Relion® Protection and Control
Medium Voltage Power System Protection in Data Centers
Relion® for data center applications
Proven solutions complying to the latest standards

Protection and control

- ABB’s main product family for MV protection and control products
- A large installed base and the widest range of products for the protection, control, measurement and supervision of power systems
- Designed to implement the core values of the IEC 61850 (Ed 1 and Ed 2) standard to ensure interoperable and future-proof solutions
- The Relion® family includes relays both according to the IEC and the ANSI standards

+500,000 Relion relays in operation
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Main product series and application areas

### 611 series
- Preconfigured solutions
  - Feeder protection REF611
  - Motor protection REM611
  - Busbar and multi-purpose differential protection REB611
  - Voltage protection REU611

### 615 series
- Compact and powerful
  - Feeder protection REF615
  - Line differential protection RED615
  - Motor protection REM615
  - Transformer protection RET615
  - Voltage protection REU615
  - Capacitor bank protection REV615
  - Generator protection REG615

### 620 series
- Flexibility and performance
  - Feeder protection REF620
  - Motor protection REM620
  - Transformer protection RET620
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Main product series and application areas

**COM600**
- Substation Management
  - Process visualization, webHMI with single-line diagram (SLD)
  - Real-time and historical data handling
  - Communication gateway

**RIO600**
- Modular flexibility
  - Modular remote I/O for IEC 61850 applications
  - Extending the I/O capabilities of the relays
  - I/O flexibility to Relion® relays and COM600 over fast IEC 61850 GOOSE communication ensuring improved functionality and performance

**Summary**
- Relion
  - Wide application coverage
  - IEC 61850 Ed1 and Ed2 compliant
  - Proven technology +500,000 relays in operation

**Substation Management**
- Increased functionality and flexibility for data center applications
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Protecting the MV power distribution system

MV power distribution
- MV switchgear & MCCs
- Protection relays
- Distribution transformer
- Active voltage conditioning
- Network mgmt SCADA
- Data communication

Back-up power
- Diesel generators
- Electrification

Uninterruptible power systems
- UPS products
- Diesel generators
- Batteries
- Service contracts
- Transfer switch

Building automation
- Remote power panels
- Power measurement
- KNX/EIB
- Data communication

Security systems
- Lighting system
- Fire protection
- Security alarms

LV power distribution
- LV switchgear & MCCs
- Intelligent PDUs
- Active filters
- Power factor correction
- Network analyzer
- Data communication

Server Cabinets
- Server
- Rack
- Storage devices
- PDUs
- Communication cabling
- Lighting system

HVAC solutions
- Cooling units
- EFF1 electric motors
- Variable speed drive
- Components for control panels
- PLCs
- Data communication
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Application examples

**Feeder protection**

- **Incoming feeder, outgoing feeders and bus-tie protection**
  - Directional and non-directional overcurrent and earth-fault protection with multifrequency neutral admittance, voltage, frequency and power based protection and measurements, synchro-check and circuit-breaker condition monitoring

**Transformer protection**

- Transformer differential with voltage protection restricted earth-fault protection, back-up protection

**Line differential protection**

- **Phase-segregated, two-end, line differential protection**
  - Two-stage line differential protection with non-directional earth-fault protection
  - Point-to-point optical protection communication link using either multi-mode or single-mode fiber

Compact and versatile solutions for data center MV power distribution systems
Relion® for data center MV applications

Application examples

**Busbar protection**
- Dedicated high impedance busbar protection (REB611)
- Feeder protection with integrated high-impedance busbar protection (REF615)
- Busbar protection schemes using IEC 61850 GOOSE messaging, dir.overcurrent and logic

**Generator protection**
- Generator differential protection, non-directional overcurrent protection, voltage dependent overcurrent protection, earth-fault protection, voltage and frequency protection, underpower and reverse power protection, underexitation protection, underimpedance protection

**Arc protection**
- Integrated arc protection in 615 and 620 series products (3 sensors)
- The REA arc fault protection system (expandable with loop sensor option with supervision feature)

Compact and versatile solutions for data center MV power distribution systems
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Protecting the LV power distribution system
Relion® for data center LV applications

Application examples

**Feeder protection**

**Incoming feeders**
- Non-directional overcurrent and non-directional earth-fault protection

Compact and versatile solutions for data center LV power distribution systems
Relion® for data center MV and LV applications

Automatic Transfer Schemes (ATS)

ATS schemes using Relion®

- ATS schemes utilizing IEC 61850 and GOOSE messaging
- Based on the 615 and/or 620 series relays
- Reduced hard wiring of signals
- Reduced time and cost
- Increased speed with GOOSE communication
- Increased communication reliability with supervised IEC 61850 communication
- Enables a standardized solution for both LV and MV applications

Example ATS solution for LV and MV applications

Utilize IEC 61850 and gain increased reliability and speed
**Task**

Ensures continuous power supply to essential electrical equipment by changing over from a main to a stand-by feeder as fast as possible

