

UR Series

Revision 5.92 Release Notes

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Overview

Summary

Release 5.92 of the Universal Relay (UR) series introduces new improvements for general and protection functions. Highlights include:

- Line Differential Systems: Increased pickup setting range of the bus differential element – L30, L90
 - L30 – Increased availability
 - L30, L90 – Master-Slave mode of a three-line terminal application with 50DD SV supervision
 - L30, L90 – Displayed values of 87LG restraint currents
 - L30, L90 – Loopback mode with channel monitoring
- Motor Protection
 - Changes to the voltage dependent thermal overload model
 - Thermal overload trip lockout
- Common Protection and Control Elements
 - Negative Sequence and Neutral Directional Overcurrent changes
- Communications
 - IEC61850 report control blocks to capture events after an Ethernet port failure event
 - Enhancements to the IEC60870-5-104 protocol
 - IEC61850 analog inputs
 - UR Operating System debug port has been changed to reject Ethernet traffic
- Product Advisory
 - Firmware upgrade restrictions for C70 and B90 devices with IRC modules and direct I/O enabled

This document contains the release notes for release 5.92 of the UR family.

- Affected products: B30, B90*, C30, C60, C70*, D30, D60, F35, F60, G30, G60, L30, L60, L90, M60, N60, T35, T60
- Date of release: Feb 25th , 2013
- Firmware revision: 5.92

* Please refer to product advisory note on page 8

This document also contains the release notes of previous 5.9x firmware versions.

If users have existing UR devices installed with older version of firmware (version 4.0x or higher), they can download and install this new firmware to benefit from the enhancements described in this release note. If the user does not require these new features and enhancements, no upgrade of the relays is required.

Products Affected

This release encompasses the following UR products:

- B30 Cost-Effective Bus Differential System
- B90 Low-Impedance Bus Differential System
- C30 Controller System
- C60 Breaker Protection System
- C70 Capacitor Bank Protection and Control System
- D30 Line Distance Protection System
- D60 Line Distance Protection System
- F35 Multiple Feeder Protection System
- F60 Feeder Protection System
- G30 Generator and Transformer Protection System
- G60 Generator Protection System
- L30 Line Current Differential System
- L60 Line Phase Comparison System
- L90 Line Current Differential System
- M60 Motor Protection System
- N60 Network Stability and Synchrophasor Measurement System
- T35 Transformer Protection System
- T60 Transformer Protection System

Firmware Compatibility

The 5.92 firmware release is compatible with the UR series hardware versions 4.00 and higher.

The use of the 5.92 firmware requires the EnerVista UR Setup software to be version 5.9x or higher.

FW 5.92 Release details

In the following enhancement descriptions, a revision category letter is placed to the left of the description. See the Appendix at the end of this document for a description of the categories displayed.

Line Differential Protection Systems

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

601-1

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 FW 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 FW version 5.92, 6.01, or newer.

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

601-2

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 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 FW version introduces a change to the 87L element so 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 above.

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 device firmware with FW version 6.01 or use the UR FlexLogic to implement the parallel supervision explained above.

This change applies to UR devices with FW version 5.92, 6.01, or newer.

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

601-3

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 $0.11 \times I_n$.

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

This change applies to UR devices with FW version 5.92, 6.01, or newer.

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

601-4

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 FW version changes the UR device 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 FW version 5.92, 6.01, or newer.

Motor Protection Systems

F **Changes to voltage -dependent thermal overload element add security when starting very high inertia motors**

572-1

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 "I_{eq}" when the relay senses significant motor load changes.

