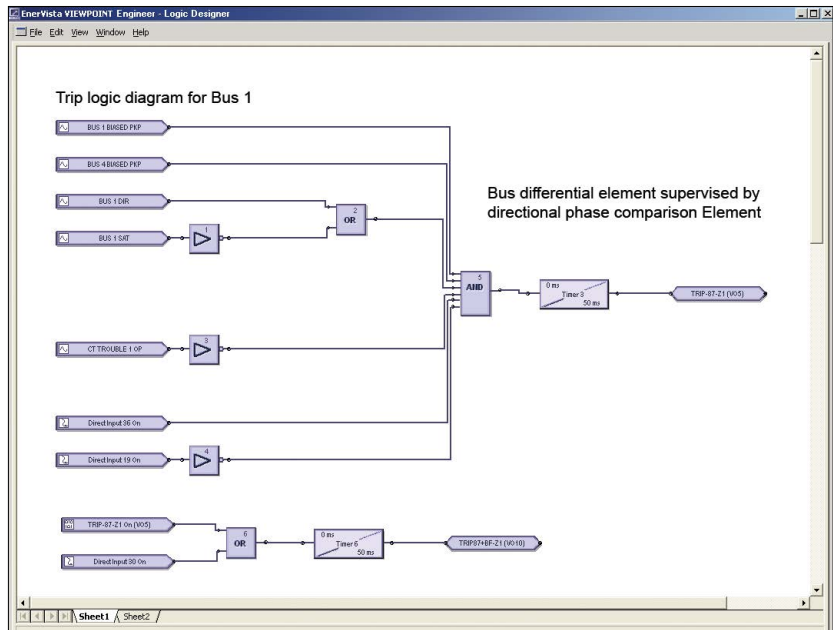
The internal operation of the B30 elements, logic, and outputs can be monitored in real-time to simplify commissioning and troubleshooting procedures.

- Flexible, modular high density I/O covering a broad range of input signals and tripping schemes

- Types of digital outputs include trip-rated Form-A and Solid State Relay (SSR) mechanically latching, and Form-C outputs

- Form-A and SSR outputs available with optional circuit continuity monitoring and

current detection to verify continuity and health of the associated circuitry

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

- RTDs and DCmA inputs are available to monitor equipment parameters, such as temperature and pressure

Monitoring and Metering

The B30 includes high accuracy metering and recording for all AC signals. Voltage, current, power and energy metering are built into the relay as a standard feature.Current and voltage parameters are available as total RMS magnitude, and as fundamental frequency magnitude and angle.

Fault and Disturbance Recording

The advanced disturbance and event recording features within the B30 can significantly reduce the time needed for postmortem analysis of power system events and the creation of regulatory reports. Recording functions include:

- Sequence of Event (SOE)
  - 1024 time stamped events
- Oscillography
  - Supports IEEE C37.111-1999/2013, IEC 60255-24 Ed 2.0 COMTRADE standard
  - 128 digital and up to 56 analog channels
  - Events up to 45s in length
- Data Logger and Disturbance Recording
  - 16 channels up to 1 sample/cycle/channel
- Fault Reports
  - Powerful summary report of pre-fault and fault values

The very high sampling rate and large amount of storage space available for data recording in the B30 can eliminate the need for installing costly stand-alone recording equipment.

Advanced Device Health Diagnostics

The B30 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.

- Comprehensive device health diagnostic performed at startup
- Monitors the CT/VT input circuitry to validate the integrity of all signals

