GE
Grid Solutions

UR Family

Version 6.0x

Release Notes

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Overview

This document contains the release notes for firmware and software versions 6.00 to 6.09 of the GE Universal Relay (UR) family of products.

Applicable to products: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

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Date of release 6.04: 20 January 2015

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Date of release 6.08: 19 November 2021

Date of release 6.09: 29 March 2024

In the following descriptions, a category letter is placed to the left of the title. See the table at the end of this document for descriptions of the categories.

Firmware

Firmware 6.00

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  - Existing Phase and Negative sequence directional elements are now available when the C70 is connected to a HardFiber Brick
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  - The Pause functionality of the Autoreclose element to freeze all shot timers
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  - UR IEC 6870-5-104 implementation has been enhanced to support "Test command with Date/Time"
  - The "IEC104 Point Lists" element has been changed to properly display analog values when only one analog point is programmed
  - The "IEC104 Point Lists" element has been changed to ensure the entire list is retrieved when all analog points are being used
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- PMU Synchrophasor
  - Complete state-of-the-art Synchrophasor measuring and data streaming capabilities with new "P class" Synchrophasor
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UR device is in test mode

- UR Platform
  - New Turkish language support
  - New FlexLogic operand enables IRIG-B time synchronization to indicate "GPS receiver is not locked to satellite"

Bus Differential Protection Systems

E **Increased pickup setting range of the Bus differential element**

Applicable: B30, B90

The top limit pickup level of the bus differential element has been increased from 2.0 pu to 6.0 pu.

This pickup range increase provides our Low Impedance Bus Bar Differential Systems, B30 and B90, with additional selectivity and security for special bus bar applications.

GE tracking number: 600-1

Capacitor Bank P&C Systems

E **Existing Phase and Negative sequence directional elements are now available when the C70 is connected to a HardFiber Brick**

Applicable: C70

This firmware version makes the phase and negative sequence directional elements "**67P**" and "**67_2**" available when the relay order code includes a process bus module for use of the UR with HardFiber Bricks.

Two independent elements are available for each one of them: phase (67P_1, 67P_2) and negative sequence (67_21, 67_22) directional functions.

GE tracking number: 600-2

Feeder Protection Systems

N **Extended ground protection capabilities have been given to the F35 through the addition of Wattmetric elements**

Applicable: F35

Four new Wattmetric Zero-Sequence Directional elements, ANSI code "**32G or 32N"**, have been added to the F35 multiple feeder protection system.

This enhancement enables the F35 to better protect ungrounded/resistor- grounded/resonant-grounded distribution networks. They can also be used to add directional control of other non-directional elements.

A total of four independent elements with independent settings are available.

GE tracking number: 600-3

E **F60 delivers additional protection and control capabilities by supporting a second DSP module**

Applicable: F60

The F60 has been enhanced to support a second DSP module (CT/VT inputs). This enhancement allows the F60 to fully protect two independent feeders. Similar to the other UR devices that support multiple DSP modules, once the second DSP module is installed, the F60 duplicates the number of sources and increase the number of protection and control elements available.

This enhancement increases the range of schemes that the F60 can protect, for example breaker-and-a-half with independent CT inputs, and complete automatic-transfer scheme (Incomer-Tie-Incomer) in a single device.

For details, see the F60 instruction manual and EnerVista UR Setup software.
GE tracking number: 600-12

Motor Protection Systems

F **Changes to Voltage Dependent Thermal Overload element add security when starting very high inertia motors**

Applicable: M60

Two key variables of the thermal overload protection element have been changed to increase the element's security:

The "Voltage Dependent Thermal Overload curve" has been modified (10% more Stall current at 100% volts) to give motors a longer acceleration time. This is especially useful when protecting very high inertia motors.

Negative sequence currents are now filtered to properly bias the equivalent motor heating current "Ieq" when the relay senses significant motor load changes

If either your thermal overload element is not set for voltage dependency or your relay firmware version matches any of those listed as follows, no action is required.

Firmware versions that fix this issue: 5.72, 6.00.

GE tracking number: 572-1

Common Protection and Control Elements

E **The VTFF element has been enhanced to also detect VT bank open neutral conditions**

Applicable: C60, C70, D30, D60, F60, G30, G60, L30, L60, L90, M60, N60, T60

The "Voltage Transformer Fuse Failure" element is used to raise an alarm and/or block elements that operate incorrectly for either a full or partial loss of AC potential caused by one or more blown fuses or by tripped secondary circuit breakers.

With firmware version 6.00, the VTFF element's algorithm has been modified to also detect an open neutral condition by measuring the 3rd harmonic content of 3V0. New settings are available to set the 3rd harmonic operating level, and to enable or disable the open neutral detection.

For details, see the applicable UR instruction manual.

GE tracking number: 600-4

G **The Pause functionality of the Autoreclose element to freeze all shot timers**

Applicable: C60, D30, D60, F35, F60, L30, L60, L90

The "Autoreclose" element has Pause functionality that is intended to freeze the element when the associated operand is activated.

This firmware version changed the autoreclose Pause functionality to freeze all 3-pole shot timers and dead timers so that they can resume their time count from the value they were at when the pause was activated.

Previous firmware version blocked the timers, so they did not resume at the value at which they were paused.

If either your Autoreclose element is not set to pause or your relay firmware version matches any of those listed as follows, no action is required.

Firmware versions with this change: 6.00.

GE tracking number: 600-4

U **The "Negative Sequence Overvoltage" and "Neutral Directional Overcurrent" elements have been modified to deliver enhanced security and dependability when sensing very low levels of V2 (V0) and significant levels of I2 (I0)**

Applicable: C70, D30, D60, F60, G30, G60, L30, L60, L90, M60, T60

This firmware version introduces important changes to the "Negative Sequence Overvoltage" and "Neutral Directional Overcurrent" elements, which improve element security and dependability.

Polarizing voltage compensation with offset impedance is only applied when the current magnitude I2 or I0 exceeds 0.2 pu. This avoids overcompensation that can lead to possible directionality errors when in presence of conditions with low levels of I2 or I0 currents.

Both polarizing and operating quantities are now checked against cutoff level settings that are selectable by the user at "Product Setup\Display Properties" for application flexibilities.

If your relay firmware version matches any of those listed as follows, no action is required. Firmware versions that fix this issue: 5.72, 6.00.

GE tracking number: 572-2

Communications

E **UR IEC 6870-5-104 implementation has been enhanced to support "Test command with Date/Time"**

Applicable: B30, B90, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

IEC 60870-5-104 determines that slave devices are to respond with a 16-bit value (test sequence counter) and its corresponding timestamp when a test command is received.

This firmware version enhances the UR IEC 60870-5-104 protocol implementation to the described test command.

If the IEC 60870 protocol is not being used or your relay firmware version matches any of those listed, no action is required.

Firmware versions that fix this issue: 5.72, 6.00.

GE tracking number: 572-3

C **The "IEC104 Point Lists" element has been changed to properly display analog values when only one analog point is programmed**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

The IEC 60870-5-104 protocol supports a configurable point list element that can be programmed with binary or analog inputs.

Previous firmware versions may not display analog values properly when only one analog point is programmed.

If the IEC60870 protocol is not being used or your relay firmware version matches any of those listed, no action is required.

Firmware versions that fix this issue: 5.72, 6.00.

GE tracking number: 572-4

C **The "IEC104 Point Lists" element has been changed to ensure the entire list is retrieved when all analog points are being used**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

The IEC 60870-5-104 protocol supports a configurable point list element that can be programmed with binary or analog inputs.

Previous firmware versions may not allow IEC 60870-5-104 masters to retrieve all the analog values when all 255 analog points are programmed.

If the IEC 60870 protocol is not being used or your relay firmware version matches any of those listed, no

action is required.
Firmware versions that fix this issue: 5.72, 6.00.
GE tracking number: 572-5

C **FlexElements have been changed to properly operate when programmed to use IEC 61850 GOOSE analogs inputs**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60
The UR FlexElements are universal comparators that calculate net difference or monitor UR actual analog values.
Previous firmware versions can allow FlexElements to apply improperly the unit base value when IEC 61850 GOOSE analog are set as the FlexElement's input, which can lead to an incorrect operation of the FlexElement.
If analog GOOSE inputs are not being used or your relay firmware version matches any of those listed, no action is required.
Firmware versions that fix this issue: 5.72, 6.00.
GE tracking number: 572-6

C **UR IEC 6870-5-104 implementation has been changed to prevent slave devices from issuing start request command**

Applicable: B30, B90, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60
IEC 60870-5-104 determines that only master devices are to issue StartDT requests. UR relays are 60870-5-104 slave devices and should not issue these requests.
Previous firmware versions allow UR devices to issue a StartDT request when receiving a connect request from the IEC 60870-5-104 master.
If the IEC60870 protocol is not being used or your relay firmware version matches any of those listed, no action is required.
Firmware versions that fix this issue: 5.72, 6.00.
GE tracking number: 572-7

C **Data sets for configurable GOOSE message number 1 and 2 has been changed not to be triggered by analog values changes**

Applicable: B30, B90, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60
UR devices have eight data sets for publishing configurable GOOSE messages. Data sets number one and two do support both analog and digital values, but transmission is triggered by digital state changes only.
Nonetheless, devices with firmware version 5.90 and 5.91 can experience transmission of configurable GOOSE one and two triggered by analog values changes. This firmware version fixes that condition.
If your UR device has no analog values set to configurable GOOSE one or two, no action is required.
Firmware versions that fix this issue: 6.00.
GE tracking number: 600-11

PMU Synchrophasor

N **Complete state-of-the-art Synchrophasor measuring and data streaming capabilities with new "P class" Synchrophasor**

Applicable: D60, F60, G60, L30, L90, N60, T60
This firmware version adds to UR devices the capability of generating P-class synchrophasors and streaming them at reporting rates of up to 120 frames per second.

P-class synchrophasors are defined by the IEEE C37.118 standard as those "intended for applications requiring fast response and no explicit filtering."

As part of the implementation, setting menus were simplified as follows:

- Previous "Communication" and "Basic configuration" were merged
- The previous "Filtering" setting was removed and replaced by "Class," which allows the user to choose from class P or class M synchrophasors

For information on this subject, see the applicable UR instruction manual.

GE tracking number: 600-6

N **Complete state-of-the-art Synchrophasor measuring and data streaming capabilities with the new PMU Aggregator elements**

Applicable: N60

This firmware version adds two new aggregator elements to the N60. The aggregator elements are what connect the PMU elements to the C37.118 client via TCP or UDP. Aggregators also allow users to optimize bandwidth by bringing together "aggregating" PMU data from different PMU.

All the aggregator settings are found under the new window menu "**Settings > System Setup > Phasor Measurement Unit > Aggregators.**"

For information, see the N60 instruction manual.

GE tracking number: 600-7

E **Complete State of the art Synchrophasor measuring and data streaming capabilities with the new PMU Calibration Magnitude**

Applicable: D60, F60, G60, L30, L90, N60, T60

This firmware version adds to the UR device magnitude calibration capabilities. This feature enables magnitude correction of up to +/- 5% and can be applied to each voltage and current phase.

Previous firmware versions only allow for phase angle calibration. For information, see the applicable UR instruction manual.

GE tracking number: 600-8

G **Synchrophasor's analog channels to prevent scales issues when programmed as "Freq Rate" and the UR device is in test mode**

Applicable: D60, F60, G60, L30, L90, N60, T60

PMU elements can be configured to contain 14 phasors, 16 analog, and 16 digital channels. If any of the 16 analog channels is configured for Frequency Rate of Change (Freq Rate) and the UR device is put under test mode ("Test Mode Function" setting = "Forcible" and "Test Mode Forcing" setting = "ON"), the Freq Rate value shown by the PMU element is 10 times higher than the real value.

If Freq Rate values are not configured to any of your device's PMU analogs or your relay firmware version matches any of those listed as follows, no action is required.

Firmware versions that fix this issue: 6.00.

GE tracking number: 600-9

UR Platform

E **New Turkish language support**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

This firmware version adds Turkish language to the supported languages. Firmware files, EnerVista UR Setup software, and instruction manuals are available in Turkish.

The languages supported by UR devices with this firmware release are

- English
- French
- Chinese
- Russian
- Turkish

GE tracking number: 600-10

E **New FlexLogic operand enables IRIG-B time synchronization to indicate "GPS receiver is not locked to satellite"**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

This firmware version introduces a new FlexLogic operand named "CLOCK UNSYNCHRONIZED." This operand indicates that the GPS receiver connected to the relay has lost the link to the satellite, and then, is running on its own clock. When an "IRIG-B Unlocked" condition is detected, the operand waits two scan periods (two seconds) to be set.

GE tracking number: 600-11

Firmware 6.01

Summary

- Line Differential Protection Systems
  - Increased availability of the line differential element when experiencing short communication disruptions
  - Line Differential Element to ensure all three terminals trip correctly when the differential scheme is set with 50DD SV supervision and is operating in master slave mode
  - Displayed values of 87LG restraint current have been improved to meet +/- 5% accuracy when sensing low values
  - Loopback mode has been enhanced to allow channel monitoring
  - Positive-sequence and Negative-sequence current fault detectors have been changed to respond to vector difference values instead of magnitude difference values
- Communications
  - IEC 61850 buffered report control blocks have been changed to capture events immediately after an Ethernet port failure event
- Events and Records
  - Event recorder to avoid events flooding when there is an Ethernet port failure
- Transducer Inputs and Outputs
  - Transducer outputs have been modified to show accurate values when used to represent fault location
- UR Platform
  - IRIG-B clock synchronization to properly update time when time is set on December 31st of a leap year
  - The Real Time Clock element has been modified to ensure events-timestamp is correct when the DST function is active and power is cycled
  - The time stamp routine has been changed to prevent time stamp discrepancies and a longer protection pass period when the DST is enabled

Line Differential Protection Systems

E **Increased availability of the line differential element when experiencing short communication disruptions**

Applicable: L30

When the line differential element 87L is enabled, the interval between consecutive incoming packets on the inter-relay communication channels is monitored. When this interval between packets exceeds 66 milliseconds, a channel failure is declared.

This firmware version extends the allowed interval between packets from 66 to 100 milliseconds. This change reduces the sensitivity of the channel failure detector and prevents short communication disruptions from repeatedly taking the line differential protection out of service.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-1

H **Line Differential Element to ensure all three terminals trip correctly when the differential scheme is set with 50DD SV supervision and is operating in master slave mode**

Applicable: L30, L90

In a three-line terminal system, the Line Differential Element operates in master-master mode provided there is not any channel failure. If one communication channel fails, the 87L element changes to master-slave mode. When in that mode, the channel failure blocks the disturbance detector element 50DD SV in the slave relays, and the master relay (relay with no channel failure) trips the slave relays by sending DTT commands if a fault within the differential zone was detected.

Therefore, if the disturbance detector element "50DD SV" is set to supervise the line differential element "87L" and there is a line fault while the 87L element is in Master-Slave mode, the slave relays do not trip after receiving the DTT signal issued by the Master relay.

This firmware version introduces a change to the 87L element so that a local source disturbance detector "SCRx 50DD" is used in parallel to supervise the 87L element when the "50DD SV" element is not available. This allows the slave relays to trip after receiving the DTT command from the Master relay upon the condition described.

This fix only affects users who have L30 or L90 devices applied to a three-line terminal system and have enabled both the master-slave mode and the 50DD SV supervision.

Affected users can either upgrade their UR firmware with firmware version 6.01 or use the UR FlexLogic to implement the parallel supervision explained.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-2

M **Displayed values of 87LG restraint current have been improved to meet +/- 5% accuracy when sensing low values**

Applicable: L30, L90

The restraint current values of the ground differential element are accurately derived and used by the line differential algorithm. However, the restraint values of the ground differential element that are displayed by the relay might not meet the design accuracy of +/- 5% when restraint current values are below 0.11xIn. This has been fixed.

