

RELEASE NOTE 1MRG038191 | 2020-09-25

Release of Relion[®] 650 series Version 2.2

The evolution of Relion 650 series continues with this update. The designation of this update is revision 2.2.4

Release authorized by:

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Introduction



We are pleased to announce an update of the Relion 650 series version 2.2, our pre-configured protection and control IEDs. With this update, we bring several new features and enhancements.

The updates are covering all application areas within the products REB/REC/RED/REL/REQ and RET650. The Relion 650 series covers the following applications: line protection and control, transformer protection and control, high-impedance busbar protection, circuit breaker protection, and bay control. With the introduction of version 2.2 of the 650 series, we further expand the application areas especially for digital substations, enhancing the system functionality and flexibility.

Key system features such as support for several Ethernet communication ports, HSR redundancy method and precision time synchronization following the IEC/IEEE 61850-9-3 profile have been introduced since the launch of version 2.2. Also, process bus sampled values via IEC/UCA 61850-9-2LE has been supported in all products of the Relion 650 series. A number of system and cybersecurity features bring enhancements to these already available features.

New features and benefits



The following new features and their benefits are introduced in this update:

Hardware related

- Introducing the Line Data Communication Module (LDCM) for short and medium range communication in line distance protection REL650 offering. LDCM has so far been available in line differential protection RED650, and in REL650 it will complement line distance protection applications, enabling communication between line-ends without a need for external converters.

Application related

- Introducing a novel transient earth protection that can be universally applied in resonant, high-impedance and isolated networks. Earth faults of various types like low-Ohmic, high-Ohmic, intermittent and re-striking can be accurately and securely detected. This functionality can be integrated in line distance protection REL650.
- The existing line distance protection function ZMFPDIS is now enhanced further with an additional overall seventh zone, where-in one zone is fixed to forward, one zone is fixed to reverse and the directionality of the remaining five zones are settable. Further, the directional blinders from being fixed in the past can now be settable by the user. The enhancements meet requirements for flexible and demanding distance protection applications in solidly and high impedance grounded networks.
- The setting range for Relay Operating Angle (ROA) in the existing restricted earth fault differential protection REFPDIF is increased in order to handle applications in high-impedance grounded networks.
- The existing earth fault protection EF4PTOC is now enhanced with built-in phase selector providing information of the faulty phase(s). This enhancement meets requirement of earth-fault performance in networks where single-pole auto-reclosing is used.

- Additional backup protection functions have been added to line differential protection RED650, line distance protection REL650, circuit breaker protection REQ650, transformer protection RET650 and bay control unit REC650.
- Bay control functionality for up to 5 apparatus (one of which circuit breaker) has been added to RED650, line distance protection REL650 and transformer protection RET650.

System and cyber-security related

- The 650 series already support user accounts that are managed locally or centrally via ABB's SDM600. Central account management has been further enhanced to support Microsoft® Active Directory service for user management. This enhancement allows user account management and authorization via a third-party Active Directory domain server.
- The 650 series communication to central account management servers has been enhanced to support Lightweight Directory Access Protocol over SSL (LDAPS) also called secure LDAP.
- Default password and PIN code for the IED while being fixed in earlier versions can now be changed by user thereby meeting requirements of cyber-security standards.
- The communication to/from 650 series devices uses data encryption via Transport Layer Security (TLS). While TLS versions 1.2, 1.1, 1.0 are supported, these are also settable by the user in terms of allowed Min/Max versions. This provides the flexibility for users to raise the cyber security data encryption levels and when needed for specific cases/clients allow a lower encryption level.
- The United States Federal Information Processing Standard (FIPS) defines security and interoperability requirements for computer systems that are used in governmental organizations. The 650 series version 2.2.4 together with PCM600 version 2.10 and connectivity package version 2.4 now uses SHA-256 encryption algorithm to meet the FIPS 140 standard. This enhancement ensures that the IED and tools environment work seamlessly in a FIPS or non-FIPS system.
- All 650 series products include a feature where the function keys on the LHMI can be configured for use either with or without authentication. In addition, a configurable input is now available for additional conditional checks, like L/R position for example. This eliminates any unsafe operations with function keys.
- IEC 61850 communication supervision now covers GOOSE via logical node ALGOS and sample value supervision via logical node ALSVS.
- IEC 61850 supports a powerful feature of simulation and testing of sample values and GOOSE data. While the 650 series devices have supported this simulation mode, it is further enhanced with clear indication on the LEDs when in simulation mode and a function block output which can be used in application configurations.
- When using LDCM modules, extensive line data communication information is now available on LHMI and signal monitoring in PCM600 for supervision of communication links.
- User Defined Name (UDN) is a simple yet powerful way to identify signals in a configuration and on the LHMI. From the present 13-character limit, it is now increased to 16-characters and complies with IEC/IEEE C37.118.2, with 16 bytes for station, channel names.

- The total number of disturbance records stored in the 650 series IED has been increased from the present 100 to 200 records.
- The total storage of process events has also been increased from present 1000 to 5000 events.
- In multi-end line differential protection applications, some line ends and IEDs may need to be taken out of service. In order to increase the availability of the system the remaining parts of the system are kept in service. Feeders can now be set out-of-service or in-service from a single local end thereby reducing maintenance, testing and outage costs.
- Line differential protection security has been improved where bit errors caused by the communication system can lead to incorrect protection operation. Protection security has been enhanced such that a remote communication trip signal will be processed only when there is a genuine line differential protection start; either a local start or a remote start.
- OpenSSL updated to version 1.1.1d (<http://www.openssl.org>).

PCM600 and IED connectivity package for 650 series products version 2.2

PCM600 version 2.10 together with PCM600 2.10 Hotfix Rollup 20200424 or later and 650 series connectivity package version 2.4 will be required.

The version 2.4 of the IED Connectivity package for Relion 650 series supports 650 series version 2.2 products as well as earlier versions of the 650 series.

For further details about the connectivity package and its installation, please refer to the release note 1MRG038193.

Documentation and marketing material

The product guides, technical manuals, technical summary sheets and brochures are available via abb.com/protection-control.

Ordering and delivery

All new orders on the Relion 650 series version 2.2 products will be delivered with this latest version. Existing orders will be processed with the version/revision as acknowledged at order. If existing order shall be upgraded to this latest version, a request shall be made to **SA-T sales**.

For current delivery time, please get in touch with our sales contact at ABB Power Grids, Grid Automation Products.

Kind regards,

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