Benefits:
- Increased plant availability
- Ensuring process continuity
- Quality of energy supply
- Prevention of costly production outages
- Protection of facilities, environment and workers

**Total transfer duration time down to 30 ms**
Maximize the process uptime and protect the assets

**Protection selectivity**
- Fast protection and interlocking schemes enabled using IEC 61850 and supervised GOOSE messaging
- Protecting critical assets such as transformers, feeders, generators, busbars and switchgear

**Uptime and redundancy**
- Relay self-supervision continuously monitors the state of the relay HW and the operation of the SW to detect protection system malfunction affecting the process uptime
- Zero-loss Ethernet redundancy with HSR and PRP

**Lifecycle services**
- Training, support, spare parts throughout the entire life cycle of the relay
- Post-manufacturing service ensures the availability of protection relays that are not in active production anymore

Maximize process and communication uptime
Flexibility

Response: Digitize the switchgear using IEC 61850

Interoperability
- Vendor-independent standard
- Relion devices supporting both Ed1 and Ed2 of IEC 61850
- Device interoperability for improved substation integration
- Possible to run two protocols simultaneously

IEC 61850 communication
- Simplified substation wiring saves time and money
- Fast and reliable communication for time critical applications
- Supervised Ethernet-based communication
- Future proof: language and the way of transmitting are split

Sharing of information
- Binary and analog peer-to-peer communication (GOOSE)
- Enables the sharing of sample measured values between the devices (IEC 61850-9-2)
- Connect to SCADA, 800xA or Decathlon using IEC 61850

IEC 61850 – interoperability and connectivity
Efficiency

Response: Bring energy efficiency to the MV substations with ABB UniGear Digital

Sensor support in the relays
- Support for sensors for phase currents and phase voltages in the 615 and 620 series relays

UniGear Digital
- Relion relays + IEC 61850 + sensor technology
- Less hardware components and less wires
- Flexibility towards changing load flows
- Reduced delivery time and easier last minute changes

Energy efficiency
- Lowers energy consumption up to 250 MWh**
- Saves up 150 tons of CO2**
** compared to a typical substation with 14 switchgear panels of UniGear ZS1 type over 30 years of operation

Implements cost-efficiency in your operations
Ease of maintenance

Response: Monitor the equipment and shorten the MTTR

Plug-in design relays
- Contributes to a shortened MTTR
- Quick replacement of a unit without disturbing the majority of the wiring
- Sealable mechanism to prevent unauthorized detachment

Integrated monitoring functions
- Continuous supervision of the protection availability, operation traceability for pre and post-fault analysis
- CB condition monitoring, SF6 gas pressure supervision, fuse failure supervision, RTD and mA inputs

Efficient tools
- One configuration tool for all Relion relays
- Fast corrective actions enabled by various diagnostics and monitoring functions (disturbance records, SoE)
- WebHMI – optional local or remote relay access

Design, functionality and tools to support efficient operation and maintenance
Safety

Response: Embed active arc fault protection in the switchgear to increase personnel safety

**Personnel safety and material damage**
- Increased personnel safety during maintenance work
- Reduced material damage in case of an arc minimizes the system downtime
- Combine active (relays) and passive arc fault protection

**Integrated arc fault protection**
- Optional arc protection with 3 point-to-point arc detection sensors in the 615 and 620 series relays
- Enables continuous supervision of the CB, cable and busbar compartment of metal-enclosed switchgear

**REA arc fault protection system**
- Supports both lens and fiber type sensors
- A solution allowing extension and expansion of the system
- Tested and field-proven solution, thousands of installations in more than 30 countries

**Increased personnel safety and minimized repair and service time**
Risk management

Response: Authorize the relay access and log all user activities

**User rights profiles**
- Viewer (read only), operator, engineer and administrator
- Applies to the front-panel user interface (Local HMI), webHMI and the relay configuration tool PCM600
- Administrator programmable passwords

**Reduce the risks**
- Reduce the risk of unwanted CB operation, changed parameter setting or configuration changes with read only access
- Secured communication – webHMI with TLS encryption

**User activity logging**
- Logging of all user activities with integrated Audit trail functionality (IEEE 1686)
- The latest 2048 events are stored in the non-volatile memory (FIFO) of the relay

Role-based access control – authorized relay configuration and operation
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Protecting the MV and LV power distribution system

**Summary**

- A wide application coverage for data centers
- Proven solutions complying to the latest standards
- DNV GL (KEMA) IEC 61850 Ed 1 and Ed2 certified products
- Solutions both for LV and MV power distribution applications
- Reliable, flexible, efficient, and safe
- Support and service throughout the entire life cycle of the relay
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References

Relion® 615 and 620 series

ABB is keeping the power on at Safe Host's data center in Switzerland

[YouTube]

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