These changes do not affect the operation of the ground line differential element, but only restraint current values that are displayed.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-3

E **Loopback mode has been enhanced to allow channel monitoring**

Applicable: L30, L90

Upon detection of a loopback test, a UR device goes into Loopback Mode which, among other elements, disables the channel monitoring. Without channel monitoring, commissioning or troubleshooting procedures with loopback tests can become complex.

This firmware version changes the UR loopback mode to allow channel monitoring while a loopback test is performed. This allows users access to the Channel status data (channel 1/2 status, number of lost packets, and so on), which simplifies commissioning and/or troubleshooting procedures.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-4

P **Positive-sequence and Negative-sequence current fault detectors have been changed to respond to vector difference values instead of magnitude difference values**

Applicable: L60

The L60 provides one "Rate of change of negative-sequence current fault detector" and one "Rate of change of positive-sequence current fault detector."

In previous firmware versions, those fault locators responded to **magnitude change** of the negative-sequence and positive-sequence current phasor over half a cycle window.

This firmware version changes these elements to respond to the **vector difference** of negative-sequence and positive-sequence current phasor over half a cycle period, which increases sensitivity of the elements during faults where the current phasor magnitude remains about the same but angle considerably changes.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-9

Communications

C **IEC 61850 buffered report control blocks have been changed to capture events immediately after an Ethernet port failure event**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

When a UR relay (IEC 61850 server) is reporting data to an IEC 61850 client and the Ethernet ports are disconnected (Prim/Sec Ethernet Fail event), the IEC 61850 buffered report control blocks are intended to capture data that will be served to the client when the communication failure is cleared.

However, UR devices with previous firmware versions have shown that buffered report control blocks start recording events after two minutes of disconnecting the Ethernet ports, missing any event that occurs within that period.

This firmware version changes the Buffered Report Control Blocks to ensure that they start capturing events immediately after the Ethernet fail event is detected.

Users who do not use the IEC61850 buffered report services are not affected by this issue. This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-5

Events and Records

R **Event recorder to avoid events flooding when there is an Ethernet port failure**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

The UR Event Recorder registers all UR self-test events, which include Ethernet Port Failures "Pri Ethernet Fail/Sec Ethernet Fail."

Relays with previous firmware versions show that the event recorder properly registers Ethernet Failure events when they appear. However, as long as the Ethernet failure condition remains, this event is generated every two seconds, which floods the event recorder.

This firmware version fixes the event recorder to prevent event flooding by registering only one event per Ethernet port failure.

UR devices with no Ethernet ports are not affected by this issue.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-6

Transducer Inputs and Outputs

M **Transducer outputs have been modified to show accurate values when used to represent fault location**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

The UR transducer output elements "DCmA Outputs" can be programmed to represent a number of analog values available in the UR. One of the choices is fault location (distance to fault).

Relays with previous firmware versions show transduced distance to fault values that do not match the calculated distance.

This firmware version makes DCmA output elements use the "line length" setting as the element's base unit when a DCmA output is used to represent fault location, thus providing accurate transduced fault location.

This firmware change only affects users who have configured the UR DCmA outputs to represent a fault location.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-7

UR Platform

R **IRIG-B clock synchronization to properly update time when time is set on December 31st of a leap year**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

If the date and time settings were provided to a UR device on December 31st of a leap year, the relay displayed the "Maintenance Alert: IRIG-B error" and did not update its date and time.

This firmware version ensures that the relay date and time are properly updated regardless when these parameters are set and the type of year.

This change applies to UR devices with firmware version 6.01 or newer.

GE tracking number: 601-8

R **The Real Time Clock element has been modified to ensure events-timestamp is correct when the DST function is active and power is cycled**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

The Real Time Clock element has Daylight Savings Time "DST" functionality that allows the device to follow local DST rules.

Previous firmware versions show that if the DST function is active and the device auxiliary power is cycled, the events timestamp could shift one hour from the actual time.

This firmware version ensures that the DST time is preserved when the auxiliary power is removed from the relay. Furthermore, the DST function setting is applied correctly to the timestamp that is shown on the fault report summary page when accessed through EnerVista UR Setup software or a web browser.

GE tracking number: 590-14

P **The time stamp routine has been changed to prevent time stamp discrepancies and a longer protection pass period when the DST is enabled**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

When the Daylight Savings Time (DST) function is enabled, the time stamp routine checks whether the timestamp needs to be updated according to the DST for every event record.

On a relay generating dozens of events within one protection pass period, this routine can make the protection pass longer than the relay's specification. The communication elements running at the end of the protection pass then use the latest protection pass time, which forces a discrepancy between the internal event recorder and communication protocol time stamp.

A UR generating dozens of events within one protection pass period can also lead protection and control elements to operate out of specification.

This only affects end users having UR devices with previous firmware version 5.90/6.00 and using the DST function. End users whose UR devices meet these conditions are advised to upgrade their relays with firmware version 6.01.

UR devices with firmware versions prior to 5.90 are not affected.

GE tracking number: 591-1

Firmware 6.02

Summary

- Capacitor Bank Protection and Control System
  - Neutral Voltage Unbalance Autoset and Voltage Differential Autoset not operational if C70 has only voltage inputs, i.e. only 8V CT/VT DSPs
- Line Differential Protection Systems
  - The voltage memory for distance polarization in L90 relays has been changed to ensure that only actual voltage values are used when there is an important difference between system and sampling frequencies
  - The Distance protection element have been changed to ensure that setting changes to line protection elements, made when the relays is in service, do not make the Phase Distance element operate
  - Increased security for line differential protection when experiencing Phase and Frequency Locked Loop (PFLL) transition errors
- Motor Protection Systems
  - Motor Thermal Lockout Times to be displayed regardless of motor state
  - Asserted Motor Emergency Restart operand should reset the Restart Delay operand
  - Motor Restart Delay Lockout and Emergency Restart of a Motor
- Common Protection and Control Elements
  - B90 and C70 direct input/output ring failure in firmware 5.92/6.01
  - The Restricted Ground Fault algorithm has been changed to correctly apply timers that determine the value of negative sequence restraining current used during transformers energization and operation stages
  - Possible Overfrequency misoperation at low RMS metered values
- Communications
  - The UR operating system debug port has been changed to reject Ethernet traffic
  - IEC 61850 buffered and unbuffered report control blocks available for LLNO and GGIO1 have been changed to scan and capture event changes every two milliseconds
- PMU Synchrophasors
  - PMU elements have been changed to meet specified angle accuracy on UR devices connected to HardFiber bricks
- Cyber Security
  - New keyboard command for password reset and default settings aligned to NERC-CIP requirements
- Events and Records
  - Modbus register 0xF222 to show settings default cause
  - Event description added to allow better distinction between event types in Event Report
- Platform
  - HardFiber Brick firmware has been changed to improve the resilience against flash memory corruption

Capacitor Bank Protection and Control System

P **Neutral Voltage Unbalance Autoset and Voltage Differential Autoset not operational if C70 has only voltage inputs, i.e. only 8V CT/VT DSPs**

Applicable: C70

UR firmware version 7.20 introduces the following fix to the Neutral Voltage Unbalance and Voltage Differential elements. The Autoset functionality of both these elements does not change any of the coefficients as expected if the C70 has only voltage inputs, hence is not an issue if the C70 has any CT bank inputs in its order code.

GE tracking number: 720-4

Line Differential Protection Systems

F **The voltage memory for distance polarization in L90 relays has been changed to ensure that only actual voltage values are used when there is an important difference between system and sampling frequencies**

Applicable: L90

Inter-relay communication (IRC) between L90 devices located at each line terminal is primarily required for line differential and pilot scheme applications. Single or redundant communication channels can be applied.

After recovering from a channel failure, L90 devices must synchronize for the Line Differential element to return to normal operation. The synchronization process can cause the tracking (sampling) frequency to deviate from the system frequency. A significant difference between the "system frequency" and "sampling frequency" can cause the distance element to operate if voltage memory is used for distance polarization.

This FW release prevents the use of voltage memory for distance polarization when under the described condition.

This issue only affects users who have both (line differential and distance) protection elements enabled. Users who set both distance and line differential elements to enable simultaneously are advised to upgrade their relay's FW version with version 6.02 /7.1x.

For further information on the voltage memory for distance polarization, see the L90 instruction manual.

GE tracking number: 710-11

F **The Distance protection element have been changed to ensure that setting changes to line protection elements, made when the relays is in service, do not make the Phase Distance element operate**

Applicable: L90

Setting changes to UR devices can be carried out by uploading a complete setting file or editing individual setting fields via the front panel or EnerVista UR Setup software.

When editing individual settings, changing any of the line differential or distance protection setting fields can cause, provided the relay is in service and close-to-nominal current and voltage signals are applied, the Phase Distance element to operate.

This firmware release ensures that the Phase Distance element does not operate under the described conditions.

Standard operating procedures require users to remove the relay from service when protection related settings are changed or updated. Users who follow this type of procedure are not at risk of experiencing misoperation.

GE tracking number: 710-12

E **Increased security for line differential protection when experiencing Phase and Frequency Locked Loop (PFLL) transition errors**

Applicable: L30, L90

When line differential protection (87L) schemes are exposed to extremely noisy or unreliable channel conditions, which causes the PFLL element to lose synchronism and then re-synchronize, GE strongly recommends that, for maximum security, the disturbance detector element (50DD) be assigned to supervise operation of the 87L element.

Failing to follow this recommendation potentially can cause the 87L element to misoperate during re-synchronizing attempt.

Firmware version 7.20 improves the 87L element to prevent misoperation when, under the described conditions, the 50DD element is not supervising the 87L element.

Customers who have followed GE recommendations for heavily noisy channels or having reliable inter-relay communication are not required to take action.

GE tracking number: 720-7

Motor Protection Systems

E **Motor Thermal Lockout Times to be displayed regardless of motor state**

Applicable: M60

UR firmware version 7.20 introduces the following enhancements to the Actual Values of Motor data:

- Thermal Lockout Time
- Start/Hour Lockout Time
- Time-Between-Starts Lockout Time
- Restart Delay Lockout Time
- Total Motor Lockout Time

These times are calculated and displayed whether the motor is running or stopped. Calculated values are updated continuously while the motor is running. These calculations and displays have no impact on the Thermal element algorithm.

GE tracking number: 720-9

P **Asserted Motor Emergency Restart operand should reset the Restart Delay operand**

Applicable: M60

UR firmware version 7.20 introduces the following fixes to the Motor Restart Delay function:

the Motor Emergency Restart operand (logical 1) resets the Restart Delay OP operand. This change has no impact on the Thermal element algorithm, however allows restart of the motor without the need for the Restart Delay Timer to time-out.

GE tracking number: 720-10

P **Motor Restart Delay Lockout and Emergency Restart of a Motor**

Applicable: M60

UR firmware version 7.20 introduces the following fix to the Motor Restart Delay function. Issue:

After a successful motor start when an Emergency Restart function was used, the Emergency Restart operand is de-asserted but then the Restart Delay OP operand is re-asserted and the Restart Delay Lockout timer is loaded with previous motor stop remaining balance of Restart Delay Lockout timer value, which is incorrect.

Fix: After a successful motor start when an Emergency Restart function is used, the Emergency Restart operand is de-asserted, the Restart Delay OP operand remains de-asserted, and the Restart Delay Lockout timer initializes from 0 only if Restart Delay OP operand asserts when the motor goes offline.

GE tracking number: 720-11

Common Protection and Control Elements

C **B90 and C70 direct input/output ring failure in firmware 5.92/6.01**

Applicable: B90, C70

The direct inputs and outputs provide a means of sharing digital point states among UR devices over dedicated fiber (single or multimode), RS422, or G.703 interface. An Inter-Relay Communication (IRC) type module is required to provide these interfaces.

No switching equipment is required as the IEDs are connected directly in a ring or redundant (dual) ring configuration. This feature is optimized for speed and intended for pilot-aided schemes, distributed logic applications, or the extension of the input/output capabilities of a single relay chassis.

This firmware revision fixes the teleprotection feature that inadvertently prevented direct I/O data from being forwarded throughout the direct I/O ring.

As teleprotection and direct I/O features are mutually exclusive, this issue only affects products that do not use a teleprotection feature, specifically B90 and C70 relays.

Users who do not use the direct I/O functionality or whose B90/C70 relays do not have IRC modules are not affected by this issue.

GE tracking number: 602-1

P **The Restricted Ground Fault algorithm has been changed to correctly apply timers that determine the value of negative sequence restraining current used during transformers energization and operation stages**

Applicable: G30, G60, L90, T60

The Restricted Ground Fault element uses the maximum among the three current components as restraining signal:

Irest = max (IRO, IR1, IR2)

where the negative-sequence component of the restraining signal (IR2) is calculated as follows: IR2 = 1 x |I_2| or IR2 = 3 x |I_2|

Multiplier "1" is used right after 5 cycles of complete transformer de-energization, while multiplier "3" is used right after 2 cycles of complete transformer energization (during transformer's normal operation).

UR devices with previous firmware versions showed timers were set to 10 and 4 cycles instead.

This firmware version fixes this out-of-spec issue.

For details on the "Restricted Ground Fault" element, see the instruction manual of any applicable UR device.

GE tracking number: 720-13

F **Possible Overfrequency misoperation at low RMS metered values**

Applicable: D60, F60, G30, G60, L90, M60, N60, T60; however mostly Generator Protection applications

At very low signal sources (less than 5%), the measured frequency value can be incorrect at low frequency levels. This is experienced during generator startup. The measured frequency is based on zero-crossings, which can be invalid.

The following was done to correct the frequency metering at low signal and frequency levels:

- Hysteresis is increased to 5% of the signal RMS cutoff threshold
- Five consecutive cycles of good RMS waveform metered signal are checked to validate a good signal

GE tracking number: 720-57

Communications

C **The UR operating system debug port has been changed to reject Ethernet traffic**

Applicable: B30, B90, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

All UR devices equipped with an Ethernet port support the logical port #17185. This logical port is a debugging port dedicated to the device operating system. This port is used for factory service only.

Any port scanner connected to a UR Ethernet port detects that port as "open," however UR devices with firmware version 5.92 do support a data filter that discards any data for the debug port. The debug port traffic is only allowed when a factory service password requirement is met.

End users having UR devices with an Ethernet port and being concerned about cyber security in their substation LAN can upgrade their devices with UR firmware version 5.92. UR devices with no Ethernet port are not affected.

GE tracking number: 592-1

C **IEC 61850 buffered and unbuffered report control blocks available for LLNO and GGIO1 have been changed to scan and capture event changes every two milliseconds**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

UR firmware version 6.02 speeds up to two milliseconds the scanning and capture period of reporting services available for LLNO and GGIO1 data sets. At the end of each scanning period, data is buffered. However, like previous versions, reports are still generated and sent at the end of every MMS Reporting period (~32 ms).

Multiple reports can be created but only one is sent at the end of each MMS reporting period; thus multiple reports require multiple periods to complete transmission.

Prior to this firmware version, the LLNO and GGIO1 data sets were scanned and buffered every ~32 ms, which caused the following behaviors:

- If multiple status changes occurred within one scanning period, these events could show a common time stamp value
- Status changes that reset within the same scanning period may not be captured

This firmware version fixes these behaviors.

End users who do not use LLNO or GGIO1 report control blocks are not affected by this issue.