Cyber Security - CyberSentry UR

CyberSentry™ is a software option that delivers a wide range of cyber security features to help customers to comply with NERC CIP, NIST® IR 7628, IEC 62351 and IEC 62443 cyber security requirements and standards. Additionally, secure firmware upgrades are granted through the 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.
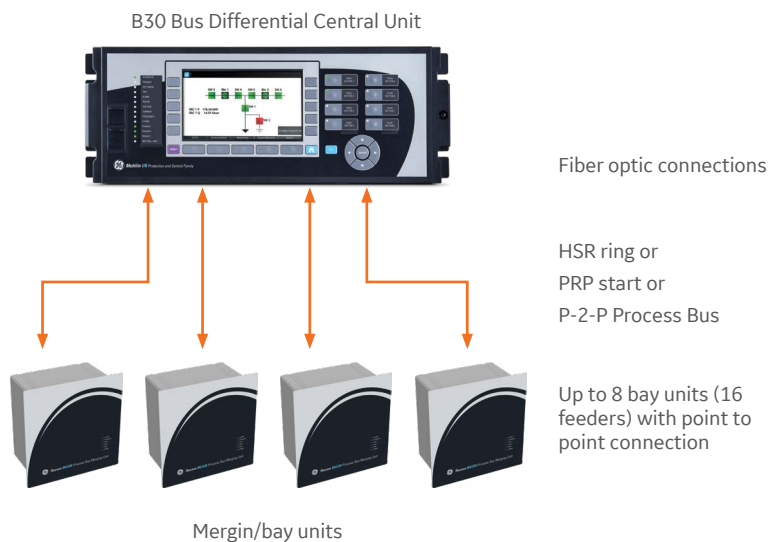
Communications

The B30 provides for secure remote data and engineering access, making it easy and flexible to use and integrate into new and existing infrastructures. Fiber optic Ethernet provides high-bandwidth communications allowing for low-latency controls and high-speed file transfers of relay fault and event record information. The available three independent Ethernet ports, and redundant Ethernet option provide the means to create fault tolerant communication architectures in an easy, cost-effective manner.

The B30 supports the most popular industry standard protocols enabling easy, direct integration into DCS and SCADA systems.

- IEC 61850 Ed. 1 and Ed. 2 Station Bus, IEC 61850-2-2LE / IEC 61869 networked or IEC 61850-9-2 HardFiber Process Bus
- 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 as an industry leader in this standard.

B30 Bus Differential Central Unit

Fiber optic connections

HSR ring or
PRP start or
P-2-P Process Bus

Up to 8 bay units (16 feeders) with point to point connection

Mergin/bay units

- 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 Systems based on IEC 61850 using universal 3rd party tools

- Multicast IEEE C37.118 synchrophasor data between PMU and PDC devices using IEC 91850-90-5

- R-GOOSE enable customer to send GOOSE messages beyond the substation, which enables Wide Area Protection & Control (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 B30 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 B30 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 GE Multilin products. The setup software within Launchpad allows for the configuration of devices in real-time by communicating using serial, Ethernet, or modem connections, or offline by creating setting files to be sent to devices at a later time.

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

- Manuals
- Application Notes
- Guideform Specifications
- Brochures
- Wiring Diagrams
- FAQ's
- Service Bulletins

Viewpoint 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

Simplifying Commissioning and Testing

Record the operation of the internal B30 elements and external connected devices with 1ms time-stamped accuracy.

Create B30 setting file templates to ensure critical settings are not altered.

User Interface

The B30 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
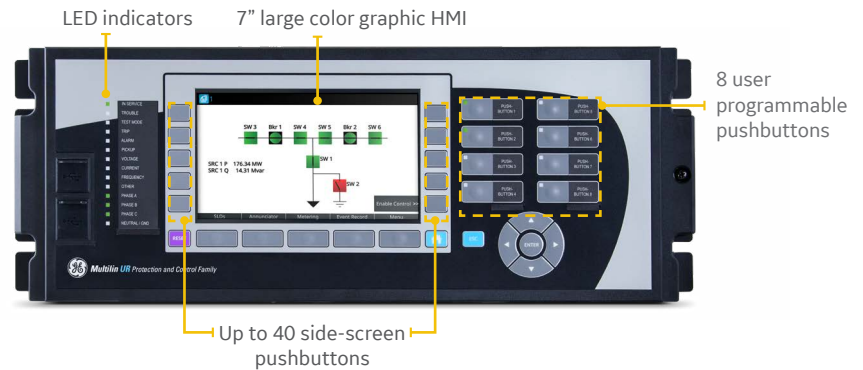
Typical Wiring

NOTE: This diagram is based on the following order code:
B30-T00-HCL-F8F-H6H-L8H-N6A-S8H-U6H
This diagram provides an example of how the device is wired, not specifically how to wire the device. Please refer to the Instruction Manual for additional details on wiring based on various configurations.

