UR Universal Relay series
Revision 4.60 release notes

GE Publication Number: GER-4043

Overview

Summary

- Affected products: UR Universal Relay series
- Date of release: February 15, 2005
- Firmware revision: 4.60
- Boot code revision: 1.13

Release summary

This document contains the release notes for the 4.60 release of the UR Universal Relay series firmware. The following relay models are covered by this note:

- B30 Bus Differential Relay
- C30 Controller
- C60 Breaker Management Relay
- D30 Line Distance Relay
- D60 Line Distance Relay
- F35 Multiple Feeder Management Relay
- F60 Feeder Management Relay
- G30 Generator Management Relay
- G60 Generator Management Relay
- L90 Line Differential Relay
- M60 Motor Relay
- N60 Network Stability and Security Relay
- T35 Transformer Management Relay
- T60 Transformer Management Relay

New features and modifications to existing features listed in the following section with corresponding revision categories and reference numbers. A change list for the Instruction Manuals is also included.

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 code letter is placed to the left of the description. An internal GE reference number is placed to the right of the description. This number may be used to reference the modification when contacting GE Multilin.

GE Multilin technical support

GE Multilin contact information and call center for product support is shown below:

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Release details

New models added

N **The L60 Line Phase Comparison Relay has been added to the UR Universal Relay series.** 14916 16397

A digital phase comparison relay has been introduced to the UR-family of relays. The relay uses a different design foundation compared with the preliminary version of the product evaluated three to four years ago. Operation is based on digitally processing all information from both currents and received voltages through fast sampling and mimicking the fundamental operating principle of a classical phase comparison function. Extended oscillography allows easy testing and analysis in the field.

For additional information, please refer to the release announcement, brochure, and manual available at http://www.GEmultilin.com.

New features

N **Display Properties: multi-language support added to UR-series relays** 14917 16352

This UR-series relays have been updated to support multiple languages. The 4.60 release contains English, Russian, and Chinese display messages. The display language is selected via the **PRODUCT SETUP ⇨ DISPLAY PROPERTIES ⇨ LANGUAGE** setting. Files transferred from the relay will be in English.

N **EnerVista Software: security report feature implemented** 15082

Support has been added to the UR-series relays for the EnerVista Viewpoint maintenance security report feature.

N **IEC 61850 Communications: order code option implemented for IEC 61850** 15510

The 4.60 release has been modified to allow combinations of software options in the product order code. For non-B90 firmware, software option numbers have been created to allow the EGD and breaker-and-a-half options to be combined with the IEC 61850 option. For B90 firmware, software options have been created to allow the various inputs, zones, and breaker failure options to be combined with the IEC 61850 option.

N **Language: order code option implemented for multi-language support** 15433

Support has been added to the UR-series of relays to identify the display language identifier in the order code options field. The second character in the third field of the UR order code will contain the language designation, as per the following convention:

C - Faceplate with keypad and LCD (English Only)

P - Faceplate with keypad, LCD, and 16 user-programmable pushbuttons (English Only)

A - Faceplate with keypad and LCD (Chinese and English)

B - Faceplate with keypad, LCD, and 16 user-programmable pushbuttons (Chinese and English)

D - Faceplate with keypad and LCD (French and English)

G - Faceplate with keypad, LCD, and 16 user-programmable pushbuttons (French and English)

R - Faceplate with keypad and LCD (Russian and English)

S - Faceplate with keypad, LCD, and 16 user-programmable pushbuttons (Russian and English)

For example, in the order code

F60-G00-HSH-F8F-K7C

the field "HSH" contains the character "S", denotes a faceplate with keypad, LCD, and 16 user-programmable pushbuttons (Russian and English).

Existing features modified

D **Auxiliary Undervoltage: event cause LEDs functionality changed** 12575

In previous revisions, the event cause LEDs for the auxiliary undervoltage protection element would not remain illuminated when the **AUX UV1 TARGET** setting was set to "Latched" and the operating conditions of the element were then removed or blocked. This functionality has been corrected for the 4.60 release.

