

UR Universal Relay Series

Revision 6.00 Release Notes

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Overview

Summary

GE Multilin issues the UR 6.00 release that introduces improvements for general and protection functions in the UR Family. The features that were modified in this release are:

- Bus Differential Systems: Increased pickup setting range of the bus differential element
- Capacitor Bank P&C System: Phase and Negative sequence directional elements available with Brick
- Feeder Protection Systems: F35 to support Wattmetric ground fault elements
- Motor Protection: Changes to the voltage dependent thermal overload model.
- Common protection and control elements
 - Enhanced VTFF
 - Enhanced Autoreclose Pause functionality
 - Changes to the neutral and Neg-Seq current directional element
- Communications
 - Changes to IEC60870-5-104 protocol
 - Changes to the analog GOOSE inputs
- PMU Synchrophasor
 - New Protection Class at 120fps synchrophasor
 - New aggregator elements – N60
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- Platform
 - New Turkish language support
- Software Exceptions

This document contains the release notes for the 6.00 release of the Universal Relay (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: Oct 27th, 2011
- Firmware revision: 6.00

This document also comprises the release notes of previous 6.0x firmware versions.

If users have existing UR Family relays installed with older version of firmware, 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 upgrading of the relays is required.

Products Affected

This release encompasses the following UR Family products:

- B30 Cost Effective Bus Differential System
- B90 Low Impedance Bus Differential System
- C30 Controller System
- C60 Breaker Protection System
- C70 Capacitor Bank Prot & Ctrl System
- D30 Line Distance Protection System
- D60 Line Distance Protection System
- F35 Multiple Feeder Protection System
- F60 Feeder Protection System
- G30 Generator & 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 new version 6.00 firmware that is a part of this release is compatible with the UR series hardware version 4.00 and higher.

The use of the new 6.00 firmware requires the EnverVista UR Setup software to be version 6.0x or higher. GE Multilin suggests users to use the latest version available of UR Setup software.

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

Bus Differential Protection Systems

E Increased pickup setting range of the Bus differential element

600-1

Applicable: B30, B90

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

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.

Capacitor Bank P&C Systems

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

600-2

Applicable: C70

This FW version makes the phase and negative sequence directional elements “**67P**” and “**67_2**” available when the relay’s order code includes a process bus module.

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

Feeder Protection Systems

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

600-3

Applicable: F35

Four new Wattmetric Zero-Sequence directional elements, ANSI code “32N”, have been added to the F35 multi feeder protection system.

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

A total of four (04) independent elements with independent settings are available.

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

600-12

Applicable: F60

The F60 Feeder Protection System 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 increase the range of schemes the F60 can protect. E.g. Breaker and Half with independent CT inputs, complete automatic-transfer scheme (Incomer-Tie-Incomer) in a single device

For further details please refer to the F60 Instruction manual and UR Setup Software.

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 dependent or your relays' FW version matches any of the listed below, no action is required.

FW versions that fix this issue: 5.72, 6.00

Common Protection and Control Elements

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

600-4

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 may 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 FW 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 further details, please refer to the UR instruction manual

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

600-5

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

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

This FW version changed the autoreclose Pause functionality to freeze all 3-pole shot timers and dead timers in a way they can resume their time count from the value they were when the paused operand was activated.

Previous FW version blocked the timers, so they didn’t resume at the value they were paused.

If either your Autoreclose element is not set to pause or your relays’ FW version matches any of the listed below, no action is required. FW versions with this change: 6.00

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 0.2pu. 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’s FW version matches any of the listed below no action is required.
FW versions that fix this issue: 5.72, 6.00

Communications

E UR IEC60870-5-104 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 should respond with a 16-bit value (test sequence counter) and its corresponding timestamp when a test command is received.

This FW version enhances the UR IEC60870-5-104 protocol implementation to the described test command.

If the IEC60870 protocol is not being used or your relay’s FW version matches any of the listed below no action is required.

FW versions that fix this issue: 5.72, 6.00

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 the IEC60870 protocol is not being used or your relay’s FW version matches any of the listed below no action is required.

FW versions that fix this issue: 5.72, 6.00

C The “IEC104 Point Lists” element has been changed to ensure 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 the 255 analog points are programmed.

If the IEC60870 protocol is not being used or your relay’s FW version matches any of the listed below no action is required.

FW versions that fix this issue: 5.72, 6.00

C UR Flexelements have been changed to properly operate when programmed to use IEC61850 GOOSE analogs 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 analog GOOSE inputs are not being used or your relay's FW version matches any of the listed below no action is required.

FW versions that fix this issue: 5.72, 6.00

C UR IEC60870-5-104 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 then 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 protocol is not being used or your relay's FW version matches any of the listed below no action is required.

FW versions that fix this issue: 5.72, 6.00

PMU Synchrophasor

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

600-6

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

This FW 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 define 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:

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

For further information on this subject please refer to the UR devices instruction manual

N Complete State of the art Synchrophasor measuring and data streaming capabilities with the new “PMU Aggregator elements”

600-7

Applicable: N60

This FW version adds to the N60 Network Stability and synchrophasor Measurement System two new aggregator elements. 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 “System Setup\Phasor Measurement Unit\Aggregators”

For further information on this subject please refer to the UR devices instruction manual.

E Complete State of the art Synchrophasor measuring and data streaming capabilities with the new “PMU Magnitude calibration”

600-8

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

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

Previous FW versions only allow for phase angle calibration.

For further information on this subject please refer to the UR devices instruction manual

G Synchrophasor’s analog channels to prevent scales issues when programmed as “Freq rate” and the UR device is in test mode

600-9

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 will be 10 times higher than the real value.

If “Freq Rate of change” values are not configured to any of your device’s PMU analogs or your relay’s FW version matches any of the listed below no action is required.

FW versions that fix this issue: 6.00

UR Platform

E New Turkish Language support

600-10

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

This FW version adds Turkish language to the four already supported languages. Firmware file, UR Setup software and Instruction manuals will be all available in Turkish.

The languages supported by UR devices are:

- English
- French
- Chinese
- Russian
- Turkish

E New Flexlogic operand enables IRIG-B time synchronization to indicate “GPS receiver is not locked to satellite”

600-11

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 flexlogic operand named “CLOCK UNSYNCHRONIZED”. This new 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 will wait two scan periods (2 seconds) to be set.

G Software exceptions

Applicable: 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 paths

It is our recommendation that all customers upgrade to the latest version of UR-series firmware to take advantage of the latest developments and feature enhancements. Firmware upgrades can be easily performed 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-series devices installed with versions 4.00 firmware and above, the revision 5.60 release can be uploaded to the relay using the EnerVista UR Setup software.

Upgrade path for revisions below version 4.00

For UR-series devices installed with versions of firmware below 4.00, an upgrade package must be obtained from GE Multilin 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
 - Support for Breaker-and-a-Half Transmission Line Protection (D60, L90)
 - Motor Health Diagnostics (M60)
 - Enhanced Front Panel
- Exceeds new IEEE C37.90 requirements
 - Transient immunity (2 to 4 kV)

Change categories

This document uses the following categories to classify the 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, etc.)
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 could be taken immediately
H	Hidden failure to trip	Protection may not operate when it should
F	False trip	Protection may operate when it should not
B	Unexpected restart	Relay restarts unexpectedly

The revision category letter is placed to the left of the change description.

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