GE

B30 BUS DIFFERENTIAL RELAY

VOLTAGE INPUTS — VX F8c, VX F8a, VC F7c, VC F7a, VB F6c, VB F6a, VA F5c, VA F5a

VOLTAGE INPUTS — VC F7c, VC F7a, VB F6c, VB F6a, VA F5c, VA F5a

OPEN DELTA VT CONNECTION (ABC)

CURRENT INPUTS 8H / 8J

Terminal		
IA5 F1a	IA F1b	IA1 F1c	F1
IB5 F2a	IB F2b	IB1 F2c	
IC5 F3a	IC F3b	IC1 F3c	
IA5 F5a	IA F5b	IA1 F5c	F2
IB5 F6a	IB F6b	IB1 F6c	
IC5 F7a	IC F7b	IC1 F7c	

CURRENT INPUTS 8H / 8J

IA5 L1a	IA L1b	IA1 L1c	F3
IB5 L2a	IB L2b	IB1 L2c	
IC5 L3a	IC L3b	IC1 L3c	
IA5 L5a	IA L5b	IA1 L5c	F4
IB5 L6a	IB L6b	IB1 L6c	
IC5 L7a	IC L7b	IC1 L7c	

CURRENT INPUTS 8H / 8J

IA5 S 1a	IA S 1b	IA1 S 1c	F5
IB5 S 2a	IB S 2b	IB1 S 2c	
IC5 S 3a	IC S 3b	IC1 S 3c	
IA5 S 5a	IA S 5b	IA1 S 5c	F6
IB5 S 6a	IB S 6b	IB1 S 6c	
IC5 S 7a	IC S 7b	IC1 S 7c	

DIGITAL INPUTS/OUTPUTS 6H

- H1a / H1b / H1c — H1
- H2a / H2b / H2c — H2
- H3a / H3b / H3c — H3
- H4a / H4b / H4c — H4
- H5a / H5b / H5c — H5
- H6a / H6b / H6c — H6
- H7a + CONTACT INPUT H7a
- H7c + CONTACT INPUT H7c
- H8a + CONTACT INPUT H8a
- H8c + CONTACT INPUT H8c
- H7b − COMMON H7b
- H8b — SURGE

DIGITAL INPUTS/OUTPUTS 6H

- U1a / U1b / U1c — U1
- U2a / U2b / U2c — U2
- U3a / U3b / U3c — U3
- U4a / U4b / U4c — U4
- U5a / U5b / U5c — U5
- U6a / U6b / U6c — U6
- U7a + CONTACT INPUT U7a
- U7c + CONTACT INPUT U7c
- U8a + CONTACT INPUT U8a
- U8c + CONTACT INPUT U8c
- U7b − COMMON U7b
- U8b — SURGE

DIGITAL INPUTS/OUTPUTS 6A

- N1a / N1b / N1c — N1
- N2a / N2b / N2c — N2
- N3a / N3b / N3c — N3
- N4a / N4b / N4c — N4
- N5a + CONTACT INPUT N5a
- N5c + CONTACT INPUT N5c
- N6a + CONTACT INPUT N6a
- N6c + CONTACT INPUT N6c
- N5b − COMMON N5b
- N7a + CONTACT INPUT N7a
- N7c + CONTACT INPUT N7c
- N8a + CONTACT INPUT N8a
- N8c + CONTACT INPUT N8c
- N7b − COMMON N7b
- N8b — SURGE

