The power of one solution for protection and control

What’s new in Relion® 670 and 650 series?
The power of one solution for protection and control

Presenters

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Agenda
The power of one solution for protection and control

1. Relion® series - The power of one
2. Relion® 670 and 650 series introduction
3. What’s new in Relion® 670 and 650 series?
4. Application areas
5. Product evolution
6. Certificates
7. Our offering
8. Summary
Relion® series
The power of one

What does Relion® stands for?

Safeguarding your investment

Excellent reliability

Minimal maintenance

Long term support & ease of exchange

Standard compliance

Cyber security

June 3, 2016
What’s new?
Relion® 670 series version 2.1
The power of one solution for protection and control
Relion® 670 series version 2.0
We are leading the digital substation evolution

Major features in 670 series version 2.0

- IEC 61850, Edition 2
- IEC60870-5-103 protocol
- Cyber security
- Improved HMI
- Improved mechanical design
- Improved fault locator
- Breaker monitoring
- Global base values
- Forcing
- Higher capability for 9-2LE applications
Relion® 670 series version 2.0
We are leading the digital substation evolution

Protection functions

- Fast distance protection
- Frequency accumulative protection
- Fuse supervision, VDSPVC
- Rotor overload protection (49R)
- Stator overload protection (49S)
- Binary signal integrator, TIGAPC
- Gas medium supervision, SIMG
- Liquid medium supervision, SIML
- Limit counter function, TEIGAPC
- Multi-purpose filter, SMAIHPAC
- Under-impedance monitoring, ZGVPDIS
- Pole slip
Relion® 670 series version 2.1
The power of one solution for protection and control

Features

- Improvement of the fast line distance protection
  - Complemented by combined, easily settable characteristics of Quad/Mho
  - Supporting remote parameterization enabling adaptive line distance protection applications
- Enhanced security and integration by supporting Central Account Management (CAM) in the IED which is harmonized across the SA system portfolio
- Enhanced flexibility and thereby acceptance where the user’s IEC 61850 communication models are abstractly mapped to the IED internal models
- Support PCM600 version 2.7 features like Central Account Management, Flexible Product Naming, Forcing, 64bit native

Product portfolio

- The released product portfolio includes
  - Eight products based on application:
    - REB, REC, RED, REG, REL, RER, RES and RET
  - 51 different product variants
    - 37 configured
    - 14 customized
- Hardware
  - Same hardware as 670 version 2.0 + a new TRM variant 10I+2U as an option
- Tools
  - PCM600 2.7 will be required
  - Connectivity package 3.1 will be required
Relion® 670 series version 2.1
What’s new?

- High-speed distance protection, ZMFPDIS and ZMFCPDIS
  - Combined Quad/Mho/Offset Mho characteristics
  - Settable Quad/Mho operating characteristic per zone/fault loop type PE/PP
  - Tested according to IEC 60255-121, typical operate time for Mho now 15ms (prev. 25ms)
  - Easier to set enables faster deployment. Graphical view in GPST in PCM600
  - Lower CT requirements
  - Continuous impedance measurement, ZMMXU
    - To HMI and remotely via communication
  - Some settings mapped to IEC 61850

- Running hour meter, TEILGAPC
  - Accumulate the total running or energized time of generator, transformer, reactor and provide this value locally on HMI or remotely via communication

- Compare integer, INTCOMP
  - Compares two integer variables, e.g., can be used to check Tap-Changer position

- Compare real, REALCOMP
  - Compares two real variables, e.g., can be used to compare current or voltage level
What’s new?
Relion® 650 series version 2.1
The power of one solution for ready to use protection and control
Relion® 650 series version 2.1
The power of one solution for ready-to-use protection and control

Features

- New line distance protection for the 650 series
  - Complemented by combined, easily settable characteristics of Quad/Mho
  - Supporting remote parameterization enabling adaptive line distance protection applications
- Enhanced security and integration by supporting Central Account Management (CAM) in the IED which is harmonized across the SA system portfolio
- Enhanced flexibility and thereby acceptance where the user’s IEC 61850 communication models are abstractly mapped to the IED internal models
- Support PCM600 version 2.7 features like Central Account Management, Flexible Product Naming, Forcing, 64bit native

Product portfolio

- The released product portfolio includes
  - Six products based on application:
    - REB, REC, RED, REL, REQ and RET
  - One configuration per product
- Hardware
  - Same hardware as 670 version 2.1
  - 6U ½ 19"
- Tools
  - PCM600 2.7 will be required
  - Connectivity package 2.1 will be required
What’s new in Relion® 670 and 650 series?