GE tracking number: 720-37

PMU Synchrophasors

M **PMU elements have been changed to meet specified angle accuracy on UR devices connected to HardFiber bricks**

Applicable: D60, F60, G60, L30, L90, N60, T60

UR devices that are part of a HardFiber solution and configured to stream Phasor Measurement Unit (PMU) data can show that phasor values part of the PMU are shifted by about 35 degrees. This is introduced by the existing communication delay between process bus modules in the relay and bricks (merging unit).

With this firmware release, this delay is compensated so the generated PMU data meets published accuracy.

GE tracking number: 602-2

Cyber Security

N **New keyboard command for password reset and default settings aligned to NERC-CIP requirements**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

UR devices have an encrypted version of the "Setting" and "Command" passwords that can be used to retrieve the actual passwords when users forget any of the passwords. To use the previous encrypted passwords, users have to contact GE Multilin's technical support team and provide their encrypted passwords (one or more per relay), then technical support provides a decrypted version for each submitted password.

This firmware version introduces a new mechanism for password reset (not password retrieval) that gives users independence and complete ownership of the password reset procedure—one key code that can be used on all UR devices.

To reset the password, users must now submit a key via the front panel (users can obtain their key by contacting GE technical support). This "password reset command" also clears all settings and event records, which is aligned to the NERC-CIP R7.1 and R7.2 requirement.

Users are advised to back up the relay data previous to submitting the password reset command. For details, see the UR instruction manual.

This change only affects UR devices with firmware version 5.92/6.02.

GE tracking number: 592-2

Events and Records

N **Modbus register 0xF222 to show settings default cause**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

UR settings can be defaulted by any of the following commands:

- Factory service
- Update order code
- New major firmware revision
- Bad setting detected during start up

UR firmware 6.02 enables UR devices to record the cause of the last settings default command.

UR devices with previous firmware versions did record the settings default command but did not capture the cause.

This record is accessible via Modbus register 0xF222 and via the HTTP protocol.

GE tracking number: 602-3

E **Event description added to allow better distinction between event types in Event Report**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

Event descriptions of contact inputs and outputs, virtual inputs and outputs, direct inputs and outputs, remote inputs, double point inputs, field contact inputs and outputs, field latching outputs, shared inputs and outputs, FlexElements, and digital elements include added abbreviated text to allow belter distinction between various event types with the same name. For example, Contact Input 1 ON with default settings is presented as Cont Ip 1 ON(CI1).

GE tracking number: 720-44

Platform

E HardFiber Brick firmware has been changed to improve the resilience against flash memory corruption

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

Brick firmware has improved resiliency against flash memory corruption during boot-up.

This firmware release ensures that Brick firmware is maintained when connecting the Brick to HardFiber URs with earlier firmware versions.

GE tracking number: 720-60

Firmware 6.03

Summary

- Low Impedance Bus Differential System – B90
  - Oscillography functionality has been changed to accurately show current values of the 7th analog channel of 8K type DSP modules
- Generator Protection System – G60
  - G60 protection capabilities have been improved to fit schemes where nominal frequency can be switched between 50 and 60 Hz
- Common Protection and Control Elements
  - The "Fault Type" comparator logic, that is part of distance protection elements, has been changed to correctly block the ground distance elements when sensing a double-line-to-ground fault
  - Neutral Directional Overcurrent detection error fix
  - Setting Group elements have been changed to prevent taking relays out of service when switching setting groups
- Communications
  - IEC 61850 server has been changed to correctly indicate supported services
  - UR FlexElements have been changed to operate properly when programmed to use analog IEC 61850 GOOSE values together with local FlexAnalog values
  - The UR real time clock element has been changed to calculate correctly UTC when receiving IRIG-B time code signal with IEEE 1344 extension
- Platform
  - The "Equipment Mismatch" self-test warning alarm has been changed to prevent settings from being defaulted and to prevent continuous rebooting when triggered by I/O modules

Low Impedance Bus Differential System – B90

R **Oscillography functionality has been changed to accurately show current values of the 7th analog channel of 8K type DSP modules**

Applicable: B90

Analog values shown on an oscillography record are a scaled representation of captures values.

B90 devices with previous firmware versions showed that scale factors were incorrectly applied to the 7th analog channel of any 8K type Digital Signal processor (DSP) module installed in the relay.

This firmware version ensures that accurate values are shown and scale factors are applied correctly to all analog channels regardless the type of DSP module installed.

Performance of protection elements is not compromised by this issue. For details on the B90 oscillography, see the B90 instruction manual.

GE tracking number: 603-1

Generator Protection System – G60

E **G60 protection capabilities have been improved to fit schemes where nominal frequency can be switched between 50 and 60 Hz**

Applicable: G60

Special generator protection schemes (like mobile generation stations) can be required to support different nominal frequency values (for example 50 and 60 Hz), and so the associated protection devices must provide an easy way to switch between nominal frequency levels.

This firmware release adds to G60 devices a "toggle nominal frequency" mode. When this mode is enabled, the nominal frequency can be switched between 50 and 60 Hz by activating (rising edge) virtual output 96. This allows customers to create special logic for switching nominal frequency.

The "Toggle Nominal Frequency" mode can be enabled by submitting "Command code 107" on the relay front panel. Entering "Command code 108" disables this mode.

The actual nominal frequency value can be monitored remotely by looking at the "Nominal Frequency" setting field.

Toggle Nominal frequency mode adds the text "Nominal Frequency Toggle Enabled" to the G60 web page when active.

GE tracking number: 603-2

Common Protection and Control Elements

P **The "Fault Type" comparator logic, that is part of distance protection elements, has been changed to correctly block the ground distance elements when sensing a double-line-to-ground fault**

Applicable: D30, D60, G60, L60, L90, T60

In order to maintain selectivity during a double-line-to-ground fault, the Ground Distance element is supervised by the "Fault Type" comparator that uses phase angle between the negative and zero-sequence currents.

However, the "Fault Type" comparator can also be removed when under the following conditions:

a. During an open pole condition or

b. When "3I_0 > OC Supv and I_2 < CutOff"

Any of these conditions prevents the "Fault Type" comparator from blocking the ground distance elements.

Devices with previous firmware versions show the CutOff level is not correctly scaled, which breaks the condition "b" described.

End users who set the distance element to enabled are advised to upgrade their relay's firmware version to version 7.1x or later.

For details on the "Fault Type" comparator, see the instruction manual of any applicable UR device.

GE tracking number: 710-8

P **Neutral Directional Overcurrent detection error fix**

Applicable: C70, D30, D60, F60, G30, G60, L30, L60, L90, M60, T60

Neutral Directional Overcurrent element flags NTRL DIR OC FWD and NTRL DIR OC REV do not operate as expected when polarization is selected as Dual.

When ground current (IG) is not supplied, the V0 and I0 comparator had a small error, reducing the operate region by 20 to 40 degrees (from the limit angle) and was found to be smaller for the NTRL DIR OC REV operand. This applies to all previous firmware versions and is fixed in 7.20.

GE tracking number: 720-26

U **Setting Group elements have been changed to prevent taking relays out of service when switching setting groups**

Applicable: D30, D60, G60, L60, L90, T60

Setting group switching is a fast operation that, under normal conditions, should not trigger any self-test alarm.

Some UR devices with previous firmware revisions have shown that switching setting groups can activate a major self-test alarm (Module failure 5) that takes the relay out-of-service. The relay has to be rebooted to get it back in service.

This firmware release ensures that UR relays do not trigger unnecessary alarms when switching setting groups.

End users whose URs are not configured for switching setting groups are not affected by this issue. For details on setting group switching, see the instruction manual of any applicable UR device.

GE tracking number: 603-3

Communications

C **IEC 61850 server has been changed to correctly indicate supported services**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

After a 61850 client initiates communication with a UR device, the UR indicates all supported MMS client-server services. This can cause unnecessary client-server traffic.

UR devices with previous firmware versions incorrectly indicate that MMS "DefineNamedVariableList" is a supported service.

This firmware version fixes this issue.

GE tracking number: 721-02

C **UR FlexElements have been changed to operate properly when programmed to use analog IEC 61850 GOOSE values together with local FlexAnalog values**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

UR FlexElements are universal comparators that can calculate net difference between two values or monitor UR actual analog values. Local FlexAnalog and GOOSE analogs are supported by FlexElements.

Previous firmware revisions have shown that there was a mismatch of per unit bases between GOOSE analogs and local FlexAnalogs, which prevented correct operation of FlexElements when configured to use these two types of analog values.

This firmware release ensures correct operation of FlexElements when set with GOOSE analogs and local FlexAnalogs. This kind of setting is found on advanced applications, such as voltage synch-check between local and remote line terminals.

If FlexElements in your existing UR devices are not set with GOOSE analogs together with local FlexAnalogs, a firmware upgrade is not required.

For details on FlexElements, see the instruction manual of any applicable UR device.

GE tracking number: 603-4

C **The UR real time clock element has been changed to calculate correctly UTC when receiving IRIG-B time code signal with IEEE 1344 extension**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

UR devices support receiving IRIG-B signals with or without the IEEE 1344 extension. The IEEE 1344 extension adds additional information, such as year, daylight savings time (DST), and time zone, to the IRIG-B signal.

Prior firmware versions have shown that UR devices receiving IRIG-B signals with the IEEE 1344 extension may not accurately calculate UTC, which directly affects the GOOSE messages time stamp (must use UTC reference).

This firmware version ensures that UTC is correctly calculated under the described conditions.
For details on UR real time clock functionality, see the instruction manual of any applicable UR device.
GE tracking number: 583-03

Platform

U **The "Equipment Mismatch" self-test warning alarm has been changed to prevent settings from being defaulted and to prevent continuous rebooting when triggered by I/O modules**

Applicable: B30, B90, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60
A defective input and output (I/O) module can trigger an "Equipment Mismatch" self-test alarm. Previous firmware revisions have shown that, under this condition, the relay settings can be defaulted and, if an "update order code" command is submitted, the relay can fall into continuous rebooting.
This firmware release ensures that settings are not defaulted and prevents continuous reboot when UR relays are under the described conditions.
Users having URs with a previous firmware version can detect that settings have been defaulted when an "Equipment Mismatch" alarm and a "Relay out-of-service" alarm are active simultaneously. A continuous rebooting condition can be detected by identifying intermittent and consistent communication in and out events.
For details on self-test warning functionality, see the instruction manual of any applicable UR device.
GE tracking number: 603-5

Firmware 6.04

Summary

Release 6.04 of the Universal Relay (UR) series introduces improvements for general and protection functions. Highlights include:

- Capacitor Bank Protection and Control System – C70
  - The automatic-setting feature of voltage differential (87V) has been changed to prevent potential blocking of 87V
- Common Protection and Control elements
  - Breaker Arcing element corrections
  - Time Overcurrent (TOC) elements changed to fix operation time
- Common Protection and Control elements
  - Breaker position XCBR.ST.Pos attribute corrected

Capacitor Bank Protection and Control System – C70

U The automatic-setting feature of voltage differential (87V) has been changed to prevent potential blocking of 87V

604-1

Applicable: C70

The voltage differential (87V) automatic-setting feature has been changed to prevent blocking of the 87V element when supervisory conditions for calculating match factor are not met. This is only an issue if Autoset is set to Auto Mode.

If the automatic-setting determines that the matching factors are invalid, the element now reverts back to pre-existing balancing factors, including supervisory conditions, and does not block 87V.

Firmware from version 5.20 is affected.

GE tracking number: 604-1

Common Protection and Control Elements

M Breaker Arcing element corrections

604-2

Applicable: C60, D30, D60, F35, F60, L30, L60, L90, T35, T60

The Breaker Arcing element has a setting labeled **BKR 1 ARC AMP DELAY**, which is used to program the delay interval between the time that the tripping sequence is initiated and the time the breaker contacts are expected to part. Integration of currents starts after the delay expires and when configured breaker contacts are received, on a per-phase basis.

The check for tripping sequence initiation is done as per the **BKR 1 ARC AMP DELAY** setting. This is corrected to monitor the input conditions to the tripping sequence every run of the element and to restart the initiation when conditions are satisfied. With this change, the Breaker Arcing element integrates every 100 ms regardless of the timer delay setting.

This problem existed since 4.20 firmware revision and is fixed.

GE tracking number: 604-2

P **Time Overcurrent (TOC) elements were changed to ensure correct operation time when the relay status is changed from "Not Programmed" to "Programmed"**

Applicable: B30, B90, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

Previous FW versions allow the TOC elements to run while in the "Not Programmed" condition, so if there was a fault while changing the relay status to "Programmed" (setting change), the TOC elements operated faster than specified.

All TOC elements have been modified to ensure that the element is inactive when the relay is in the "Not Programmed" state.

Standard maintenance procedures require users to block or disconnect trip commands (for example through test block or freezing contact outputs) while performing any maintenance/in-servicing activity on the protective relays. If procedures do not fulfill protection isolation, upgrading to this newer firmware version is advisable.

Firmware versions 5.47 and below, 5.50 to 5.53, and 6.00 to 6.03 are affected.

GE tracking number: 554-2

Communications

C **Breaker position XCBR.ST.Pos attribute corrected**

Applicable: B30, C30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60

The intermediate state of the breaker position XCBR.ST.Pos attribute was corrected in this firmware release. All other state indications were confirmed to be correct.

All previous firmware versions are affected.

GE tracking number: 604-3

HardFiber

U **HardFiber functionality corrections**

Applicable: All UR Products with HardFiber capabilities

Firmware version 6.03 does not have the correct binary file for HardFiber Brick, consequently any upgrade to 6.03 from any release except 6.02 corrupts the Brick and needs to be upgraded in the factory.

This firmware release corrects the issue.

GE tracking number: 604-5

Firmware 6.05

Summary

Improvements in version 6.05 include the following.

- Common Platform Elements
  - LEDs of user programmable pushbuttons to signal correctly when LED tests in progress
  - IEC 61850 double point status (DPS) out of order configuration issue corrected
  - Customer Support Information webpage and links have been updated
  - URinfo.txt file corrections
  - CPU high-utilization monitor enhanced
  - Changes to the DSP setting buffer prevents nuisance alarms
  - Improvement to DSP checksum diagnostic
  - Improvement to DSP internal diagnostic timestamp
  - Improvement to DSP Interrupt diagnostic
- Common Protection and Control Elements
  - Phase Overvoltage element operating time corrected
  - Volts per Hz element operating time corrected at low frequencies
  - In UR devices with HardFiber, changes to Phase IOC operands prevent them from remaining latched when the IOC function is disabled
  - UR setting group elements have been changed not to reset when power cycling the relay
- Communications
  - UR FlexElements have been changed to properly operate when programmed to use IEC 61850 GOOSE analogs inputs
  - Corrected GOOSE analogs metering and recording
  - Corrected IEC 61850 GOOSE input analogs to use RxGoose PU Base
  - Client connection to IEC 61850 buffered and unbuffered report control block releases randomly on disconnection
- Controller Systems – C30, C60
  - Oscillography time alignment issues when the same signal is used as event trigger and digital channel
- Cyber Security
  - Security audit trail changed to prevent corrupted records when relay is power cycle
  - Session monitor password protection is removed from “FACTORY_EVENT.TXT” and “SETTING_CHANGES.LOG”
- Events and Records
  - Increased accuracy of fault locator element
  - Changes to the fault locator element prevent relay issue
- Generator Protection Systems – G30, G60
  - G60 overfrequency DPO events have been changed to correctly trigger when frequency elements drop out
- Line Differential Systems – L30, L60, L90
  - In L30 and L90 devices with HardFiber, the CT Fail Detector element #2 has been changed to use the setting value from the correct timer

- PMU – Synchrophasor
  - Corrected PMU angle measurements for certain configurations
  - PMU phasor angles corrected for UR devices communicating to HardFiber Brick when more than one PMU is enabled
  - UR PMU frequency and ROCOF functions have been corrected
  - PMU elements ensure stable readings regardless the source assignment and configuration
- Transformer Protection Systems – T35, T60
  - Transformer 2nd harmonic metering corrections in FlexElements

Common Platform Elements

C **LEDs of user programmable pushbuttons to signal correctly when LED tests in progress**

Products: All
Impacted firmware: All to 6.04
Corrected firmware: 6.05
Workaround: None
Description: Each programmable pushbutton on a UR front-panel has an LED that lights when the pushbutton is pressed.
Previous firmware versions allow these LEDs to light up randomly when running an LED test command.
With release 6.05, all pushbutton LEDs light simultaneously and steadily when an LED test is performed.
GE tracking number: 605-02

C **IEC 61850 double point status (DPS) out of order configuration issue corrected**

Products: All with IEC 61850 software option
Impacted firmware: All to 6.04, 7.0x to 7.24
Corrected firmware: 6.05, 7.25
Workaround: None
Description: IEC 61850 double point status operand bits are incorrect if configured out of order.
The new releases fix the issue.
GE tracking number: 725-12

G **Customer Support Information webpage and links have been updated**

Products: All
Impacted firmware: All to 6.04, 7.0x to 7.1x
Corrected firmware: 6.05, 7.20
Workaround: None
Description: The customer service webpage information is updated to
Address: 650 Markland St.
Markham, Ontario
Canada L6C 0M1
Phone: (905) 927-7070
Fax: (905) 927-5096
Email: multilin.tech@ge.com
Internet: http://www.gedigitalenergy.com/multilin/index.htm
GE tracking numbers: 720-29

R **URinfo.txt file corrections**

Products: All

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31

Corrected firmware: 6.05, 7.25, 7.32

Workaround: None

Description: Incorrect serial number, firmware boot version, and CPU module serial number are being retrieved from the relay settings file, for example the URinfo.txt file.