CPU

- 1a 100BaseFX Rx/Tx — PORT 1
- 1b 100BaseFX Rx/Tx — PORT 2
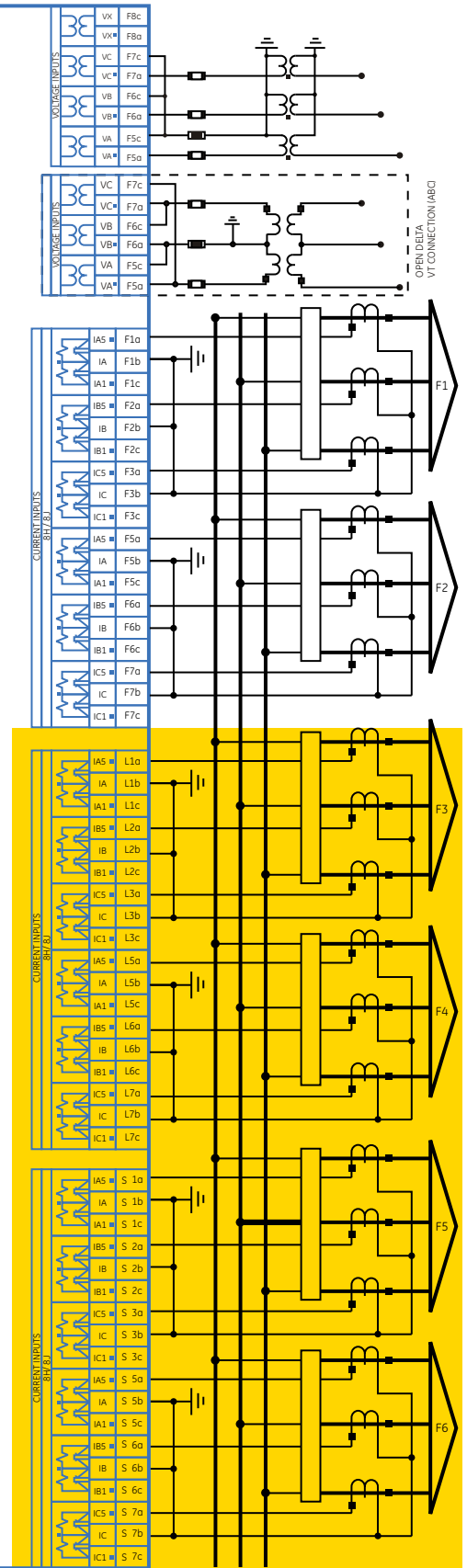- 1c 100BaseFX Rx/Tx — PORT 3
- D1a + / D2a − / D3a com — RS485 COM 2
- D4b − / D4a − — IRIG-B Input
- BNC

POWER SUPPLY 1

- B1b / B1a / B2b — CRITICAL FAILURE
- B3a − / B3b + — 48 VDC OUTPUT
- B5b HI − / B6b LO − — CONTROL POWER
- B6a −
- B8a — SURGE
- B8b — FILTER

* Fibre Optic
Ground at UR Device
Shielded twisted pairs
Co-axial
Wet
Dry
(DC ONLY)
DC
AC or DC
No. 10AWG Minimum
GROUND BUS
MODULES MUST BE GROUNDED IF TERMINAL IS PROVIDED

836784A3.CDR

A B C

MODULE ARRANGEMENT

X	W	V	U	T	S	R	P	N	M	L	K	J	H	G	F	D	B
		6	8				6		8				8		9	1	
		Inputs/outputs *	CT *				Inputs/outputs *		CT *				Inputs/outputs		CT	CPU	Power Supply

* Optional

Ordering

B30 - * ** - H * - F ** - H ** - L **- N **- S ** - U ** - W ** For Full Sized Horizontal Mount

Category	Code	Description
Base Unit	B30	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
	03	IEC 61850
	A0	CyberSentry UR Lvl 1
	B0	IEEE 1588
	C0	PRP
	D0	IEEE 1588 + CyberSentry UR
	IO	-9-2LE 8 Feeders 3 zones + 61850 + IEEE 1588 + PRP + CyberSentry UR Lvl 1
	OH	-9-2LE Extended 16 Feeders & 6 zones + 61850 + IEEE 1588 + PRP + CyberSentry UR Lvl 1
	OT	-9-2LE Extended 24 Feeders & 6 zones + 61850 + IEEE 1588 + PRP + CyberSentry UR Lvl 1
Mount/Coating	H	Horizontal (19" rack)
	A	Horizontal (19" rack) - Harsh Chemical Environment Option
User Interface	E	7" Graphical display, USB front port & programmable pushbuttons - Multi-Language (FW 7.6x or higher)
	C	Basic 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)

