



ABB MEDIUM VOLTAGE PRODUCTS, DISTRIBUTION AUTOMATION, 1MRS758555 B

# Relion<sup>®</sup> Protection and Control

Medium Voltage Power System Protection in Data Centers



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# 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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# Relion® for data center applications

## Main product series and application areas

### 611 series

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#### Preconfigured solutions

- Feeder protection **REF611**
- Motor protection **REM611**
- Busbar and multi-purpose differential protection **REB611**
- Voltage protection **REU611**

### 615 series

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#### 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

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#### Flexibility and performance

- Feeder protection **REF620**
- Motor protection **REM620**
- Transformer protection **RET620**

# Relion® for data center applications

## 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

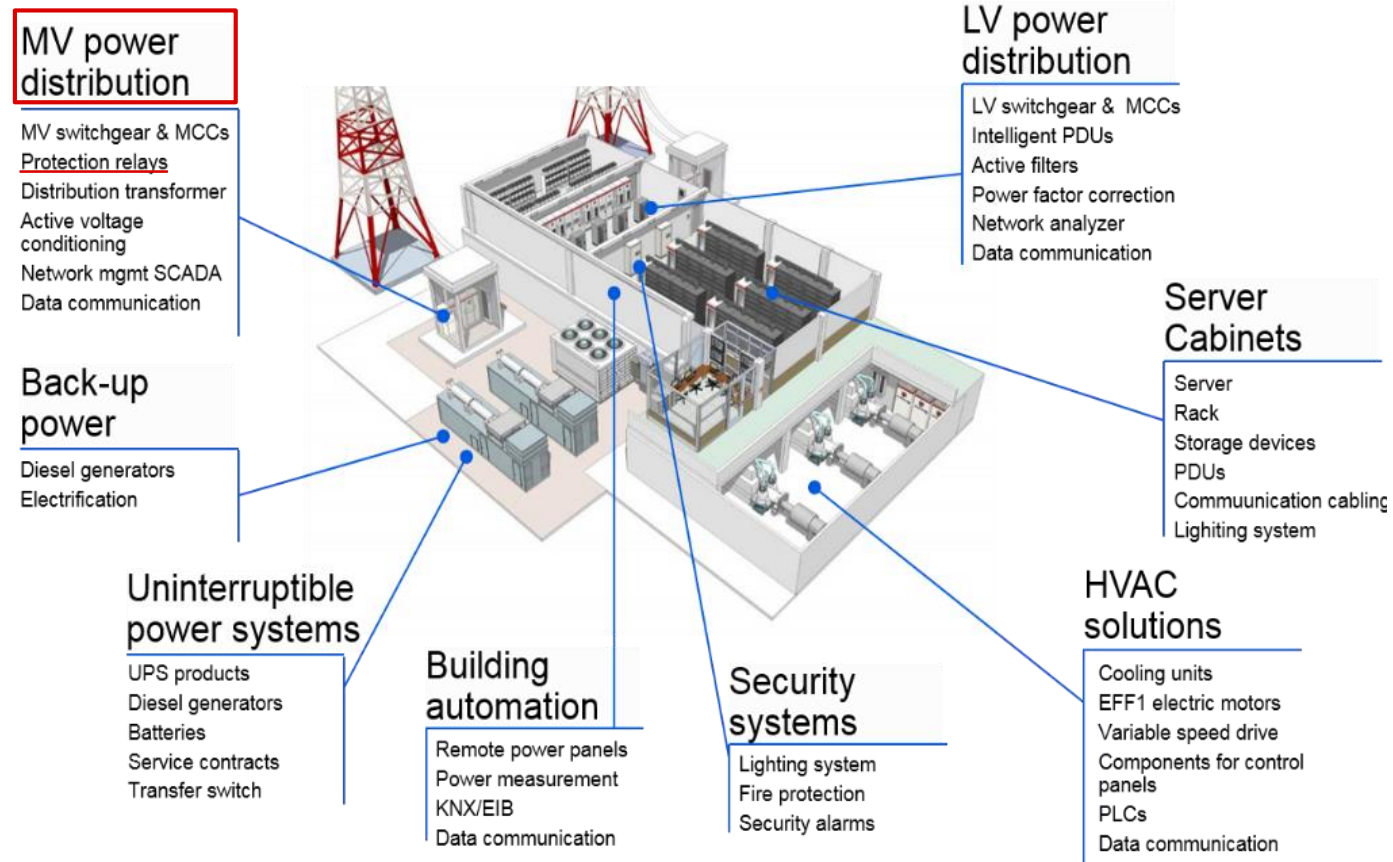
- Wide application coverage
- IEC 61850 Ed1 and Ed2 compliant
- Proven technology +500.000 relays in operation

#### Substation Management

- Increased functionality and flexibility for data center applications

# Relion® for data centers

## Protecting the MV power distribution system



# Relion® for data center MV applications

## 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



REF615

### Transformer protection

#### Transformer protection

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



RET615

### 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



RED615

Compact and versatile solutions for data center MV power distribution systems

# Relion® for data center MV applications

## Application examples

### Busbar protection

#### 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



REB611 or REF615

### Generator protection

#### Protection for back-up generators

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



REG615

### Arc protection

#### Arc fault protection for switchgear systems

- 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)