System functions

Defense in depth
- Central Account Management

Flexible product naming
- Via IEC 61850

Protection settings
- Via IEC 61850

IEC 61850
- Edition 1 and Edition 2

GOOSE tripping
- Performance class P1 (3ms)

Communication supported
- IEC 60870-5-103

Standard
What’s new in Relion® 670 and 650 series?

Defense in depth

- CAM (Central Account Management) based on IEC 62351-8 RBAC
  - Centralized administration of users, manage users for all IEDs centrally from a single server using SDM600
  - User credentials and roles are created/stored in an online authentication service server
    - Authentication is done at the server
    - Authorization check is done at the IED
    - New PCM Tool component “Account Management” is included in PCM600 2.7
- 670 and 650 series version 2.1 fully supports centralized user account management and security logging
What’s new in Relion® 670 and 650 series?

Defense in depth

- Certificate management
  - Certificates were introduced from 650 version 1.3 and 670 version 2.0
  - In 650 version 1.3, and 670 version 2.0 self-signed certificates were used to encrypt and secure communication
  - In 670/650 version 2.1, customers are allowed to deploy certificates issued by a Certificate Authority (CA)
  - PCM600 is used to deploy/remove signed certificates
What’s new in Relion® 670 and 650 series?

**Flexible Product Naming (FPN)**

- Enable the IEC 61850 client to see names of logical nodes, parameters, attributes etc., as per its own definition
  - In principle one look-up table between IEC 61850 naming definitions and client naming definitions
- FPN is a way to map the IED’s IEC 61850 data model to a customer defined IEC 61850 data model
- FPN allows customer to use standardized, predefined and IED-vendor independent templates for building and maintaining substations
- FPN offers significant flexibility and efficiency in substation engineering
- FPN is supported for both IEC 61850 Edition 1 and Edition 2
What’s new in Relion® 670 and 650 series?

Protection settings via IEC 61850

- Facility to change certain settings remotely using IEC 61850
- Dedicated enable/disable setting and indication in ACT
- Functionality supported when in IEC 61850 Edition 2
- High-speed distance protection
  - Change zone X&R reaches and load-encroachment blinder area settings remotely
  - Over-current protection
    - Change current pickup remotely
    - OC4PTOC, EF4PTOC, PHPIOC, EFPIOC
What’s new in Relion® 670 and 650 series?

IEC 61850

- Supports both IEC 61850 edition 1 and edition 2
- Easy switch between editions
  - Done through PCM600
- No extra ordering needed
  - Always included
- Fully certified through DNV GL

Easy to order, easy to use
What’s new in Relion® 670 and 650 series?

Communication

- IEC 60870-5-103 protocol
  - Compliance and thereby interoperability with VDEW standard for 103 commands
  - Parametrized selective handling of events
    - Events time-tagged with either relative or absolute timestamp
    - Events to be included as part of general interrogation or not
What’s new in Relion® 670 series version 2.1?

Increased number of binary of disturbance recording channels

- REB
  - Increased number of disturbance recording channels from 96 to 352 in order to capture all important information for 24 bays
- REC
  - 352 disturbance recording channels available since 670 2.0
- RED, REG, REL, RES and RET
  - Increased disturbance recording channels from 96 to 128
What’s new in Relion® 670 and 650 series?

- Time saving during testing and commissioning
  - Support for forcing of BIM, BOM, IOM and SOM
  - Can be performed from PCM600 and/or local HMI
  - Forcing is possible only when the IED is in test mode. Leaving test mode will go back to unforced (live from process) values

Forcing of binary inputs and outputs
What’s new in Relion® 670 and 650 series?

Harmonized pre-configurations

- To facilitate faster deployment, familiarity across the configurations, common look & feel style guide
  - Application block diagrams
  - Application configurations including:
    - variable naming
    - graphic display layouts
    - IO allocation
    - disturbance record signal allocation
    - LED allocation
What’s new in Relion® 670 and 650 series?

PCM600 related

- IEDs appear based on application and not on voltage level
- Once the new connectivity packages are installed, the 670 and 650 series version 2.1 and older versions if previously installed will appear based on application

- After installing 650/670 2.1 IED modules, the Object Types in PCM600 now appear based on application.
- The same structure shown from IED context menu as well.
What’s new in Relion® 670 and 650 series?