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

FW versions that fix this issue: 5.72, 5.92, and newer

U **Enhanced thermal overload element prevents permanent lockout after a motor thermal overload trip when the element is disabled or the relay is powered off.**

571-3

Applicable: M60

When the thermal overload element "49" operates, it is intended to go to a lockout state until the motor temperature returns to a safe level. This is known as motor cooling time, and the thermal lockout automatically resets after this period. However, there are situations where the thermal overload element trips and remains locked out until an emergency restart is performed. These conditions are:

1. When in thermal lockout state, the thermal element is disabled and, after the motor cooling time has elapsed, the thermal element is enabled again. It is important to remark that changing settings during a thermal lockout is not a normal procedure.
2. When in thermal lockout state, the relay is powered off and, after the motor cooling time has elapsed, the relay is powered on again.

Under these conditions, the thermal lockout remained on until an emergency restart command was performed.

Users who proceed as described are advised to update the FW version to 5.71, 5.92, or newer.

Common Protection and Control Systems

- U** **The “Negative Sequence 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)**

572-2

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

This FW version introduces important changes to the “Negative sequence directional” and the “Neutral directional” overcurrent elements, which improve the element’s security and dependability.

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

(2) 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 FW version matches any of those listed as follows, no action is required.
FW versions that fix this issue: 5.72, 5.92, 6.0x, 7.xx

Communications

- C** **IEC61850 buffered report control blocks have been changed to capture events immediately after an Ethernet port failure event.**

601-5

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

When a UR relay (IEC61850 server) is reporting data to an IEC61850 client and the Ethernet ports are disconnected (Prim/Sec Ethernet Fail event), the IEC61850 buffered report control blocks are intended to capture data that are served to the client when the communication failure is cleared.

However, UR devices with previous FW 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 FW version changes the Buffered Report Control Blocks to ensure that they capture 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 FW version 5.92, 6.01 or newer.

- E** **UR IEC6870-5-104 implementation has been enhanced to support “Test command with Date/Time”**

572-3

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

IEC60870-5-104 determines that slave devices are to respond with a 16-bit value (test sequence counter) and its timestamp when a test command is received.

This FW version enhances the UR IEC60870-5-104 protocol implementation as described.

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

572-4

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

The IEC60870-5-104 protocol supports a configurable point list element that can be programmed with binary or analog inputs.

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

If your relay FW version matches any of those listed as follows, no action is required.
FW versions that fix this issue: 5.72, 5.92 or newer

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

572-5

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

The IEC60870-5-104 protocol supports a configurable point list element that can be programmed with binary or analog inputs.

Previous FW versions may not allow IEC60870-5-104 masters to retrieve all the analog values when all 255 analog points are programmed. The current fix ensures that all analog values are retrieved.

If your relay FW version matches any of those listed as follows, no action is required.
FW versions that fix this issue: 5.72, 5.92 or newer

- C **UR FlexElements have been changed to properly operate when programmed to use IEC61850 GOOSE analog inputs.**

572-6

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 can calculate net difference or monitor UR actual analog values.

Previous FW version may allow FlexElements to improperly apply the unit base value when IEC61850 GOOSE analog are set as the FlexElement's input, which may lead to an incorrect operation of the FlexElement.

If your relay FW version matches any of those listed as follows, no action is required.
FW versions that fix this issue: 5.72, 5.92 or newer

- C **UR IEC6870-5-104 implementation has been changed to prevent slave devices from issuing start request command**

572-7

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

IEC60870-5-104 determines that only master devices should issue StartDT requests. UR relays are 60870-5-104 slave devices and should not issue this request.

Previous FW versions allow UR devices to issue a StartDT request when receiving a connect request from the IEC60870-5-104 master.

If the IEC60870-5-4 protocol is not being used or your relay FW version matches any of those listed as follows, no action is required.

FW versions that fix this issue: 5.72, 5.92 or newer

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

592-1

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 debug 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 FW 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 FW version 5.92. UR devices with no Ethernet port are not affected.

Product Advisory

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

Applicable: B90 and 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.

In firmware revisions 5.92 and 6.01, a change was made to the teleprotection feature, which 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 which 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.