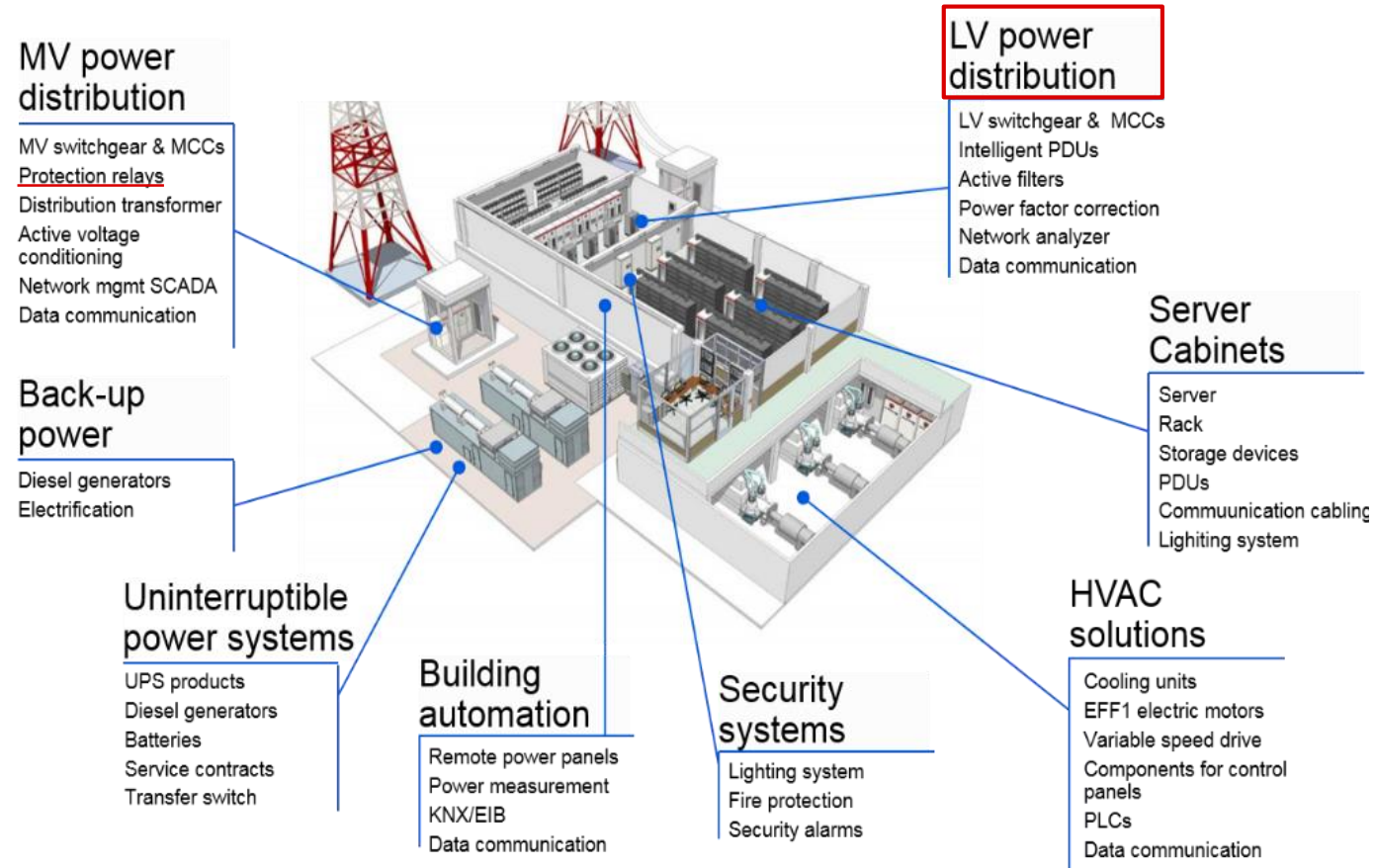


615 and 620 series or REA

Compact and versatile solutions for data center MV power distribution systems

# Relion® for data centers

## 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



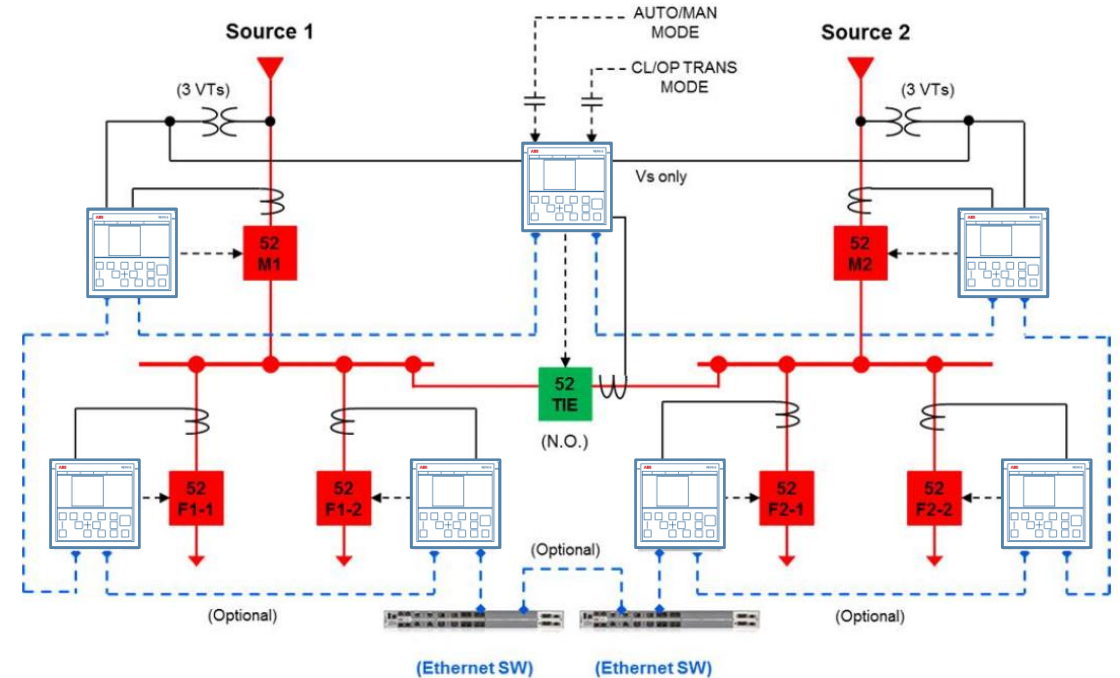
Compact and versatile solutions for data center LV power distribution systems

# 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

# ABB Automatic Transfer Schemes (ATS) in data centers

## SUE 3000 and High Speed Transfer Systems (HSTS)

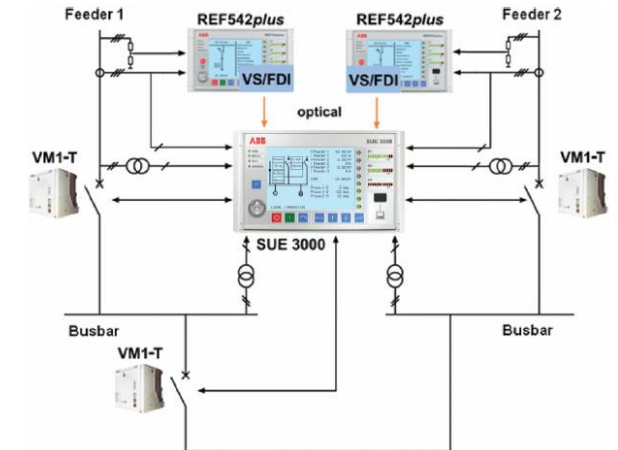
### Task

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



# Availability and reliability

Response: Maximize the process uptime and protect the assets

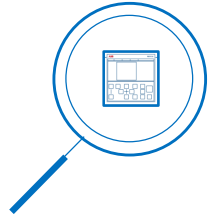
## Protection selectivity

- 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

## Inter-operability

- 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



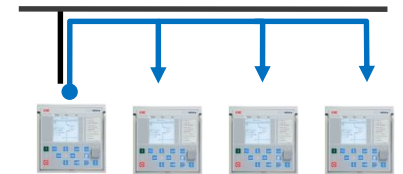
## IEC 61850 communication

- 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