PCM600 related

- Control over configuration environment
  - The IED serial number and firmware version are displayed in PCM600 object properties window
  - This is read from the IED whenever the user performs common read or partial read from PCM600
  - The PCM600 version and connectivity package version is now displayed in the IED LHMI
  - This available on the IED after the user performs common write or partial write from PCM600
What’s new in Relion® 670 and 650 series?

PCM600 related

- Bulk read/write of IEDs for faster and efficient handling
  - For a set of IEDs under bulk write, it is possible to define whether to write “61850 configuration” or not
  - The same 61850 setting is used for all the IEDs that are added for bulk write operation
Application areas
## Relion® portfolio

<table>
<thead>
<tr>
<th>Application area</th>
<th>Type</th>
<th>670 series</th>
<th>650 series</th>
<th>REB500</th>
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<tr>
<td>Busbar protection</td>
<td>REB</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<td>Bay control</td>
<td>REC</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Generator protection</td>
<td>REG</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Line distance protection</td>
<td>REL</td>
<td>✔️</td>
<td>✔️</td>
<td>(backup)</td>
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<td>Line differential protection</td>
<td>RED</td>
<td>✔️</td>
<td>✔️</td>
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<td>Transformer protection</td>
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<td>RES</td>
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<td>RER</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>
Relion® 670 series
Railway application, RER670 application areas

Developed for 16.7 Hz railway

- RER670 is specifically developed to protect and control
  - 16.7 Hz, 2-phase transmission networks
  - 16.7 Hz 1 and 2-phase power transformers

Safeguarding your assets
with RER670

Fast and reliable line protection
for all types of power system grounding

Transformer protection
Flexible, reliable and high-performance

Control functions for
optimized control and reliable operation of your switchyard
Relion® 670 series
Railway application, RER670 application areas

Developed for 16.7 Hz railway

- RER670 protection and control for railway applications is available in three functional packages

Easy ordering based on application
Relion® 650 series version 2.1
New member of the 650 series

RED650

- Line differential protection with back-up distance protection and auto-reclose functionality
  - Current and voltage back-up protection
  - Control for one circuit breaker
  - 2 or 3 line ends
  - SR or MR communication
  - Compatible with RED670 version 2.1
  - In-zone transformer
  - IRIG-B time synchronization

Ready to use application
Relion® 670 series
Evolution

- From 2.0 ➔ 2.1
  - Upgrade, migrate application

- From 1.x ➔ 2.1
  - New IED, migrate application
Relion® 650 series
Evolution

- Fifth release of the Relion 650 series
  - New member of the 650 family; RED650
- Three active versions
  - 650 1.1
  - 650 1.3
  - 650 2.1
- No migration from 650 1.x to 650 2.1
Relion® 670 and 650 series version 2.1
IEC 61850 Ed1 successfully tested at ABB’s SVC center
Relion® 670 and 650 series version 2.1
DNV-GL(KEMA) Conformance Test

IEC 61850 Ed2, IEC 60870 -5-103 and DNP 3.0 conformance certificate
Relion® 670 and 650 series
Our offering

- Busbar protection
- Bay control
- Generator protection
- Line distance protection
- Line differential protection
- Transformer protection
- Breaker protection
- Wide area monitoring
- Railway application
What’s new in Relion® 670 series?
The power of one solution for protection and control

Your benefits

- Complete portfolio for the most demanding protection, control and monitoring applications
- Advanced system functionality to build modern substation automation systems
- Available as pre-configured or customized version depending on application requirements
- High flexibility, large I/O capability

Relion® 670 series
What’s new in Relion® 650 series?
The power of one solution for ready-to-use protection and control

Your benefits

- Maximum configurability and performance within a narrowed down, pre-defined ecosystem
- Meets the most common requirements of protection and control for transmission and sub-transmission networks

Relion® 650 series
Relion® 670 and 650 series

What can you expect?

- Expect nothing less than the best
- Expect flexibility and performance
- Expect solutions perfectly tailored to your needs
- Expect future-proof and flexible system architectures
- Expect outstanding communication capabilities
- Expect world-class quality
- Expect skilled specialists from the technology leader dedicated to fulfill your expectations and needs

The power of one solution for protection and control

www.abb.com/protection-control
What’s new in Relion® 670 and 650 series?

Summary

- Presentation and recordings will be available on [www.abb.com/protection-control](http://www.abb.com/protection-control)
- For more information please contact your local ABB Sales Team via [www.abb.com/protection-control](http://www.abb.com/protection-control)

Thanks for joining us