Previous FW 5.91 Release Details

In the following descriptions, a revision category letter is placed to the left of the description. See the Appendix at the end of this document for a description of the categories displayed.

Platform

P **The timestamp routine has been changed to prevent timestamp discrepancies and a longer protection pass period when daylight savings time (DST) is enabled**

591-1

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

When the DST function is enabled, the timestamp routine checks whether the timestamp needs to be updated according to DST for every single UR 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 specification. Therefore, the communication elements running at the end of the protection pass use the latest protection pass time, which forces a discrepancy between the internal event recorder and communication protocol time stamp.

A UR relay 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 FW version 5.90 and using the DST function. Upgrade the relays with FW version 5.91 or newer.

UR devices with FW version previous to 5.90 are not affected.

Previous FW 5.90 Release Details

In the following descriptions, a revision category letter is placed to the left of the description. See the Appendix at the end of this document for a description of the categories displayed.

Bus Differential Systems B30, B90

E Increased alarm delay setting range for bus replica “Isolator” Elements simplifies B90 configuration

590-1

Applicable: B90

In the B90 device, isolator elements have an “Alarm delay” setting that has to be set longer than Isolator operating time. In order to support schemes with slow-operation isolators, the time-range upper limit for the “Alarm Delay” setting has been increased from 10.00 seconds to 120.00 seconds.

Customers having previous FW versions have to do extra configuration (“Flexlogic Timers” or “Digital Elements”) for extending the alarm delay when slow-operation isolators are part of the protected Bus Bar scheme; so this enhancements simplifies the B90 configuration for those cases.

Controller Systems C30, C60

N Additional P&C functionality to the C60 Breaker Protection Systems by adding the open pole detector and overvoltage elements

590-2

Applicable: C60

This FW version provides the C60 Breaker Protection System with additional protection and control capabilities by adding the “Open Pole Detector” and the “Phase Over-voltage” elements. A single element is available per protection function.

These two new elements enable the C60 to be used in advanced applications (for example, single pole trip, auto-reclose). For further information, see the instruction manual.

Line Differential and Phase Comparison Systems L30, L60, L90

N **L30 current differential element has been enhanced to support the new “In-zone” power transformer functionality**

590-3

Applicable: L30

This FW version enhances the protection functionality of the L30 Line Current Differential System by enabling the differential element to fit differential schemes that have a power transformer within the protection zone “In-zone transformer.”

In order to internally compensate for current phase-shift caused by the transformer connection group and magnetizing inrush-current (based on 2nd harmonic detection), this enhancement introduces new setting fields to the existing “87L Power System” and “Current Differential” elements.

The “In-zone Transformer” functionality supports both two-terminal and three-terminal line applications and can be ordered through the following software options:

Device	SW Option	
L30	24	In zone TX Protection
	25	In zone TX Protection + IEC61850
	26	In zone TX Protection + PMU
	27	In zone TX Protection + IEC61850 + PMU

For further information, see the instruction manual.

N **New FlexAnalog voltage values enable the L90 to synchronize with remote terminals**

590-4

Applicable: L90

This FW version delivers six new FlexAnalog values to the L90 Line Differential System. They are named as follows:

- “Local Vcomp Mag”: Local fault locator composite voltage magnitude
- “Local Vcomp Ang”: Local fault locator composite voltage angle
- “Term 1 Vcomp Mag”: Terminal 1 fault locator composite voltage magnitude
- “Term 1 Vcomp Ang”: Terminal 1 fault locator composite voltage angle
- “Term 2 Vcomp Mag”: Terminal 2 fault locator composite voltage magnitude
- “Term 2 Vcomp Ang”: Terminal 2 fault locator composite voltage angle

When voltages are balanced, the composite voltages are presented as magnitude and angle in primary-value positive-sequence voltage terms, and then can be used for synchronism check between local and remote sources.

See the instruction manual for additional information on the composite voltages.