In the new releases, the boot revision, serial number and CPU module serial number are corrected in the urinfo.txt file retrieved by the EnerVista UR Setup software.

GE tracking numbers: 725-20

E **CPU high-utilization monitor enhanced**

Products: All

Impacted firmware: All to 6.04, 7.0x to 7.24

Corrected firmware: 6.05, 7.25, 7.31

Workaround: None

Description: The CPU utilization monitor available on the UR webpage has been enhanced with four counters to provide a trend.

GE tracking numbers: 605-8

R **Changes to the DSP setting buffer prevents nuisance alarms**

Products: All

Impacted firmware: 5.70 to 6.04

Corrected firmware: 6.05

Workaround: None

Description: The internal DSP register used to calculate the checksum of the setting buffer is corrected to 0 during initialization. Some previous versions had an incorrect initial value, thus the configuration of sources (for example, enabling the source) incorrectly triggers Module Failure 07.

Release 6.05 fixes the issue.

GE tracking numbers: 605-11

E **Improvement to DSP checksum diagnostic**

Products: All

Impacted firmware: All after 5.20

Corrected firmware: 6.05, 7.26

Workaround: None

Description: Improvements applied to increase relay dependability.

GE tracking numbers: 605-13

E **Improvement to DSP internal diagnostic timestamp**

Products: All

Impacted firmware: All after 5.70

Corrected firmware: 6.05, 7.26

Workaround: None

Description: Improvements applied to time stamp of internal diagnostic events.

GE tracking numbers: 605-14

E **Improvement to DSP Interrupt diagnostic**

Products: All

Impacted firmware: All after 5.70
Corrected firmware: 6.05
Workaround: None
Description: Improvements applied to increase relay dependability.
GE tracking numbers: 605-15

Common Protection and Control Elements

P **Phase Overvoltage element operating time corrected**

Products: C60, C70, D30, D60, F60, G30, G60, L30, L60, L90, M60, N60, T60
Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31
Corrected firmware: 6.05, 7.25, 7.32
Workaround: None
Description: The Phase Overvoltage operate time is too slow, not meeting specifications. The reason for the slower operation is the incorrect number of security counts used.
The new releases fix the issue. The Phase Overvoltage element now operates in less than 30 ms at 1.1 x pickup, which is one cycle faster than before the fix and meets specifications.
GE tracking numbers: 725-6

P **Volts per Hz element operating time corrected at low frequencies**

Products: G30, G60, T60
Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31
Corrected firmware: 6.05, 7.25, 7.26, 7.32
Workaround: None
Description: The Volts per Hertz element operates faster than expected if the operating curve is set to definite time at low voltages and frequencies (tested at 14% of pickup). The operate time is correct when V/Hz is 25% above nominal voltage/frequency.
The new releases fix this issue.
GE tracking numbers: 725-5

P **In UR devices with HardFiber, changes to Phase IOC operands prevent them from remaining latched when the IOC function is disabled**

Products: C70, D60, and L90 with HardFiber
Impacted firmware: 5.60 to 6.04
Corrected firmware: 6.05
Workaround: None
Description: Operands of Phase IOC elements can be set to latch, self-reset, or disabled via user settings. If the operand is latched due to a fault event, disabling the Phase IOC element must reset the operand. Existing firmware versions allow this operand to remain latched when the respective element is disabled.
This release fixes the issue.
GE tracking numbers: 605-5

P **UR setting group elements have been changed not to reset when power cycling the relay**

Products: All
Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30
Corrected firmware: 6.05, 7.25, 7.31
Workaround: None
Description: Default settings in UR relays make “setting group #1” always active. When configuration is

changed to enable another setting group (for example, Setting group #3) and the setting group element is in "Blocked" state, then the active setting group may reset to default (group #1) after power cycling the relay.

GE tracking numbers: 605-9

Communications

C **UR FlexElements have been changed to properly operate when programmed to use IEC 61850 GOOSE analogs inputs**

Product: All with IEC 61850 software option

Impacted firmware: All to 6.04

Corrected firmware: 6.05, 5.72

Workaround: None

Description: The UR FlexElements are universal comparators that can calculate net difference or monitor UR actual analog values.

Previous FW version can allow FlexElements to improperly apply the unit base value when IEC 61850 GOOSE analog are set as the FlexElement's input, which can lead to an incorrect operation of the FlexElement.

If analog GOOSE inputs are not being used or your relay's firmware version matches the corrected or later releases, no action is required.

GE tracking numbers: 572-6

R **Corrected GOOSE analogs metering and recording**

Products: All with IEC 61850 software option

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31

Corrected firmware: 6.05, 7.25, 7.32

Workaround: None

Description: In the new releases, the presentation of the GOOSE analogs in oscillography and data logger is changed to per unit, to be consistent with FlexElements and other FlexAnalogs. GOOSE analogs now are presented in PU units in all types of logs.

GE tracking numbers: 725-19

C **Corrected IEC 61850 GOOSE input analogs to use RxGoose PU Base**

Products: All with IEC 61850 software option

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31

Corrected firmware: 6.05, 7.25, 7.32

Workaround: None

Description: The base per unit of FlexElements or DCmA output is incorrect if configured to GOOSE analog inputs, causing incorrect operation.

The new releases fix this issue to use received Analog Goose per unit base.

GE tracking numbers: 725-9

C **Client connection to IEC 61850 buffered and unbuffered report control block releases randomly on disconnection**

Products: All with IEC 61850 software option

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31

Corrected firmware: 6.05, 7.25, 7.26, 7.32

Workaround: None

Description: When an IEC 61850 client loses connection to buffered or unbuffered report control blocks

(BRCB or URCB), the connection is reserved for limited time to allow for recovery. When this time expires, the connection is released to allow other clients connect. Releasing the client connection is now enforced to 2 minutes, where it was previously random between 2 and 10 minutes.

GE tracking numbers: 725-10

Controller Systems – C30, C60

R **Oscillography time alignment issues when the same signal is used as event trigger and digital channel**

Products: C30

Impacted firmware: 6.02

Corrected firmware: 6.05

Workaround: None

Description: The oscillography element allows users to configure, among other settings, the event trigger and up to 64 digital channels. When the same digital operand is configured to both settings, the oscillography shows time misalignment between trigger and the actual digital signal.

Release 6.05 fixes the issue.

GE tracking numbers: 605-01

Cyber Security

R **Security audit trail changed to prevent corrupted records when relay is power cycled**

Products: All

Impacted firmware: All to 6.04

Corrected firmware: 6.05

Workaround: None

Description: The Security Audit Trail functionality records some of the relay settings when a setting change is performed. The computer MAC address and name are captured to identify the communication session that changed the settings. The recorded settings are logged in the file "factory_event.txt". If power is cycled while these settings are stored, the settings in flash memory can be corrupted resulting in defaulting all settings.

Release 6.05 fixes the issue.

GE tracking numbers: 605-3

C **Session monitor password protection is removed from "FACTORY_EVENT.TXT" and "SETTING_CHANGES.LOG"**

Products: All

Impacted firmware: All to 6.04, 7.0x to 7.23

Corrected firmware: 6.05, 7.24

Workaround: None

Description: Password protection is removed from "FACTORY_EVENT.TXT" and "SETTING_CHANGES.LOG" security log files with the CyberSentry option, to allow Gateways (D400) without SSH port forwarding capabilities to write MODBUS operations and enable access to these security log files.

GE tracking numbers: 724-3

Events and Records

R **Increased accuracy of fault locator element**

Products: C60, D30, D60, F35, F60, L30, L60, L90

Impacted firmware: All to 6.04

Corrected firmware: 6.05, 7.26

Workaround: None

Description: Accuracy of the Fault Report and fault locator elements has been improved by applying more filtering to the fault location results and by continuing calculation during evolving faults. Prior to the changes, fault location accuracy did not meet specification.

GE tracking numbers: 605-4

R **Changes to the fault locator element prevent relay issue**

Products: C70, D30, D60, F35, F60, L30, L60, L90

Impacted firmware: All to 6.04, 7.0x to 7.23

Corrected firmware: 6.05

Workaround: None

Description: The fault locator element in some UR relays can cause the relay to fail due to insufficient memory stack size.

Release 6.05 fixes this issue.

GE tracking numbers: 605-10

Generator Protection Systems – G30, G60

P **G60 overfrequency DPO events have been changed to correctly trigger when frequency elements drop out**

Products: G60

Impacted firmware: All to 6.04

Corrected firmware: 6.05

Workaround: None

Description: G60 overfrequency drop out "DPO" events were triggered by the Overfrequency OP operands and not from the overfrequency DPO operands.

Release 6.05 fixes the issue.

GE tracking numbers: 605-7

Line Differential Systems – L30, L60, L90

P **In L30 and L90 devices with HardFiber, the CT Fail Detector element #2 has been changed to use the setting value from the correct timer**

Products: L30 and L90 with HardFiber

Impacted firmware: All to 6.04

Corrected firmware: 6.05

Workaround: None

Description: The second instance of the CT Fail Detector element "CT Fail 2" uses the timer value of the first instance "CT Fail 1."

Release 6.05 fixes the issue.

GE tracking numbers: 605-6

PMU - Synchrophasor

P **Corrected PMU angle measurements for certain configurations**

Products: All with PMU software option - C60, D60, F60, G60, L30, L90, N60, T60

Impacted firmware: All to 6.04, 7.0x to 7.31

Corrected firmware: 6.05, 7.32

Workaround: None

Description: Particular arrangements of sources can lead to PMU angle measurements to be off by three to five degrees. For example, assigning source 4 to PMU2 does this, and assigning a PMU to the second signal source when the first signal source is not used also does this.

The new releases fix the issue. Phase angles are consistent amongst all PMUs regardless of source used.

GE tracking numbers: 732-37

M **PMU phasor angles corrected for UR devices communicating to HardFiber Brick when more than one PMU is enabled**

Products: All with PMU software option and Process Bus Card - C60, D60, F60, G60, L30, L90, N60, T60

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31

Corrected firmware: 6.05, 7.25, 7.26, 7.32

Workaround: None

Description: Phase angles of other than the first enabled PMU are off by 30 degrees if more than one PMU is used in a UR communicating to a HardFiber Brick.

The new releases fix the issue.

GE tracking numbers: 725-27

M **UR PMU frequency and ROCOF functions have been corrected**

Products: All with PMU software option - C60, D60, F60, G60, L30, L90, N60, T60

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.31

Corrected firmware: 6.05, 7.25, 7.32

Workaround: None

Description: Current and voltage cutoff levels have been corrected in PMU frequency and ROCOF functions.

The new releases fix the issue.

GE tracking numbers: 725-14

M **PMU elements ensure stable readings regardless the source assignment and configuration**

Products: C60, D60, F60, G60, L30, L90, N60, T60

Impacted firmware: All to 6.04

Corrected firmware: 6.05

Workaround: Ensure source one is used when source two is assigned to PMU elements

Description: Particular arrangements of sources can lead to unstable PMU readings. For example, When PMU is assigned the second source of a DSP and the first source of the DSP is unused, then the PMU metering is not stable.

Release 6.05 fixes the issue.

GE tracking numbers: 605-12

Transformer Protection Systems – T35, T60

M **Transformer 2nd harmonic metering corrections in FlexElements**

Products: T35, T60

Impacted firmware: All to 6.04, 7.0x to 7.24, 7.30, 7.31

Corrected firmware: 6.05, 7.25, 7.26, 7.32

Workaround: None

Description: When 2nd harmonic differential harmonics magnitudes Xfmr harm2 Iad, Ibd, and Icd are used as an input to FlexElements, the FlexElement metering value does not read correctly and shows a higher value.

The new releases use per unit correction factors to fix the issue.

GE tracking numbers: 725-21

Firmware 6.06

Summary

Improvements include the following.