R **Breaker Arcing Current: FlexAnalog value for breaker arcing current corrected** 12616

In previous revisions, the metering value of breaker arcing current available for use in FlexElements™ was correct, but its representation in web pages, the data logger, and oscillography records was incorrect. This has been corrected for the 4.60 release.

E **Breaker Failure: improved reset time for the overcurrent supervision of the breaker failure protection** 9565

Applicable to: C60, D60, F60, L60, L90, and M60 relays

The reset time for all overcurrent conditions of the Breaker Failure protection has been improved. Algorithm changes have been implemented to speed up the reset time, and guarantee better than 0.7 power cycle reset time with the multiple of pickup of up to 50, and under system conditions that include a realistic subsidence current from saturated CTs. The enhanced Breaker Failure operation allows shortening the security margin for reset of the overcurrent conditions, and meeting tighter total fault clearing time system requirements.

The algorithm responds to waveform signatures characteristic for a current interrupted by a circuit breaker. Care must be taken when testing for the reset time – unnatural patterns of interrupting the current should be avoided when using secondary injection sets or similar equipment to test the relay.

R **Contact Inputs: correction to contact input operation during power on** 14748

A contact input state can change when the relay is first powered on and the contact input voltage level is above 17 V, but below a higher threshold setting for the input. In previous revisions, the input state would then revert back to OFF after 1/8th of a power cycle. However, the input should not register a state change unless the input voltage exceeds the threshold setting and remains above the hysteresis level.

For example, if

Threshold = 33 V
Voltage at input at time of control power applied = 24 V

then the relay would record a state change of ON then OFF. This functionality has been corrected for the 4.60 release.

D **Current Differential: channel configuration default value corrected** 15830

When the L90 current differential feature is disabled, the default value for channel validity should be "N/A". However, in earlier revisions, the channel validity displays "OK". This has been corrected in the 4.60 release to display the correct status.

E **Digital Elements: setting added to control faceplate LED indication** 12979

In previous revisions, instantaneous pickup or delayed operation of any digital element was indicated by the Pickup LED on the front panel. With the 4.60 release, the **DIGITAL ELEMENT 1(16) PICKUP LED** settings are provided to disable this indication on a per element basis.

C **DNP Communications: add support for DNP file transfer services (Object 70)** 6978

Support for DNP file transfer services (DNP Object 70) has been added. All UR-series relay files can be transferred to a DNP master using these services. The UR-series relays now support file transfer using Modbus, TFTP, MMS, and DNP.

C **DNP Communications: reporting changed for binary and frozen counters in a DNP Class 0 response** 13121

DNP Technical Bulletin TB-2002-001 states that it is incorrect to report both binary and frozen counters in response to a Class 0 poll. With the 4.60 release, only binary counters are reported in response to a Class 0 poll.

C **DNP Communications: improved support for binary output trip/close pair operation** 4825

The DNP binary outputs typically map one-to-one to IED data points. That is, each DNP binary output controls a single physical or virtual control point in an IED. In the UR-series relays, DNP binary outputs are mapped to virtual inputs. Some legacy DNP implementations use a mapping of one DNP binary output to two physical or virtual control points. This was used to support the concept of trip/close (for circuit breakers) or raise/lower (for tap changers) using a single control point. That is, the DNP master can operate a single point for both trip and close, or raise and lower, operations. DNP Technical Bulletin 9701-002 recommends not using this type of implementation for new designs.

The UR-series relays can now be configured to support "paired" control points. Each paired control point operates two virtual inputs. A setting has been provided to allow configuration of from 0 to 16 binary output paired controls. Points not configured as paired operate as in previous versions.

R **Event Recorder: time change event held in memory** 11012 15478

In previous revisions, the UR-series relays will not log an event if the system time being written to the relay is earlier than the present displayed system time. This time change event is not lost, and the relay will display this event, once the time being written is greater than the displayed time. The 4.60 release has been modified to display all time change events, regardless of sequence.

R **Fault Report: correction to title in fault report on web pages** 14746

The "Pre and Post Fault Phasors" title in the web fault report should read "Prefault and Fault Phasors". This has been corrected for the 4.60 release.