N Phase and Neutral Directional Overcurrent Elements have been added to the L30

590-5

Applicable: L30

This FW version enhances the protection functionality of the L30 Line Current Differential System by adding both phase and neutral directional overcurrent elements.

Through these elements, the L30 provides the means to maintain selective directional overcurrent protection when the Current Differential element "87L" is blocked due to communication failures.

Both phase and neutral directional elements follow the standard implementation of the L90. For further information, see the instruction manual.

Motor Protection Systems

E The M60 Motor Protection System has been enhanced to match curve time-constant settings as per IEC standard

590-6

Applicable: M60

This FW version enhances the protection functionality of the M60 Motor Protection System by adding a new time setting to the "Thermal" Protection Element.

The new settings is named "Thermal Model IEC Curve K factor" and is available within the Thermal Model element. This new setting is active when the "Curve" type is set as "IEC."

For further information, see the M60 instruction manual.

Common Protection Elements

N Extending UR family protection capabilities by adding thermal overload elements

590-7

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

This FW version introduces a new element named "Thermal Overload Protection" to comply with the IEC 255-8 standard.

The element offers hot and cold curves, has thermal memory and allows the user to set trip and reset constants. Two independent elements of the same kind are available per device.

The thermal overload element enables the UR devices to protect different kinds of power assets (such as cables, overhead lines, reactors, bus bars, capacitor banks, and so on) from an overload condition. For further information, see the instruction manual.

N New “broken conductor” elements have been added to T&D UR devices extending UR detection capabilities

590-8

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

This FW version introduces a new element named “Broken Conductor.”

The broken conductor element can detect line broken conductor or single-pole breaker malfunction conditions by checking the phase current input signals and the I_2 / I_1 ratio. Besides, two independent elements of the same kind are available per DSP module.

For further information, see the instruction manual.

N Additional P&C capability to D60 and L90 Transmission Protection Systems by adding frequency and power directional elements

590-9

Applicable: D60, L90

This FW version provides the D60 line distance and L90 line current differential protection systems additional protection and control capabilities by adding sensitive directional power and the full set of frequency elements. These elements are listed below:

<u>Decription</u>	<u># of elements</u>
Sensitive Directional Power	(2)
Frequency Rate of Change	(4)
Overfrequency	(4)
Underfrequency	(6)

All new elements follow the standard implementation of other UR devices, such as the F60 and N60. For further information, see the instruction manual.

E Timer settings of breaker and switch elements have been increased or adjusted to better fit the application

590-10

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

This firmware version introduces new time ranges to all different timers that are part of the “Breaker” and “Switches” elements. All existing time ranges were extended to be from 0.000 to 65.535 seconds.

Previous and new time ranges for breaker and switches related timers

<u>Breaker Timers</u>	<u>Previous range</u>	<u>New Range</u>
Toperate	0.000 to 2.000 s	0.000 to 65.535 s
Alarm Delay	0.000 to 1e6.000 s	0.000 to 65.535 s
Manual Close recall time	0.000 to 1e6.000 s	0.000 to 65.535 s

<u>Switches Timers</u>	<u>Previous range</u>	<u>New range</u>
Toperate	0.000 to 2.000 s	0.000 to 65.535 s
Alarm Delay	0.000 to 1e6.000 s	0.000 to 65.535 s

These new ranges better fit applications that have slow operating switches. Customers having previous FW versions have to set the Alarm delay higher than usual just to prevent false alarms.

N Extending selected UR breaker diagnostic capabilities by adding breaker re-strike elements

590-11

Applicable: D60, L90, F35, T60

This FW version provides additional breaker diagnostic functionality to selected UR devices by adding two breaker restrike elements to the existing monitoring functions.

These Breaker Restrike elements follow the standard implementation other UR devices have, such as the C70, C60, and F60, and they also have an option to exclude high-frequency detection patterns. For further information, see the instruction manual.