- Bus Differential System – B90
  - Fixed unexpected reboot in B90s with mismatch between hardware configuration and software option
  - Corrected firmware to prevent unexpected restart in B90
- Capacitor Bank Protection and Control System – C70
  - Corrected C70 Voltage Differential element calculation
- Line Differential Systems – L30, L90
  - Improved L90 with HardFiber reboot command structure
  - Corrected 87L Max Asymmetry alarms
  - Enhanced line differential with In-zone Transformer protection element to allow schemes where not all line differential devices have the In-zone Tx option
- Network Stability System – N60
  - Changed the initialization process to prevent unnecessary reboot after a firmware upgrade
- Transformer Protection System – G30, T35, T60
  - Corrected firmware to prevent latching of “XFMR PCNT DIFF PKP” and “XFMR PCNT DIFF 5TH" operands for Transformer Percent Differential element
- Common Protection and Control Elements
  - Corrected the scaling of “V0 3rd Harmonic” FlexAnalog in VT Fuse Failure element 2 and higher
  - Changed VT Fuse Fail Element reset time
  - Corrected operation of Volts/Hz element with definite time
  - Corrected Thermal Overload Protection operation when the pre-fault current is very close to the base current pickup
  - Corrected the use of “REVERSE PH ROTATION” settings when relay boots up
  - Corrected Thermal Overload element to prevent early trip on hot curve at marginal thermal pickup level
  - Changed Autoreclose element timer, connected to Phase Select Multi-P operand pickup time, from 0 to 10 ms
  - Corrected Breaker Arcing element
  - Corrected FlexElement actual value metering when using Volts per Hertz element 2
  - Modified the VTFF element to prevent continued operation after healthy voltages are restored and to increase selectivity for slight voltage disturbance events
  - Corrected echo logic in the 1P POTT pilot scheme
  - Changed VT Fuse Failure (VTFF) element to correctly operate under specific fault conditions
  - Fixed C60 and N60 Autoreclose and VTFF elements to use correctly the Open Pole OP operand
  - Corrected firmware to prevent breaker misoperation when removing the breaker block after issuing an IEC 61850 breaker command with an active block
  - Corrected firmware to prevent applying an IEC 61850 CSWI control command when XCBR#.BlkOpn or XCBR#.BlkCls is active
- Common Platform Functions
  - Corrected firmware to prevent "Unit Not Calibrated: Contact Factory (F8L)" message on switching to

firmware 7 CPU module
  - Fixed firmware to prevent an unexpected restart when accessing the Default Settings Diagnostic webpage or text file after a firmware upgrade
  - Fixed firmware to prevent an unexpected restart when upgrading a relay without DSP modules
  - Corrected reset of Virtual Inputs when set to Self-Reset
  - Corrected firmware to prevent incorrect deactivation of the "ANY MAJOR ERROR" FlexLogic operand when a minor self-test error is cleared
  - Corrected operation of optional user-programmable pushbuttons 4 to 7 with basic front panel via EnerVista software
  - Corrected firmware to issue the “BAD IRIG-B” signal
  - Corrected firmware to update Process Card after a CPU firmware upgrade
  - Corrected voltage LED latching
  - Changed firmware to allow time entry when IRIG-B or SNTP is enabled
- Events and Records
  - Fixed DSP self-test error to record events during DSP failure and allow user pushbuttons to operate
- Cyber Security
  - Fixed predictable TCP sequence number vulnerability in VxWorks 5.3.1
  - Corrected firmware to prevent an unexpected restart due to MMS frames with corrupted CLNP header
  - Fixed DNP3 vulnerability described in ICS-CERT Advisory (ICSA-13-291-01B)
  - Fixed firmware to address VxWorks vulnerability described in ICS-CERT Advisory ICSA-10-214-01
- Communications
  - Corrected IEC 61850 GOOSE input analogs to use RxGOOSE PU Base
  - Corrected unexpected 1-P Autoreclose lockout in AR “Protection Only” mode
  - Corrected firmware to allow changes to the IEC 61850 GI attribute only for the client that reserved the IEC 61850 report
  - Allowed write to unsupported IEC 61850 buffered and unbuffered report control block trigger options TrgOps
  - Corrected possible unexpected restart in relays with Breaker Arcing elements and order code with more than two CT banks
  - Corrected potential unexpected restart at bootup in relays using IEC 60870-5-104
  - Blocked clock synchronization by communication protocols (DNP, IEC 60870-5-103, IEC 60870-5-104) if IRIG-B is active
  - Fixed firmware to correctly display IEC 61850 XCBR CO data
  - Corrected functionality of IEC104 Counter Interrogation command with qualifier “freeze with reset”
  - Fixed firmware to return correctly the value of point 4009 (Events Since Last Clear) to an IEC104 Counter Interrogation command
  - Corrected IEC 60870-5-104 IV (valid/invalid) bit in timestamp
- HardFiber
  - Fixed UR with HardFiber in service but not protecting
- Phasor Measurement Unit (PMU) - Synchrophasors
  - Updated year in the PMU header frame to 2014 in compliance with IEEE C37.118 2011 standard
- Transducer Inputs and Outputs
  - Corrected Rx GOOSE analogs assigned to DCmA output that show zero after a power cycle
- Self-Test Diagnostic Alarms

– Added alarms and improved functionality

Bus Differential System – B90

B **Fixed unexpected reboot in B90s with mismatch between hardware configuration and software option**

Products: B90

Impacted firmware: All to 6.05, 7.00 to 7.31

Corrected firmware: 6.06, 7.32, 7.40

Workaround: Update hardware configuration to match software option

Description: If there is a mismatch between the number of CT banks in the relay and the software option indicating the number of feeders in the order code, the relay experiences unexpected, continuous rebooting shortly after going into service.

In the new releases, the firmware prevents unexpected rebooting in a B90 relay when the hardware configuration (number of CT banks) does not match the software option (number of feeders). The device goes into service and no alarm generates about a mismatch.

GE tracking number: 732-1

B **Corrected firmware to prevent unexpected restart in B90**

Products: B90

Impacted firmware: All to 6.05, 7.00 to 7.26

Corrected firmware: 6.06, 7.30

Workaround: None

Description: A B30 or B90 relay can experience an unexpected restart when zone 2 or higher LEDs are turned on.

In the new releases, this issue is resolved.

GE tracking number: 606-12

Capacitor Bank Protection and Control System – C70

C **Corrected C70 Voltage Differential element calculation**

Products: C70

Impacted firmware: All to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: Enter the K factor manually

Description: The 87V element does not calculate K factors correctly, when K factor is close to 1 or below 1.

The new releases fix the issue.

GE tracking number: 740-18

Line Differential Systems – L30, L90

R **Improved L90 with HardFiber reboot command structure**

Products: L90

Impacted firmware: All to 6.05, 7.00 to 7.24

Corrected firmware: 6.06, 7.25

Workaround: Not applicable

Description: During the reboot of an L90 with HardFiber, “System Integrity Recovery” events are logged

due to incorrect shutdown sequence.
The new releases fix the issue.
GE tracking number: 725-1

C **Corrected 87L Max Asymmetry alarms**
Products: L30, L90
Impacted firmware: All to 6.05, 7.00 to 7.25, 7.30, 7.31
Corrected firmware: 6.06, 7.26, 7.32, 7.4
Workaround: None
Description: During 87L re-synchronization, or when transmission packets are lost occasionally or corrupted, incorrect GPS timestamps can be used, potentially causing 87L Max Asymmetry nuisance alarms. This does not cause relay malfunction.
The new releases fix the issue.
GE tracking number: 726-1

E **Enhanced line differential with In-zone Transformer protection element to allow schemes where not all line differential devices have the In-zone Tx option**
Products: L30, L90
Impacted firmware: All to 6.05, 7.00 to 7.1x
Corrected firmware: 6.06, 7.20
Workaround: Not applicable
Description: The In-Zone Transformer (Tx) software option enables line differential devices to support a power transformer between line terminals.
All L30 or L90 devices deployed for protecting this kind of scheme must have the In-Zone transformer software option.
If there is no power transformer between terminals, none of the UR relays should have the In-zone transformer software option.
UR firmware versions 6.06, 7.20, and later allow using devices with In-Zone Tx on one terminal and without In-Zone Tx on the other terminals on schemes with no power transformer between line terminals, provided devices with In-Zone Tx are set to "TX connection = None."
End users having line differential schemes with UR devices supporting the same software option are not affected by this change.
GE tracking number: 720-8

Network Stability System – N60

B **Changed the initialization process to prevent unnecessary reboot after a firmware upgrade**
Products: N60
Impacted firmware: All to 6.05, 7.00 to 7.20
Corrected firmware: 6.06, 7.21
Workaround: None
Description: When upgrading firmware, UR devices normally execute a single reboot at the end of the upgrade process.
N60 devices can reboot twice at the end of the process because of minor initialization issues. Once the second reboot completes, the N60 is back to normal operation.
The corrected versions ensure that the firmware upgrade process is completed with the first reboot (no second reboot is required).
GE tracking number: 721-1

Transformer Protection Systems

P **Corrected firmware to prevent latching of "XFMR PCNT DIFF PKP" and "XFMR PCNT DIFF 5TH" operands for Transformer Percent Differential element**

Products: G30, T35, T60

Impacted firmware: All to 6.05, 7.00 to 7.26, 7.30 to 7.61

Corrected firmware: 6.06, 7.27, 7.70 and up

Workaround: None

Description: The "XFMR PCNT DIFF PKP" and "XFMR PCNT DIFF 5TH" operands of the Transformer Percent Differential element can remain latched after activation and are reset only by rebooting the relay.

The new releases correct the issue.

GE tracking number: 770-16

Common Protection and Control Elements

M **Corrected the scaling of "V0 3rd Harmonic" FlexAnalog in VT Fuse Failure element 2 and higher**

Products: C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T60

Impacted firmware: 6.00 to 6.05, 7.00 to 7.60

Corrected firmware: 6.06, 7.61

Workaround: None

Description: The VTFF element setting configuration includes "VT Fuse Failure Alarm Delay," "Neutral Wire Open Detection," and "Neutral Wire Open 3 Harm PKP." Any changes to these settings from default are not applied in VTFF element 2 or higher.

The new releases fix the issue.

GE tracking number: 761-6

P **Changed VT Fuse Fail Element reset time**

Products: All

Impacted firmware: All to 6.05, 7.00 to 7.1x

Corrected firmware: 6.06, 7.20

Workaround: None

Description: The VT Fuse Fail Latch Reset timer dropout is changed from 0.5 to 0 cycles, allowing quicker re-arming of the VT fuse fail element after a reset.

GE tracking number: 720-27

P **Corrected operation of Volts/Hz element with definite time**

Products: G30, G60, L90, T60

Impacted firmware: All to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: None

Description: The Volts/Hz element with a small definite time setting (for example 0.05TD) can assert pickup and operate operands at the same time.

The new releases fix the issue.

GE tracking number: 740-5

P **Corrected Thermal Overload Protection operation when the pre-fault current is very close to the base current pickup**

Products: All with Thermal Overload Protection - B30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L60, L90,

N60, T35, T60

Impacted firmware: All to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: None

Description: The Thermal Overload Protection element operates much faster than expected when the pre-fault current is very close to the base current pickup value.

The new releases fix the issue.

GE tracking number: 740-2

F **Corrected the use of "REVERSE PH ROTATION" settings when relay boots up**

Products: G30, G60

Impacted firmware: All to 6.05, 7.00 to 7.60

Corrected firmware: 6.06, 7.61

Workaround: None

Description: The relay incorrectly uses the state of FlexLogic operand assigned to "REVERSE PH ROTATION" setting at start up. This causes incorrect Phase rotation to be used by the relay. The issue occurs during relay power-up only and not during runtime.

The new releases fix the issue.

GE tracking number: 761-50

P **Corrected Thermal Overload element to prevent early trip on hot curve at marginal thermal pickup level**

Products: All except B90, C30, M60

Impacted firmware: All to 6.05, 7.00 to 7.60

Corrected firmware: 6.06, 7.61

Workaround: None

Description: In previous releases, early thermal tripping occurs to the hot curve at marginal thermal pickup level.

The new releases fix the issue.

GE tracking number: 761-49

E **Changed Autoreclose element timer, connected to Phase Select Multi-P operand pickup time, from 0 to 10 ms**

Products: C60, D60, L60, L90

Impacted firmware: 2.90 to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: Not applicable

Description: If the Autoreclose mode is selected as Mode 3: 3Pole-A, the recloser can go incorrectly to lockout during switch-off transients. During breaker pole opening, the phase selector can assert the PHASE SELECT MULTI-P operand transiently, causing the autorelcoser to lock out.

In the corrected releases, in the Autoreclose element, pickup time for the timer connected to FlexLogic operand PHASE SELECT MULTI-P is changed from 0 to 10 ms. Dropout time remains unchanged (5 ms).

GE tracking number: 726-22

P **Corrected Breaker Arcing element**

Products: C60, D30, D60, F35, F60, L30, L60, L90, T35, T60

Impacted firmware: All to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32

Workaround: None

Description: In the new releases, the following changes are implemented in the Breaker Arcing elements:

- Integration of kA2-cycle is fixed now to a 100 ms window that starts after BKR ARC AMP DELAY expires, which was initiated by ARC AMP INT. Previously, integration continued until ARC AMP INT dropped out, regardless of the 100 ms window.
- In previous versions when breaker operating time is measured, the timer resets to 0 if current is present for more than 100 ms. This is now changed to only stop the timer.

GE tracking number: 726-8

P Corrected FlexElement actual value metering when using Volts per Hertz element 2

Products: G30, G60, T60

Impacted firmware: 2.80 to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: None

Description: FlexElements using Volts per Hertz element 2 meters values incorrectly by a factor of 1000 (too high). Volts per Hertz element 1 is not affected.

The new releases fix the issue.

GE tracking number: 726-10

P Modified the VTFF element to prevent continued operation after healthy voltages are restored and to increase selectivity for slight voltage disturbance events

Products: C60, C70, D30, D60, F60, G30, G60, L30, L60, L90, M60, N60, T60

Impacted firmware: 6.00 to 6.05, 7.00, 7.10

Corrected firmware: 6.06, 7.11

Workaround: Not applicable

Description: With the new releases, new dV/dt comparators are added to each voltage phase of the VTFF element to speed up its operation. This ensures reliable blocking of high-speed protection elements when a fuse failure event occurs (for example, distance element zone 1).

And further changes are made because of the following conditions:

a) While implementing the dV/dt comparators, a flaw in the logic was inadvertently introduced. As a result, when a valid VTFF condition occurred, the VTFF element operated as expected. But when healthy voltage was restored, the VTFF element remained operational until either the 50DD element (disturbance detector) operated or the protected asset was de-energized (current signals drop to zero).

Protection elements were not compromised if assigned to be blocked by the VTFF element (the VTFF element reset momentarily when a fault occurs), allowing the operation of the protection element even though the VTFF element was in operating condition prior to the fault. Therefore, the described VTFF alarm behavior did not compromise performance of protection elements.

The corrected releases fix this condition.

b) The dV/dt comparator threshold level is changed from 10 to 20%. This increases the VTFF element selectivity when sensing slight voltage variations. UR devices with firmware version 7.10 can show nuisance VTFF alarms under the described conditions.

If the VTFF element in an affected UR device is not enabled, no action is required, meaning upgrade is optional.

GE tracking number: 711-1

P Corrected echo logic in the 1P POTT pilot scheme

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: Adding an MMS client that polls for data prevents the issue

Description: In the one-pole POTT pilot scheme, if the Permissive RX signal is continuously ON, the echo

signal oscillates (echo signal is repeated following ECHO DURATION and ECHO DURATION settings timers).

The new releases fix the issue. Echoed logic is modified so that the received RX signal is echoed once only with a settable duration and a lockout period.

GE tracking number: 740-12

H Changed VT Fuse Failure (VTFF) element to correctly operate under specific fault conditions

Products: C60, C70, D30, D60, F60, G30, G60, L30, L60, L90, M60, N60, T60

Impacted firmware: All to 6.05, 7.0x

Corrected firmware: 6.06, 7.10

Workaround: Not applicable

Description: The logic scheme of the VTFF element has been enhanced with additional voltage comparators and timers to ensure that the VTFF element operates correctly under the following failure conditions:

- When, as a result of an external fault, the negative sequence voltage significantly increases over a few cycles immediately followed by a drop of the 50DD element. The VTFF element does not operate.
- When, as a result of a fault within the protected zone, the VTFF element operates and latches faster than the 50DD element. The VTFF element latches only after a two power cycle period.
- When all phase voltages significantly drop. The VTFF element operates instantaneously.

This issue does not affect end users who set the VTFF element to "Disabled." End users who set the VTFF element to "Enabled" are advised to upgrade their relay firmware to version 7.10 or later.

GE tracking number: 710-6

D Fixed C60 and N60 Autoreclose and VTFF elements to use correctly the Open Pole OP operand

Products: C60, N60

Impacted firmware: All to 6.05, 7.00 to 7.31

Corrected firmware: 6.06, 7.32, 7.40

Workaround: None

Description: Open Pole operands are not mapped correctly to Autoreclose and VTFF elements in C60 and N60 relays. This can result in inadvertent lockout of the Autoreclose when Open Pole is set to 'I AND V only' mode, or erroneous VTFF operation in a single-pole tripping application.

The new releases fix the issue.

GE tracking number: 732-3

F Corrected firmware to prevent breaker misoperation when removing the breaker block after issuing an IEC 61850 breaker command with an active block

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.0x

Corrected firmware: 6.06, 7.10

Workaround: None

Description: The following sequence results in the relay closing/opening the breaker:

1. Block Close/Open breaker is active.
2. IEC 61850 command to close/open breaker.
3. Breaker is blocked from closing/opening.
4. Block Close/Open breaker is removed.
5. Breaker is closing/opening due to #2.