CT/VT DSP				Description
	8L	8L	8L	Standard 4CT/4VT w/ enhanced diagnostics
	8M	8M	8M	Sensitive Ground 4CT/4VT w/ enhanced diagnostics
	8N	8N	8N	Standard 8CT w/ enhanced diagnostics
	8R	8R	8R	Sensitive Ground 8CT w/ enhanced diagnostics

IEC 61850 Process Bus[4,5]	Code	Description
	81	8 Port IEC 61850 Process Bus Module
	85	-9-2LE & 61869 Process Bus, 2 x 1000BaseF
	86	-9-2LE & 61869 Process Bus, 4 x 1000BaseF + 4 x 100BaseFx
	87	-9-2LE & 61869 Process Bus, 4 x 100BaseFx

Digital I/O				Description
	XX	XX	XX	No module
	4A	4A	4A	4 Solid State (No Monitoring) MOSFET Outputs
	4C	4C	4C	4 Solid State (Current w/opt Voltage) MOSFET Outputs
	4D	4D	4D	16 Digital Inputs with Auto-Burnish
	4L	4L	4L	14 Form-A (No Monitoring) Latchable Outputs
	67	67	67	8 Form-A (No Monitoring) Outputs
	6C	6C	6C	8 Form-C Outputs
	6D	6D	6D	16 Digital Inputs
	6E	6E	6E	4 Form-C Outputs, 8 Digital Inputs
	6F	6F	6F	8 Fast Form-C Outputs
	6K	6K	6K	4 Form-C & 4 Fast Form-C Outputs
	6L	6L	6L	2 Form-A (Current w/ opt Voltage) & 2 Form-C Outputs, 8 Digital Inputs
	6M	6M	6M	2 Form-A (Current w/ opt Voltage) & 4 Form-C Outputs, 4 Digital Inputs
	6N	6N	6N	4 Form-A (Current w/ opt Voltage) Outputs, 8 Digital Inputs
	6P	6P	6P	6 Form-A (Current w/ opt Voltage) Outputs, 4 Digital Inputs
	6R	6R	6R	2 Form-A (No Monitoring) & 2 Form-C Outputs, 8 Digital Inputs
	6S	6S	6S	2 Form-A (No Monitoring) & 4 Form-C Outputs, 4 Digital Inputs
	6T	6T	6T	4 Form-A (No Monitoring) Outputs, 8 Digital Inputs
	6U	6U	6U	6 Form-A (No Monitoring) Outputs, 4 Digital
	6V	6V	6V	2 Form-A (Cur w/ opt Volt) 1 Form-C Output, 2 Latching Outputs, 8 Digital Inputs
	6W	6W	6W	30 Contact Inputs - Pin Terminals[3]
	6X	6X	6X	18 Form-A (No Monitoring) Outputs - Pin Terminals[3]

Transducer I/O				Description
	5A	5A	5A	4 dcmA Inputs, 4 dcmA Outputs
	5F	5F	5F	8 dcmA Inputs

Inter-Relay Communications	Code	Description
	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	Channel 1 - IEEE C37.94, 820nm, multimode , 64/128 kbps; Channel 2 - 1550 nm, singlemode, LASER
	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
	77	IEEE C37.94, 820 nm, multimode, LED, 2 Channel

Ordering Notes:

1. To view all available model order codes, options for B30 or to order the UR Classic Front Panel, please visit GE's On-Line Store at http://store.gedigitalenergy.com/viewprod.asp?model=B30
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
4. Process bus module requires empty slots next to it.
5. Conventional DSP and Process Bus modules cannot run simultaneously

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