C Breaker and switch elements have been changed to ensure they show the right status when there is no feedback from the breaker/switch auxiliary contacts and to comply with the IEC61850 standard

590-12

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

“Breaker” and “switch” elements declare status depending on the breaker’s switch’s auxiliary contact feedback (normally open and normally closed contacts).

This FW version introduces changes to the breaker and switch elements logic that ensure the proper status indication when there is no feedback from the auxiliary contacts (No DC voltage on both normally open and normally closed contacts).

On top of that, the logic related to both “Bad” and “Intermediate” status was modified to comply with the IEC61850 standard (00 = “intermediate”, 11 = “Bad”).

For further information, see the instruction manual.

E The V/Hz protection element has been enhanced to use phase-to-phase voltage signals.

590-13

Applicable: G30, G60, T60

This FW version enhances the over-excitation protection element “Volts/Hertz” to allow the use of phase-to-phase voltages.

Either phase-to-ground or phase-to-phase voltages can be used by the protection element when there are wye-connected VTs available.

This new voltage setting is beneficial when protecting generators that are impedance-grounded or isolated neutral. For further information, see the instruction manual.

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

590-14

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 a Daylight Savings Time (DST) function that allows the device to follow local DST.

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

P **Changes to the “IEEE Very Inverse Overcurrent Curve” to ensure accurate tripping times when configured with very low pickup value**

590-15

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

This FW version introduces changes to the “IEEE Very Inverse Overcurrent Curve” that make its operating time to better match the specification when the configured pickup value is lower than 0.1 per unit.

Devices with previous FW versions can operate faster than the specified time under such conditions.

Users with time overcurrent applications that require pickup values higher than 0.1 per unit are not affected by this issue, and a firmware update is not required.

Communications

N **New IEC61850 buffered report control block “BRCB” improves UR device reporting capabilities when communicating with IEC61850 clients**

590-16

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

This FW version introduces a new and configurable IEC61850 report control block that was implemented at the LLNO logical node.

This BRCB has 64 data items, each one of which can be configured with data objects pertaining to existing logical nodes. All data objects are shown using standard IEC61850 notations. Configuration of the data items is available via UR software only.

As part of the implementation, a second instance of this BRCB delivers redundant information exchange. The second BRCB is a copy of the first one intended to support two-party-application-association (TPAA).

Previous RCBs are still available, which extends the list of available reporting services as follows:

LLNO: 2 buffered
GGIO1: 2 buffered, 3 unbuffered
GGIO 4: 3 unbuffered
MMXU: 1 buffered and 3 unbuffered per source

For further information, see the instruction manual.

E **Enhanced IEC61850 GOOSE capabilities enable UR devices to receive GOOSE messages from up to 16 other remote devices**

590-17

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

The number of devices the UR can receive “standard IEC61850 GOOSE messages” from, is determined by the number of data sets dedicated to receive GOOSE messages “GOOSEIn.”

This FW version doubles the quantity of “GOOSEIn” data sets available, which increases the quantity to 16 of them (GOOSEIn 1 to GOOSEIn 16). The number of data items has been reduced from 64 to 32 per data set to support the additional devices.

E Enhanced IEC61850 GOOSE capabilities enable UR devices to directly map status data attributes from existing logical nodes into outgoing GOOSE data sets

590-18

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

Within UR devices, standard IEC61850 GOOSE message transmission is configured through the outgoing data sets "GOOSEOut."

This FW version extends the available data that can be mapped into the GOOSEOut data items, thus status data attributes from any existing logical node can be set to any GOOSEOut data item.

Previous to this FW version, GOOSEOut data items are restricted to use data attributes coming from GGIO1, GGIO4, GGIO5, and MMXU logical nodes.

PMU Synchronphasor

N F60 and T60 Protection Systems to deliver synchronphasor measuring and data streaming capabilities

590-19

Applicable: F60, T60

This FW version introduces to the F60 and T60 the capability of generating and streaming synchronphasor "PMU" data.