The new releases fix the issue.

GE tracking number: 606-11

G Corrected firmware to prevent applying an IEC 61850 CSWI control command when XCBR#.BlkOpn or XCBR#.BlkCls is active

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05

Corrected firmware: 6.06

Workaround: None

Description: An IEC 61850 CSWI control command is not blocked when Bkr0XCBR#.BlkOpn or Bkr0XCBR#.BlkCls is active.

In version 6.06, this issue is fixed.

GE tracking number: 606-14

Common Platform Functions

M, U Corrected firmware to prevent "Unit Not Calibrated: Contact Factory (F8L)" message on switching to firmware 7 CPU module

Products: All except C30

Impacted firmware: 5.49, 5.83, 5.96, 6.00 to 6.05

Corrected firmware: 6.06

Workaround: Avoid defaulting the settings in a version lower than 7.00 and then replacing the CPU with one running version 7.00 and higher

Description: If in a firmware version lower than 7.00 the settings are reset to factory defaults using service command 20511 and the CPU is replaced with a firmware version 7.xx CPU, the relay declares the digital signal processor (DSP) modules as not calibrated and displays the self-test message "Unit not calibrated: Contact factory (F8L)."

In version 6.06, this issue is fixed.

GE tracking number: 606-2

B Fixed firmware to prevent an unexpected restart when accessing the Default Settings Diagnostic webpage or text file after a firmware upgrade

Products: All

Impacted firmware: 6.00 to 6.05

Corrected firmware: 6.06

Workaround: Avoid accessing this web page after a firmware upgrade

Description: In previous 6.0x versions, accessing the Default Settings Diagnostics webpage or text file after a firmware upgrade can cause the relay to experience an unexpected restart.

In version 6.06, this issue is fixed.

GE tracking number: 606-3

B Fixed firmware to prevent an unexpected restart when upgrading a relay without DSP modules

Products: All without DSP modules

Impacted firmware: All to 6.05

Corrected firmware: 6.06

Workaround: None

Description: Upgrading a relay without DSP modules can cause the relay to experience an unexpected restart.

In version 6.06, this issue is fixed.

GE tracking number: 606-4

C **Corrected reset of Virtual Inputs when set to Self-Reset**

Products: All

Impacted firmware: All to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: None

Description: Virtual Inputs are not always activated for at least one protection pass (2 ms at 60 Hz) when resetting is set to Self-Reset. This is evident when the event recorder shows the same time-stamp for VI On and VI Off in the case a Virtual Input is configured as Self-Reset.

The new releases fix the issue. Self-resetting Virtual Inputs now hold their value for at least one protection pass and the events are logged accordingly.

GE tracking number: 726-24

G **Corrected firmware to prevent incorrect deactivation of the "ANY MAJOR ERROR" FlexLogic operand when a minor self-test error is cleared**

Products: All

Impacted firmware: All to 6.05

Corrected firmware: 6.06, 7.00

Workaround: None

Description: When a minor self-test clears, it also deactivates the "ANY MAJOR ERROR" FlexLogic operand. For example, a relay in "Not Programmed" state asserts the "ANY MAJOR ERROR" FlexLogic operand. Clearing a minor self-test de-asserts this operand, even though the relay is still not programmed.

The new releases fix the issue.

GE tracking number: 606-5

D **Corrected operation of optional user-programmable pushbuttons 4 to 7 with basic front panel via EnerVista software**

Products: All with basic front panel and optional user-programmable pushbuttons (types P, G, S, and B)

Impacted firmware: 5.40 to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: Operate the pushbuttons from the relay front panel

Description: Optional user-programmable pushbuttons 4 to 7 on the basic front panel can be operated from the front panel but not using the EnerVista UR Setup or Engineer software.

The new releases fix the issue so that the pushbuttons operate with the software too.

GE tracking number: 726-27

C **Corrected firmware to issue the "BAD IRIG-B" signal**

Products: All using IRIG-B time synchronization

Impacted firmware: All to 6.05

Corrected firmware: 6.06

Workaround: None

Description: A relay asserts the "BAD IRIG-B" self-test earlier than expected when using certain IRIG-B generators, for example Tektron TTM 01-E IRIG-B generator.

The new release fixes the issue.

GE tracking number: 606-7

U **Corrected firmware to update Process Card after a CPU firmware upgrade**

Products: All except C30, B90, L60

Impacted firmware: 5.60 to 6.05, 7.01, 7.11

Corrected firmware: 6.06, 7.20

Workaround: Contact GE technical support for instructions

Description: On rare occasions after a firmware upgrade on a HardFiber relay, it remains in service for only few seconds.

In the corrected releases, this issue is addressed by improving robustness in the firmware upgrade mechanism so that all components are updated with the binary.

GE tracking number: 606-8

D **Corrected voltage LED latching**

Products: C70

Impacted firmware: All to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: None

Description: The voltage LED goes on if Neutral Voltage Unbalance operates, however it does not latch.

The corrected releases fix the issue so that latching occurs.

GE tracking number: 726-23

G **Changed firmware to allow time entry when IRIG-B or SNTP is enabled**

Products: B30, B90

Impacted firmware: All to 6.05

Corrected firmware: 6.06, 7.00

Workaround: None

Description: In the impacted versions, time entry from the front panel or from Modbus is not allowed while IRIG-B or SNTP is enabled.

In the new releases, the relay allows time entry from the front panel or over Modbus even when IRIG-B or SNTP is enabled. Note that while the relay is in service and synchronized to IRIG-B or SNTP, changing the time from the front panel or over Modbus can have unexpected consequences, especially for order codes including synchrophasors.

GE tracking number: 606-13

Events and Records

U **Fixed DSP self-test error to record events during DSP failure and allow user pushbuttons to operate**

Products: All except C30

Impacted firmware: 5.40 to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: None

Description: No events are recorded when the relay experiences DSP self-test error, for example Module Failure 08. After powering up the relay, depending on the firmware version, the timestamps are the same as the Module Failure 08 timestamp or no events are recorded at all.

The new releases fix the issue.

GE tracking number: 726-21

Cyber Security

C **Fixed predictable TCP sequence number vulnerability in VxWorks 5.3.1 (CVE-2015-3963)**

Products: All

Impacted firmware: All to 6.05

Corrected firmware: 6.06

Workaround: None

Description: In previous versions, the Wind River VxWorks is subject to a vulnerability described in ICS-Cert Advisory ICSA-15-169-01B and NIST CVE-2015-3963 vulnerability report.

In version 6.06, this issue is fixed.

GE tracking number: 606-1

C,B Corrected firmware to prevent an unexpected restart due to MMS frames with corrupted CLNP header

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00 to 7.25

Corrected firmware: 6.06, 7.26

Workaround: None

Description: MMS frames with a corrupted Connectionless Network Protocol (CLNP) header can cause an unexpected restart of the relay.

The new releases fix the issue.

GE tracking number: 606-6

C Fixed DNP3 vulnerability described in ICS-CERT Advisory (ICSA-13-291-01B)

Products: All

Impacted firmware: All to 6.05, 7.00 to 7.20

Corrected firmware: 6.06, 7.21

Workaround: None

Description: A vulnerability is described in ICS-CERT Advisory (ICSA-13-291-01B).

The new releases fix the issue by upgrading DNP and IEC 104 libraries.

GE tracking number: 606-9

G Fixed firmware to address VxWorks vulnerability described in ICS-CERT Advisory ICSA-10-214-01

Products: All

Impacted firmware: All to 5.47, 5.80 to 5.82, 5.90 to 5.91, 6.00 to 6.01

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: None

Description: The third-party Wind River VxWorks is subject to a vulnerability described in ICS-CERT Advisory ICSA-10-214-01. The VxWorks debug port is open by default.

In the new releases, the vulnerability is addressed. The debug port is disabled by default in versions 6.06, 7.26, 7.32, 7.40 or greater. In UR versions 5.48, 5.49, 5.83, 5.92, 6.02 to 6.05, 7.00 to 7.25, and 7.31, the VxWorks debug port is password-protected with two factory-service passwords.

GE tracking number: 606-10

Communications

C Corrected IEC 61850 GOOSE input analogs to use RxGOOSE PU Base

Products: All with the IEC 61850 software option and DCmA outputs

Impacted firmware: All to 6.04, 7.00 to 7.24, 7.30, 7.31; versions 6.05 and 7.32 require power cycling to apply new PU base values

Corrected firmware: 6.05, 6.06, 7.25, 7.32, 7.40

Workaround: None

Description: The base per unit of FlexElements or DCmA output is incorrect if configured to GOOSE analog inputs, causing incorrect operation.

The new releases fix this issue to use received Analog Goose per unit base.

GE tracking number: 725-9

E **Corrected unexpected 1-P Autoreclose lockout in AR "Protection Only" mode**

Products: C60, D60, L60, L90

Impacted firmware: 5.6 to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: None

Description: Autoreclose can lock out in the "Protection Only" mode when the Breaker Close timer is set too short.

The new releases prevent lockout by resetting Latch before Close Breaker command 20 ms after Open Pole is declared regardless of the Breaker Close timer.

GE tracking number: 740-28

C **Corrected firmware to allow changes to the IEC 61850 GI attribute only for the client that reserved the IEC 61850 report**

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00 to 7.41

Corrected firmware: 6.06, 7.42

Workaround: Avoid issuing a GI request from a client that has not enabled an IEC61850 report

Description: If IEC 61850 client #1 enabled a buffered or unbuffered report and IEC 61850 client #2 issued a GI request, the relay still issues a report to client #1.

The new releases fix the issue. The GI attribute is writeable only for the client that reserved the report. This is applicable to both URCB and BRCB.

GE tracking number: 742-16

C **Allowed write to unsupported IEC 61850 buffered and unbuffered report control block trigger options TrgOps**

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00 to 7.24, 7.30, 7.31

Corrected firmware: 6.06, 7.25, 7.32, 7.40

Workaround: None

Description: Some UR firmware versions reject client write requests with the value "1" for the quality-change and data-update trigger option bits in report control blocks.

In the new releases, write operation to all bits of the trigger options TrgOps operand of all buffered and unbuffered control blocks is corrected. The device supports the pre-listed TrgOps even though it allowed the write operation. All trigger options are accepted, even if they never actually trigger a report.

GE tracking number: 725-11

B **Corrected possible unexpected restart in relays with Breaker Arcing elements and order code with more than two CT banks**

Products: C60, D30, D60, F35, F60, L30, L60, L90, T35, T60

Impacted firmware: 4.20 to 6.05, 7.00 to 7.31

Corrected firmware: 6.06, 7.32, 7.40

Workaround: None

Description: In previous versions, a relay with Breaker Arcing elements and more than two CT banks can possibly experience an unexpected restart.

In the new releases, this issue is fixed by correcting the initialization of the Breaker Arcing elements.

GE tracking number: 732-7

B **Corrected potential unexpected restart at bootup in relays using IEC 60870-5-104**

Products: All relays configured to use IEC 60870-5-104

Impacted firmware: All to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: None

Description: In relays configured to use IEC 60870-5-104 under **Settings > Product Setup > Communications**, there is a low possibility of an unexpected restart during bootup.

The new releases fix the issue.

GE tracking number: 740-32

E **Blocked clock synchronization by communication protocols (DNP, IEC 60870-5-104) if IRIG-B is active**

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: None

Description: In previous releases, clock synchronization by communications protocols is allowed when IRIG-B is active.

In the new releases, if IRIG-B is enabled and active, clock synchronization by communication protocols (DNP, IEC 60870-5-104) is blocked. Clock synchronization from the front panel and over Modbus is always enabled.

GE tracking number: 740-54

C **Fixed firmware to correctly display IEC61850 XCBR CO data**

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00, 7.01

Corrected firmware: 6.06, 7.10

Workaround: None

Description: In previous releases, IEC 61850 XCBR CO data can be incorrectly displayed in a MMS client, or not available.

The new releases fix the issue.

GE tracking number: 606-15

C **Corrected functionality of IEC104 Counter Interrogation command with qualifier "freeze with reset"**

Products: All using IEC 60870-5-104

Impacted firmware: All to 6.05, 7.00 to 7.61

Corrected firmware: 6.06

Workaround: Use two separate Counter Interrogation commands, the first with qualifier "freeze" and the second with qualifier "reset"

Description: In previous releases, an IEC104 Counter Interrogation command with "freeze with reset" clears the frozen counter values.

In the new release, this issue is fixed.

GE tracking number: 606-16

C **Fixed firmware to return correctly the value of point 4009 (Events Since Last Clear) to an IEC104 Counter Interrogation command**

Products: All using IEC 60870-5-104

Impacted firmware: All to 6.05, 7.00 to 7.11

Corrected firmware: 6.06, 7.20

Workaround: None

Description: In previous releases, the value returned by point 4009 (Events Since Last Clear) to an IEC104 Counter Interrogation command is incorrect.

In the new releases, this issue is fixed.

GE tracking number: 606-17

C **Corrected IEC 60870-5-104 IV (valid/invalid) bit in timestamp**

Products: All using the IEC 60870-5-104 software option

Impacted firmware: All to 6.06, 7.20 to 7.26, 7.30 to 7.32

Corrected firmware: 6.06, 7.40

Workaround: None

Description: The IEC 60870-5-104 invalid/valid (IV) bit in the timestamp is inconsistent for different transmissions. For example, the single-point with date/time transmission might have a bit value different from the integrated totals with date/time transmission.

The new releases fix the issue.

GE tracking number: 740-100

HardFiber

U **Fixed UR with HardFiber in service but not protecting**

Products: All with Process Bus Card (B30, C60, C70, D30, D60, F35, F60, G30, G60, L30, L90, M60, N60, T35, T60)

Impacted firmware: 5.60 to 6.05, 7.00 to 7.25, 7.30, 7.31

Corrected firmware: 6.06, 7.26, 7.32, 7.40

Workaround: None

Description: After a firmware upgrade, a UR used with HardFiber can potentially be in service, meter correctly but not perform protection functions. The issue potentially happens after UR firmware upgrade and subsequent initial startup, and the relay does not indicate out of service status. The issue can be checked by operating any of the protection elements after the upgrade. If the relay shows correct operation there are no further checks required while the relay is in operation.

The new releases fix the issue.

GE tracking number: 726-28

Phasor Measurement Unit (PMU) – Synchrophasors

C **Updated year in the PMU header frame to 2014 in compliance with IEEE C37.118 2011 standard**

Products: All with the PMU software option

Impacted firmware: 6.00 to 6.05, 7.00 to 7.60

Corrected firmware: 6.06, 7.61

Workaround: None

Description: In previous versions, the year in the PMU header frame is 2005, although the relay is compliant with the IEEE C37.118 2011 standard.

In the new releases, the year in the PMU header frame is corrected to 2014.

GE tracking number: 761-12

Transducer Inputs and Outputs

M **Corrected Rx GOOSE analogs assigned to DCmA output that show zero after a power cycle**

Products: All with the IEC 61850 software option

Impacted firmware: All to 6.05, 7.00 to 7.31

Corrected firmware: 6.06, 7.32, 7.40

Workaround: None

Description: When the DCmA source setting is assigned with an RxGOOSE Analog, the DCmA Output shows a zero value in other than the first DCmA element after a power cycle.

In the corrected releases, all DCmA operate correctly with RxGOOSE assigned as an input, not just the first DCmA element.