D **FlexElements™: the FlexElement** PKP **operand no longer illuminates the pickup LED** 11234

In previous revisions, the FlexElement™ PKP operand would illuminate the front panel pickup LED contrary to the stated specifications for operation. This functionality has been corrected with the 4.60 release.

D **Hybrid POTT Scheme: missing unit added for the HYB POTT SEAL-IN DELAY setting** 16517

In earlier revisions, the "s" (for seconds) unit was missing from the **HYB POTT SEAL-IN DELAY** setting. This has been corrected for the 4.60 release.

C **IEC 61850 Communications: additional IEC 61850 features implemented** 14901

The IEC 61850 feature set in the has been modified to include additional features. The following changes and additions have been made:

1. Support for logical node PTOV - Overvoltage protection.
2. Support for logical node PTUV - Undervoltage protection.
3. Support for logical node RPSB - Power Swing protection.
4. Support for logical node RBRF - Breaker Failure protection.
5. Support for logical node RREC - Autoreclosure.
6. Support for logical node RFLO - Fault Locator.
7. Support for logical node MMXU, including buffered and unbuffered reporting, deadband functionality, and time-stamping.
8. Support for logical node GGIO, including buffered and unbuffered reporting, and time-stamping.
9. IEC 61850 GOOSE functionality, including configuration through the GOOSE control block. This includes Virtual LAN (VLAN) functionality, and ethernet priority tagging.
10. Complete IEC 61850 GSSE functionality, including configuration through the GSSE control block and support for GSSE DNA-1 and DNA-2.
11. Fully programmable logical node name prefixes.
12. Support for up to four simultaneous IEC 61850 client connections.
13. Update Sisco MMSLite library to the latest version (50052). This includes various problem resolutions and feature enhancements.
14. Other minor updates to specific data items that were missing in version 4.40.
15. The IEC 61850 feature set is now available only with a specific order code software option.

G **Internal Enhancement: CT/VT module development tool change** 11703

Changes to development tools for the CT/VT modules have been incorporated. These changes better utilize the existing resources of the modules and are transparent to the user.

G **Internal Enhancement: internal development tool changes** 12307

Some enhancements were made to an internal tool used to simulate relay functionality on a desktop PC. No relay firmware files were modified.

M **Power Metering: correction made for power metering with Delta connections** 14308

In previous revisions, the cut-off levels for voltage and current were incorrectly applied to power calculations when using a Delta VT connection. With the 4.60 release, the cut-off levels are now as follows. For Delta connections:

$$3\ \text{Phase} = (\sqrt{3} \times CT_{cutoff} \times VT_{cutoff} \times VT_{primary} \times CT_{primary}) / VT_{secondary}$$

For Wye connections:

$$3\ \text{Phase} = (\sqrt{3} \times CT_{cutoff} \times VT_{cutoff} \times VT_{primary} \times CT_{primary}) / VT_{secondary}$$

$$\text{Per Phase} = (CT_{cutoff} \times VT_{cutoff} \times VT_{primary} \times CT_{primary}) / VT_{secondary}$$

where $VT_{primary} = VT_{secondary} \times VT_{ratio}$ and $CT_{primary} = CT_{secondary} \times CT_{ratio}$

G **Settings Groups: setting groups feature removed from the C30 Controller** 10652

All associated user settings for the setting groups feature located in the control elements section in the C30 Controller have been removed, as this feature is not supported in the C30.

G **Split Phase Protection: range of the pickup settings changed** 14827

The minimum setting for phase A, B and C pickup for split phase protection has been changed to 0.020 pu from 0.000 pu.

P **Underfrequency: voltage pickup setting corrected upon changing auxiliary VT ratio** 14690

In previous versions, the underfrequency minimum pickup setting was not updated upon an auxiliary VT ratio change. For example, a pickup setting of "0.1 pu" and auxiliary VT ratio of 100:1 resulted in a 10 V minimum signal for the element above which the frequency is measured. Changing the auxiliary VT ratio to 50:1 and maintaining the same pickup level did not update the minimum voltage to 5 V.

With the 4.60 release, this has been fixed by properly updating the underfrequency settings upon auxiliary VT ratio change.