The implementation follows the standard synchronphasor functionality of other UR devices, which also follows the latest version of the IEEE C37.118 standard.

The synchronphasor "PMU" functionality can be ordered through the following software options:

<u>Device</u>	<u>SW Option</u>	
F60	06	PMU
	07	IEC61850 + PMU
T60	06	PMU
	07	IEC61850 + PMU
	33	PMU + Synchrocheck
	34	PMU + IEC61850 + Synchrocheck

For further information, see the instruction manual.

N State of the art synchronphasor measuring and data streaming capabilities added to the UR family

590-20

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

This FW version introduces to UR devices with the phasor measurement unit (PMU) option the capability of generating and streaming M-class synchronphasor "PMU" data that follows the IEEE C37.118 standard.

The M-class PMU type was added to the setting-range of the PMU "Filtering" option. Advanced filtering methods were implemented so that the M-class PMU exceeds many of the standard requirements.

For further information, see the instruction manual.

Events and Records

- N** **A new FlexAnalog value that shows the number of triggered oscillography records has been added to the UR family**

590-21

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

This FW version introduces a new FlexAnalog value that indicates the number of triggered oscillography records in the relay.

The new FlexAnalog value is a consecutive number available over all supported communication protocols. This enables communication clients to retrieve new oscillography records once they are available.

Platform

- C** **Logic of the latching type contact outputs has been modified to ensure contact outputs correctly exit from Test Mode**

590-22

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

The UR test mode functionality allows users to force the actual state of programmable contact outputs. However, latching type contact outputs found in the I/O modules did not update their state to the real condition when returning from Test Mode.

This FW version ensures the latching type contact outputs update their state to the actual device condition after coming back from Test Mode.

EnerVista UR Setup Software

- G** **Windows 7 and Server 2008 support**

Applicable: UR Setup and UR Engineer

With this FW version, both the EnerVista UR Setup software and the Viewpoint UR Engineer software have been validated with the Windows 7 (32 bit) and Windows Server 2008 (64 bit) operating systems.

With this validation Windows XP (32 bit), Windows 7 (32 bit), and Windows Server 2008 (64 bit) have become the supported operating systems to run UR Setup and VP UR Engineer application software.

- G** **Software exceptions**

Applicable: UR Setup and UR Engineer

The following software exceptions have been corrected with software release 5.90:

Software Exceptions
When viewing FlexLogic in the "graphical view" mode of the standard FlexLogic configuration tool, it shows "AVR 4 Close OP" instead of "CUR BAL 1 STG2A OP."

UR devices with order codes containing "W2H": URPC in offline mode allow the Direct I/O data rate to be set to 64 kbps; whereas it should be restricted to 128 kbps

For T60 relay settings under "Thermal Inputs": When the "Ambient Temperature Sensor" is set to "Monthly Average" or the "Top Oil Temperature Sensor" is set to "Computed"; the setting parameter was misprinted as "RRTD Input 1."

Upgrade Paths

It is our recommendation 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 provides 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.

Upgrade path for versions 4.00 and above

For UR devices installed with versions 4.00 firmware and above, upload the 5.9x release to the relay can be done using the EnerVista UR Setup software.

Upgrade path for revisions below version 4.00

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

Benefits of revision 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)

Appendix

Change Categories

This document uses the following categories to classify improvements/changes.

Table 1: Revision categories

Code	Category	Comments
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 bring any 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

GE Technical Support

GE contact information for product support is as follows:

GE Digital Energy
650 Markland Street
Markham, Ontario
Canada L6C 0M1

Telephone: +1 905 927 7070 (worldwide), 1 800 547 8629 (North America), +34 94 4854 88 54 (Europe)
Fax: +1 905 927 5098 (worldwide)

E-mail: multilin.tech@ge.com

Home Page: <http://www.gedigitalenergy.com/multilin>