GE tracking number: 732-38

Self-Test Diagnostic Alarms

C **Added alarms and improved functionality**

Products: All

Impacted firmware: All to 6.05, 7.00 to 7.42

Corrected firmware: 6.06, 7.60

Workaround: None

Description: Prior to the corrected releases, the UR produced visible alarms for most internal diagnostic events, even when relay protection availability was not compromised. In the corrected firmware, the UR alarm design has been changed to generate user alarms only when protection is compromised. In addition, internal diagnostics are revised for lower sensitivity to internal alarms, such as redundancy checks, to allow for more secure, robust protection with fewer nuisance alarms.

The UR design continues to maintain extensive monitoring on availability of all protection elements. The design also provides robustness through a recovery mechanism that is initiated to minimize downtime for protection availability. As a result of this change, new self-tests are added to the design.

GE tracking number: 760-20

Firmware 6.07

Summary

Improvements include the following.

- Bus Differential System – B30, B90
  - Improved accuracy of bus differential pickup in the region between Low and High breakpoints
- Capacitor Bank Protection and Control System – C70
  - Corrected firmware to use 87V Autoset function setting in the 87V element
  - Changed firmware to apply consistently the “Bank Voltage Differential 1 Target” setting
  - Changed firmware to apply consistently the “Phase Current Unbalance 1 Target” setting
- Distance Protection Systems – D30, D60, L90
  - Corrected 87L Trip Logic
  - Corrected dropout of Operate operand for the Ground Distance element for zones 2 and up
- Common Protection and Control Elements
  - Corrected firmware to show N/A in fault report if fault location exceeds the line length
  - Corrected Phase Distance dropout of zone 2 operate operand
  - Corrected breaker autoreclose trigger for breakers 3 and 4
  - Corrected functioning of Breaker Restrike elements 2 and 3
  - Improved frequency rate of change element for fast frequency swings
  - Corrected inactive non-directional ground distance element for zones 2 to 5
  - Completed Phase Selector corrections
  - Modified Ground Distance current supervision
  - Corrected Overvoltage Supervision for Frequency Rate of Change element in systems with delta configured VT
  - Corrected firmware to prevent unexpected restart when writing FlexLogic settings via RS232
  - Corrected firmware to prevent unexpected restart in units without Ethernet
- Common Platform Functions
  - Improved security by adding rule to prevent entering the "<" character in text-based settings
  - Made security enhancements to IOC elements
  - Made security enhancements to differential elements
  - Increased range of "Voltage Cut-Off Level" setting to 0.1 to 2.0 V
  - Corrected timestamp in settings monitor log file for large number of events
  - Improved printing of special symbols in event recorder files and oscillography
  - Corrected Actual Value calculation after a Settings Group change for several elements
  - Improved Restricted Ground Fault (RGF) element
  - Corrected echo duration and lockout in hybrid POTT scheme
  - Corrected phase-to-phase voltage metering for WYE connection
  - Improved Breaker Flashover element
  - Corrected angle wrapping to FlexElements angle subtraction to the range -180 deg to +180 deg
  - Corrected user-programmable pushbuttons to respond when the “Pushbutton Set” input FlexLogic operand is asserted for a very short time
  - Corrected oscillography start time when “AC Input Waveforms” setpoint is set to “Off”

  - Corrected display of FlexElements Actual Values in 16-bit COMTRADE files
- Communications
  - Improved security of UR web pages
  - Resolved DNP3 vulnerability published in ICSA-20-105-02
  - Corrected potential failure to synchronize to SNTP server when duplicate frames are present in the network
  - Changed firmware to return "File non-existent" error when requesting a User Fault Report from a relay with no such file
- Phasor Measurement Unit (PMU) - Synchrophasors
  - Corrected issue with synchrophasor Power Triggering for delta connected systems

Bus Differential System – B30, B90

P **Improved accuracy of bus differential pickup in the region between Low and High breakpoints**

Products: B30, B90

Impacted firmware: All to 6.06, 7.00 to 7.28, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: None

Description: The accuracy of bus differential pickup in the region between Low and High breakpoints is improved.

GE tracking number: 790-46

Capacitor Bank Protection and Control System – C70

G **Corrected firmware to use 87V Autoset function setting in the 87V element**

Products: C70

Impacted firmware: 5.20 to 6.06, 7.00 to 7.26, 7.30 to 7.72

Corrected firmware: 6.07, 7.27, 7.73, 7.80 and up

Workaround: After changing this setting, confirm that it was applied correctly

Description: The relay applies the Current Unbalance Autoset function setting to the 87V element and not its own.

The new releases correct the issue.

GE tracking number: 727-2

G **Changed firmware to apply consistently the "Bank Voltage Differential 1 Target" setting**

Products: C70

Impacted firmware: 5.20 to 6.06, 7.00 to 7.26, 7.30 to 7.72

Corrected firmware: 6.07, 7.27, 7.73, 7.80 and up

Workaround: After changing this setting, confirm that it was applied correctly

Description: Sometimes the relay does not apply correctly the "Bank Voltage Differential 1 Target" setting, for example the setting is updated only the second time the setting is changed.

The new releases correct the issue. The relay applies the setting value correctly and consistently.

GE tracking number: 780-7

D **Changed firmware to apply consistently the "Phase Current Unbalance 1 Target" setting**

Products: C70

Impacted firmware: 5.20 to 6.06, 7.00 to 7.27, 7.30 to 7.71

Corrected firmware: 6.07, 7.28, 7.80

Workaround: After changing this setting or after applying an IEC 61850 CID file, confirm that this setting was applied correctly

Description: Sometimes the relay does not apply correctly the "Phase Current Unbalance 1 Target" setting, for example the setting is updated only the second time an IEC 61850 CID file is sent.

The new releases correct the issue. The relay applies the setting value correctly and consistently.

GE tracking number: 780-6

Distance Protection Systems – D30, D60, L90

P **Corrected 87L Trip Logic**

Products: L90

Impacted firmware: All to 6.06, 7.00 to 7.32

Corrected firmware: 6.07, 7.28, 7.40 and up

Workaround: None

Description: In rare situations when an unfaulted phase Open Pole operand is asserted slightly earlier than the faulted phase Open Pole operand during single-line-to-ground fault clearance, 87L TRIP can issue a 3-pole trip instead of 1-pole trip in a single-pole tripping application.

In the new releases, a one-cycle pickup delay timer is added in the Open Pole OP operand path to prevent 3-pole operation during a single-line-to-ground fault due to racing between Open Pole phase operands.

GE tracking number: 728-5

P **Corrected dropout of Operate operand for the Ground Distance element for zones 2 and up**

Products: D30, D60, L90

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: None

Description: For zones 2 and higher, the Operate and the Pickup operands drop out at the same time. The specification is for the Operate operand to drop out 20 msec later than the Pickup operand.

The new releases correct the issue.

GE tracking number: 790-47

Common Protection and Control Elements

P **Corrected firmware to show N/A in fault report if fault location exceeds the line length**

Products: All with fault location (C60, D30, D60, F35, F60, L30, L60, L90)

Impacted firmware: All to 6.06, 7.00 to 7.40

Corrected firmware: 6.07, 7.40 and up

Workaround: None

Description: In previous versions, the fault report can show values higher than the line length (higher than 100%).

In the new releases, the firmware shows the location as N/A if the fault exceeds the line length.

GE tracking number: 607-1

P **Corrected Phase Distance dropout of zone 2 operate operand**

Products: All with Phase Distance (D30, G60, L60, L90, T60)

Impacted firmware: All to 6.06, 7.00 to 7.11

Corrected firmware: 6.07, 7.20 and up

Workaround: None
Description: In previous versions, the Phase Distance element zone 2 operate operand drops out 20 msec after the pickup operand.
In the new releases, the zone 2 operate drops out at the same time as the pickup operand.
GE tracking number: 607-2

F **Corrected breaker autoreclose trigger for breakers 3 and 4**
Products: All
Impacted firmware: All to 6.06, 7.00 to 7.26, 7.30 to 7.42
Corrected firmware: 6.07, 7.27, 7.60 and up
Workaround: None
Description: Breakers with index higher than 2 are activated incorrectly by an autoreclose command.
The new releases fix the issue. Breakers 3 and 4 are not activated by the autoreclose function.
GE tracking number: 727-1

P **Corrected functioning of Breaker Restrike elements 2 and 3**
Products: C60, C70, D60, F35, F60, L90, T60
Impacted firmware: 5.50 to 6.06, 7.00 to 7.26, 7.30 to 7.72
Corrected firmware: 6.07, 7.27, 7.73, 7.80 and up
Workaround: None
Description: In previous versions, only the first Breaker Restrike protection element is operational.
The new releases correct the issue. All Breaker Restrike elements are operational.
GE tracking number: 780-15

P **Improved frequency rate of change element for fast frequency swings**
Products: D30, D60, F60, G30, G60, L30, L90, N60, T60
Impacted firmware: All to 6.06, 7.00 to 7.91
Corrected firmware: 6.07, 8.02
Workaround: None
Description: In previous versions, the validation conditions used for the measured frequency for ROCOF are very stringent. There is a possibility that for fast-occurring frequency swings in the system, ROCOF may not be able to follow the trend of the frequency change correctly due to the invalidation of the measured frequency.
In the new releases, the validation conditions that are used to validate the measured frequency used by ROCOF have been modified, thereby improving the robustness of the algorithm during such conditions.
GE tracking number: 802-2

H **Corrected inactive non-directional Ground Distance element for zones 2 to 5**
Products: D30, D60, L60, L90, T60
Impacted firmware: 6.06, 7.27, 7.32, 7.41
Corrected firmware: 6.07, 7.28, 7.42, 7.60
Workaround: None
Description: The non-directional Ground Distance element is inactive for zones 2 to 5. The functionality for zone 1 is correct.
The new releases fix the issue. All zones are active.
GE tracking number: 742-5

P **Completed Phase Selector corrections**
Products: D60, L60, L90

Impacted firmware: All to 6.06, 7.00 and up

Corrected firmware: 6.07, 7.27 and up

Description: The phase selector can incorrectly declare the fault type as PHASE SELECT 3P after all currents are reduced to zero during switch-off events, where the phase selector was to declare PHASE SELECT VOID. There is no impact on the protection performance unless PHASE SELECT 3P is used in logic, for example to inhibit reclosure for three-phase faults.

The new releases fix the issue.

GE tracking number: 726-3

E **Modified Ground Distance current supervision**

Products: D30, D60, L60, L90, T60

Impacted firmware: 5.7 to 6.06, 7.00 to 7.27, 7.30 to 7.32

Corrected firmware: 6.07, 7.28, 7.40

Workaround: For single-pole applications, use Open Pole element, which ensures reset from seal-in

Description: Prior to this release, the pickup (GND DIST PKP) operand is correctly supervised by both neutral and phase OC, but the operate (GND DIST OP) operand is supervised by neutral OC only.

In the new releases, current supervision logic in the Ground Distance elements is modified to include both neutral and phase current supervision for both pickup and operate operands. There are three new FlexLogic operands in Ground Distance elements. GND DIST Zn SUPN IA, GND DIST Zn SUPN IB, and GND DIST Zn SUPN IC are added.

GE tracking number: 740-45

P **Corrected Overvoltage Supervision for Frequency Rate of Change element in systems with delta configured VT**

Products: All with Frequency Rate of Change (D60, F60, G30, G60, L90, N60)

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: None

Description: The calculation of the Overvoltage Supervision for the Frequency Rate of Change element in systems with delta configured VT is incorrect.

The new releases correct the issue.

GE tracking number: 790-60

B **Corrected firmware to prevent unexpected restart when writing FlexLogic settings via RS232**

Products: All

Impacted firmware: All to 6.06

Corrected firmware: 6.07, 7.00 and up

Workaround: If Ethernet is available, write settings using an Ethernet port to prevent this issue

Description: In previous versions, occasionally writing FlexLogic settings using the front RS232 port results in an unexpected restart.

The new releases correct the issue.

GE tracking number: 607-3

B **Corrected firmware to prevent unexpected restart in units without Ethernet**

Products: All without Ethernet (CPU module 9E)

Impacted firmware: All to 6.06

Corrected firmware: 6.07

Workaround: Do not enable DNP

Description: Occasionally in units without Ethernet (CPU module 9E), writing settings to the relay results in

an unexpected restart when DNP is enabled.
The new release corrects the issue.
GE tracking number: 607-4

Common Platform Functions

E **Improved security by adding rule to prevent entering the "<" character in text-based settings**

Products: All
Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 8.03
Corrected firmware: 6.07, 7.28, 8.10
Workaround: Avoid using the "<" character in text-based settings
Description: In the new releases, for improved security, the less-than sign "<" is invalid for text-based settings, such as IED names and sources names.
GE tracking number: 810-13

F **Made security enhancements to IOC elements**

Products: All except B90, C30, T35
Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 8.21
Corrected firmware: 6.07, 7.28
Workaround: None
Description: In previous releases, in a very rare case of bit flip in the DSP memory or current drop, Phase, Neutral, and Negative-sequence IOC can inadvertently misoperate before a self-test error is detected.
In the new releases, a new trip security element is added to supervise IOC operation to confirm independently from IOC itself that the operate quantity follows the "system fault" signature. This element monitors phasors and raw samples in each phase and, based on the changes of these quantities, validates "the fault" presence. The element does not have any settings and can be disabled during testing if needed, using the Test Mode Function.
GE tracking number: 728-10

F **Made security enhancements to differential elements**

Products: B30, B90, G30, G60, M60, T35, T60
Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 8.21
Corrected firmware: 6.07, 7.28
Workaround: None
Description: In previous releases, in a very rare case of bit flip in the DSP memory or current drop, the differential element can inadvertently misoperate before a self-test error is detected.
In the new releases, a new trip security element is added to supervise differential element operation to confirm independently from the differential element itself that the operate quantity follows the "system fault" signature. This element monitors phasors in each phase and each source and, based on the changes of these quantities, validates "the fault" presence. The element does not have any settings and can be disabled during testing if needed, using the Test Mode Function.
GE tracking number: 728-11

E **Increased range of "Voltage Cut-Off Level" setting to 0.1 to 2.0 V**

Products: All except C30
Impacted firmware: All to 6.06, 7.00 to 8.03
Corrected firmware: 6.07, 8.10 and up
Workaround: None
Description: In previous versions, the range of the "Voltage Cut-Off Level" setting is 0.1 to 1.0 V.

In the new releases, the range of the setting increases to 0.1 to 2.0 V. Settings conversion in the EnerVista software preserves the Voltage Cut-Off Level value from the original settings. The software for the current release allows usage of the new extended range for firmware 8.10 and up and for version 6.07.

GE tracking number: 810-43

R **Corrected timestamp in settings monitor log file for large number of events**

Products: All

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.91

Corrected firmware: 6.07, 7.28, 8.02

Workaround: None

Description: The timestamp in the settings monitor SETTING_CHANGES.LOG file is incorrect when the number of events exceeds 1024 events.

The new releases correct the issue.

GE tracking number: 802-42

R **Improved printing of special symbols in event recorder files and oscillography**

Products: All

Impacted firmware: All to 6.06, 7.00 to 7.91

Corrected firmware: 6.07, 8.02

Workaround: None

Description: The event recorder and the oscillography files do not show correctly all special symbols, such as degree, phase, Omega, or micro.

Special symbols display correctly in the new releases.

GE tracking number: 802-41

M **Corrected Actual Value calculation after a Settings Group change for several elements**

Products: C60, D60, F60, G30, G60, L90, M60, N60, T60

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: None

Description: Corrected relay metering performance when switching Setting Groups for protection elements where Signal Source setting changes between groups. The elements are Subharmonic Stator Ground, Stator Differential, Stator Ground, Field Current, and Sensitive Directional Power.

GE tracking number: 790-56

E **Improved Restricted Ground Fault (RGF) element**

Products: All with Restricted Ground Fault element (G30, G60, T60)

Impacted firmware: All to 6.06, 7.00 to 7.27, 8.00 to 8.02

Corrected firmware: 6.07, 7.28, 8.03

Workaround: None

Description: The new releases improve the Restricted Ground Fault element by adding supervision of the ground current to prevent misoperation due to unbalanced phase currents during normal load conditions.

GE tracking number: 803-6

P **Corrected echo duration and lockout in hybrid POTT scheme**

Products: D60, L90

Impacted firmware: All to 6.06, 7.00 to 8.03

Corrected firmware: 6.07, 8.10

Workaround: None

Description: The echo duration and lockout feature in the Hybrid Permissive Overreach Transfer Trip (POTT) scheme Tx follows Rx instead of providing a deterministic lockout delay per the "Echo Duration" setting.

The new releases correct the issue.

GE tracking number: 810-30

M Corrected phase-to-phase voltage metering for WYE connection

Products: All except C30

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: None

Description: Phase-to-phase voltage metering is incorrect when the injected phase-to-ground voltages are greater than 160 V and the Phase VT secondary setting is less than 140 V.

The new releases correct the issue.

GE tracking number: 790-41

G Improved Breaker Flashover element

Products: All with Breaker Flashover (B30, C60, C70, D60, F60, L60, L90, M60, T60)

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: None

Description: Breaker Flashover logic can produce incorrect assertion of the element under breaker close scenario if all 6 VTs are configured but only 3 VTs are used.

In the new releases, this has been corrected, and the logic diagram in the instruction manual is updated.

GE tracking number: 790-32

G Corrected angle wrapping to FlexElements angle subtraction to the range -180 deg to +180 deg

Products: All

Impacted firmware: All to 6.06, 7.27, 7.30 to 7.91

Corrected firmware: 6.07, 7.28, 8.02

Workaround: None

Description: FlexElements do not apply angle wrapping correctly when comparing angles of two analog values. For example, the difference between an angle of 170 degrees and one of -170 degrees was 340 degrees.

In the new releases, subtraction of angles by FlexElements is done by applying angle wrapping to the range of -180 to 180 degrees (-0.5 pu to +0.5 pu). In the example used, the difference is now 20 degrees. This applies if both settings "Flexelement +IN" and "Flexelement -IN" are set and are angle quantities.

GE tracking number: 802-29

D Corrected user-programmable pushbuttons to respond when the "Pushbutton Set" input FlexLogic operand is asserted for a very short time

Products: All

Impacted firmware: All to 6.06, 7.00 to 7.26, 7.30 to 7.60

Corrected firmware: 6.07, 7.27, 7.61 and up

Workaround: Assert the "Pushbutton Set" operand for longer than 100 msec

Description: In previous versions, the relay can fail to operate a user-programmable pushbutton when the "Pushbutton Set" input FlexLogic operand is asserted for less than 100 msec, even though the manual specifies a minimum of 50 msec.

In the new releases, this issue is fixed.

GE tracking number: 761-45

R **Corrected oscillography start time when "AC Input Waveforms" setpoint is set to "Off"**

Products: All

Impacted firmware: All to 6.06, 7.00 to 7.26, 7.30 to 7.60

Corrected firmware: 6.07, 7.27, 7.61

Workaround: None

Description: In previous versions, if the "AC Input Waveforms" is set to "Off," the oscillography start time is incorrect.

In the new releases, this issue is fixed.

GE tracking number: 761-47

D **Corrected display of FlexElements Actual Values in 16-bit COMTRADE files**

Products: All

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82

Corrected firmware: 6.07, 7.28, 7.90

Workaround: Use 32-bit COMTRADE format

Description: FlexElement Actual Values saturate at much lower values than expected in 16-bit COMTRADE files (oscillography, datalogger).

The new releases correct the issue. The FlexElement Actual Values do not saturate for the full range of -90 pu to +90 pu.

GE tracking number: 790-55

Communications

C **Improved security of UR web pages**

Products: All

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 8.03

Corrected firmware: 6.07, 7.28, 8.10

Workaround: Secure access to the relay's web pages by strong security practices in the substation

Description: The new release includes a number of security enhancements to prevent possible corruption of the relay's web pages by a malicious user.

GE tracking number: 810-10

C **Resolved DNP3 vulnerability published in ICSA-20-105-02**

Products: All using DNP3 protocol

Impacted firmware: 6.06, 7.21 to 7.27, 7.30 to 7.63, 7.70 to 7.81, 7.90, 7.91

Corrected firmware: 6.07, 7.28, 7.64, 7.82, 8.02

Workaround: None. Apply the mitigations recommended in the ICS advisory.

Description: In April 2020, ICS-CERT published ICS advisory ICSA-20-105-02 affecting the DNP3 protocol.

The new releases correct the issue.

GE tracking number: 802-10

C **Corrected potential failure to synchronize to SNTP server when duplicate frames are present in the network**

Products: All using Simple Network Time Protocol (SNTP)

Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.81, 7.90, 7.91

Corrected firmware: 6.07, 7.28, 7.82, 8.02

Workaround: None

Description: In previous versions, if duplicate frames are present in the network the relay can fail to

synchronize correctly to the SNTP server.
The new releases correct the issue.
GE tracking number: 802-17

C **Changed firmware to return "File non-existent" error when requesting a User Fault Report from a relay with no such file**
Products: B30, B90, C70, G30, G60, M60, N60, T35, T60
Impacted firmware: All to 6.06, 7.00 to 7.26, 7.30 to 7.60
Corrected firmware: 6.07, 7.27, 7.61 and up
Workaround: None
Description: In previous versions, a relay returns an empty User Programmable Fault Report file if no such file exists.
In the new releases, the firmware returns a “File non-existent” message if there are no User Fault Report files in the relay. This affects both MMS communication and TFTP.
GE tracking number: 761-24

Phasor Measurement Unit (PMU) – Synchrophasors

M **Corrected issue with synchrophasor Power Triggering for delta connected systems**
Products: All with PMU software option (D60, F60, G60, L30, L90, N60, T60)
Impacted firmware: All to 6.06, 7.00 to 7.27, 7.30 to 7.82
Corrected firmware: 6.07, 7.28, 7.90
Workaround: None
Description: The PMU Power Trigger is calculated incorrectly for delta connected systems.
The new releases correct the issue.
GE tracking number: 790-58

Firmware 6.08

Summary

Improvements include the following.

- Bus Differential System – B30
  - Corrected unexpected restart in B30 relay with HardFiber
- Line Differential System – L60
  - Corrected unexpected self-test diagnostic alarms appearing on L60 relays
- Common Platform Functions
  - Corrected "Error Encountered: Upload Incomplete" error message when writing an offline settings file to the relay

Bus Differential System – B30

B **Corrected unexpected restart in B30 relay with HardFiber**

Products: B30 with HardFiber

Impacted firmware: 6.07, 8.21

Corrected firmware: 6.08, 8.22

Workaround: None

Description: In the impacted firmware versions, enabling the bus differential element in a B30 relay with HardFiber may cause an unexpected restart.

GE tracking number: 822-4

Line Differential System – L60

U **Corrected unexpected self-test diagnostic alarms appearing on L60 relays**

Products: L60

Impacted firmware: 6.07

Corrected firmware: 6.08

Workaround: None

Description: In version 6.07, a healthy L60 relay will assert the Diagnostic Alarm and System Failure self-tests. In version 6.08, this issue is fixed.

GE tracking number: 608-1

Common Platform Functions

C **Corrected "Error Encountered: Upload Incomplete" error message when writing a settings file to the relay using UR Setup software**

Products: All

Impacted firmware: 6.07

Corrected firmware: 6.08

Workaround: Writing the same settings using UR Setup software in online mode or using the front panel is successful.

Description: In version 6.07, in certain cases the relay does not allow writing settings to the relay that include the Virtual Input 60 or Virtual Output 60. In those cases, EnerVista UR Setup for UR displays the message “Error Encountered: Upload Incomplete” when writing a settings file to the relay.

GE tracking number: 608-2

Firmware 6.09

B90 Bus Differential System

H **Corrected FW to prevent blocking the B90 bus differential protection element after upgrading to FW version 6.07 or 6.08 from a FW version lower than 6.00**

Products: B90

Impacted firmware: 6.07, 6.08

Corrected firmware: v6.09

Workaround: Manually reboot the relay an additional time after upgrading the FW to version 6.07 or 6.08

Description: In previous versions, if the FW is upgraded from a FW version lower than 6.00 to version 6.07/6.08, the bus differential element is blocked until the relay is rebooted.

There is no issue when upgrading from firmware version 6.0x to version 6.07 or 6.08.

GE tracking number: 609-1

Common Protection and Control Elements

C **Ground distance Z1 security enhancements)**

Products: D30, D60, L60, L90, T60

Impacted firmware: All

Corrected firmware: v6.09, 843

Workaround: None

Description: In previous versions, especially with too low IN supervision setting, erroneous zero-sequence current during phase faults, evolving faults or switch-off transients may lead to ground distance zone 1 operation. In firmware version 6.09, this issue is fixed. Security improvements were made to ground distance zone 1 both MHO and QUAD, with standalone Phase Selector is used to supervise each ground distance loop for 1 power cycle into the fault

GE tracking number: 843-3

Communications

C **Enhanced firmware to allow closing of EGD logical port**

Products: All with EGD software option: B30, C30, C60, F35, F60, G30, G60, M60, T35, T60

Impacted firmware: All

Corrected firmware: v6.09, 840 and higher

Workaround: Blocking the port by the firewall

Description: In firmware version 6.09, the EGD port (logical UDP port 18246) is closed if all three EGD data exchanges are disabled.

GE tracking number: 840-13

C **Fixed FW to prevent erroneous reporting of class 1 event for binary inputs when a binary output is operated**

Products: All

Impacted firmware: 6.06, 6.07, 6.08

Corrected firmware: v6.09

Workaround: None

Description: In previous versions, after operating a DNP binary output point, the relay reports a class 1 binary input event, even if the respective point is not included in the DNP binary input points.

GE tracking number: 609-2

C **Fixed open port after firmware upgrade of relays with PMU**

Products: All with PMU

Impacted firmware: 6.00 onwards

Corrected firmware: 6.09, 8.30 and higher

Workaround: Power cycle or reboot the relay immediately after a firmware upgrade.

Description: In previous versions, a port scan done immediately after the firmware upgrade of a relay with the PMU software option will reveal an open port with a random number. A subsequent reboot resolves this issue.

GE tracking number: 830-53

E **Fixed firmware to close ports in the ephemeral range after a TFTP transfer**

Products: All

Impacted firmware: All

Corrected firmware: 6.09, 8.40 and higher

Workaround: None.

Description: In previous versions, after reading a file using TFTP a port scan may show logical ports in the ephemeral range as open.

GE tracking number: 609-3

Common Platform Functions

B **Fixed unexpected restart in CPU modules without Ethernet when using DNP**

Products: All with CPU modules without Ethernet

Impacted firmware: 6.07, 6.08

Corrected firmware: 6.09

Workaround: None.

Description: In previous versions, in relays with a CPU module without Ethernet (e.g., 9E) the relay experiences an unexpected restart when both DNP and IRIG-B are enabled.

GE tracking number: 609-4

Software

Software 6.00

Summary

G Software exceptions fixed

Applicable: EnerVista UR Setup and UR Engineer

The following software exceptions have been corrected with software release 6.00.

Software Exceptions
Phase Distance Delay setting does not have the correct value after converting from version 5.50 to 5.60.
Phase UV1 OP and Phase UV1 PKP were appearing with improper names in the FlexLogic graphical view, Logic Designer, and when printing
Pushbuttons were incorrectly changed to control pushbuttons during file conversion
ICD files incorrectly contained the type attribute when b-Type was neither Enum nor Struct in the DA and BDA elements
COM2 Selection setting was missing for some UR devices

Upgrade

GE recommends that all customers upgrade to the latest version of UR firmware to take advantage of the latest developments and feature enhancements. Upgrade the firmware using the EnerVista UR Setup software. This software can also convert settings files from an older version to the latest version and creates a Difference Report once the conversion has been completed. This Difference Report identifies new settings and additional information to assist the user during the upgrade.

Note that upgrading to firmware version 6.06 or 6.07 can increase CPU usage by up to five percent. See the Universal Relay Product Family CPU Utilization Product Advisory (GER-4485 / ursb4485).

Upgrade path for versions 4.00 to 6.05

For UR devices with version 4.00 firmware and above, upload the 6.06 firmware release to the relay using the EnerVista UR Setup software.

Upgrade path for versions below 4.00

For UR devices with firmware versions below 4.00, an upgrade package must be obtained from GE to upgrade the relay CPU and CT/VT modules.

Benefits of version 4.00 and above

The benefits of revision 4.00 and above are as follows:

- Supports many new features and functionality
- IEC 61850 communications protocol
- 100 Mb Ethernet
- IRIG-B repeater
- Isolated RS485 and IRIG-B
- Synchrophasors in the D60, L90, N60, G60, F60, and T60
- Support for breaker-and-a-half transmission line protection (D60, L90)
- Motor health diagnostics (M60)
- Enhanced front panel
- L30 line differential device
- Exceeds IEEE C37.90 requirements
- Transient immunity (2 to 4 kV)

Upgrade

If upgrading both EnerVista software and UR firmware, upgrade the software first.

To upgrade the software:

1. Download the EnerVista UR Setup software from http://www.gegridsolutions.com/app/ViewFiles.aspx?prod=urfamily&type=7
   The software is a .exe file.
2. Install the software by (double-)clicking the file.
3. Refresh the order code in EnerVista under the **Device Setup** button.

To upgrade the firmware:

1. Download the firmware from http://www.gegridsolutions.com/app/ViewFiles.aspx?prod=urfamily&type=7
   The firmware is a .bin file.
2. In the EnerVista software, navigate to **Maintenance > Update Firmware** and select the .bin file.
   For any issues, see a UR instruction manual.
   When the update finishes, the relay restarts.
3. Reconnect the EnerVista software to the relay, and refresh the order code in EnerVista under the **Device Setup** button.
4. Convert the settings file and load it to the relay, then set the device to "programmed" under **Settings > Product Setup > Installation** to put it into service.

Categories

This document uses the following categories to classify changes.

Revision categories

Code	Category	Description
N	New feature	A separate feature added to the relay. Changes to existing features even if they significantly expand the functionality are not in this category.
G	Change	A neutral change that does not add new value and is not correcting any known problem
E	Enhancement	Modification of an existing feature bringing extra value to the application
D	Changed, incomplete, or false faceplate indications	Changes to, or problems with text messages, LEDs, and user pushbuttons
R	Changed, incomplete, or false relay records	Changes to, or problems with relay records (oscillography, demand, fault reports, and so on)
C	Protocols and communications	Changes to, or problems with protocols or communication features
M	Metering	Metering out of specification or other metering problems
P	Protection out of specification	Protection operates correctly but does not meet published specifications (example: delayed trip)
U	Unavailability of protection	Protection not available in a self-demonstrating way so that corrective actions can be taken immediately
H	Hidden failure to trip	Protection does not operate when appropriate
F	False trip	Protection operates when it is not appropriate
B	Unexpected restart	Relay restarts unexpectedly

For further assistance

For product support, contact the information and call center as follows:

GE Grid Solutions
650 Markland Street
Markham, Ontario
Canada L6C 0M1
Worldwide telephone: +1 905 927 7070
Europe/Middle East/Africa telephone: +34 94 485 88 54
North America toll-free: 1 800 547 8629
Fax: +1 905 927 5098
Worldwide e-mail: multilin.tech@ge.com
Europe e-mail: multilin.tech.euro@ge.com
Website: http://www.gegridsolutions.com/multilin/