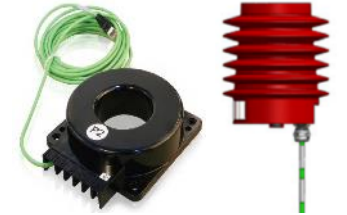
IEC 61850 – interoperability and connectivity

# 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



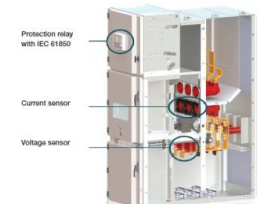
## UniGear Digital

- 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



Improves cost-efficiency in your operations

# Ease of maintenance

Response: Monitor the equipment and shorten the MTTR

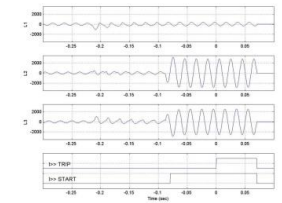
## Plug-in design relays

- 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



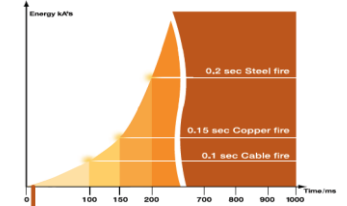
Design, functionality and tools to support efficient operation and maintenance

# 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



Operating time **7-10 ms** +  
CB operation time (30-60 ms)

## 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



Operating time **< 2.5 ms** +  
CB operation time (30-60 ms)

Increased personnel safety and minimized repair and service time

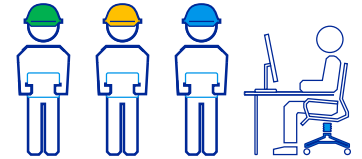


# Risk management

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



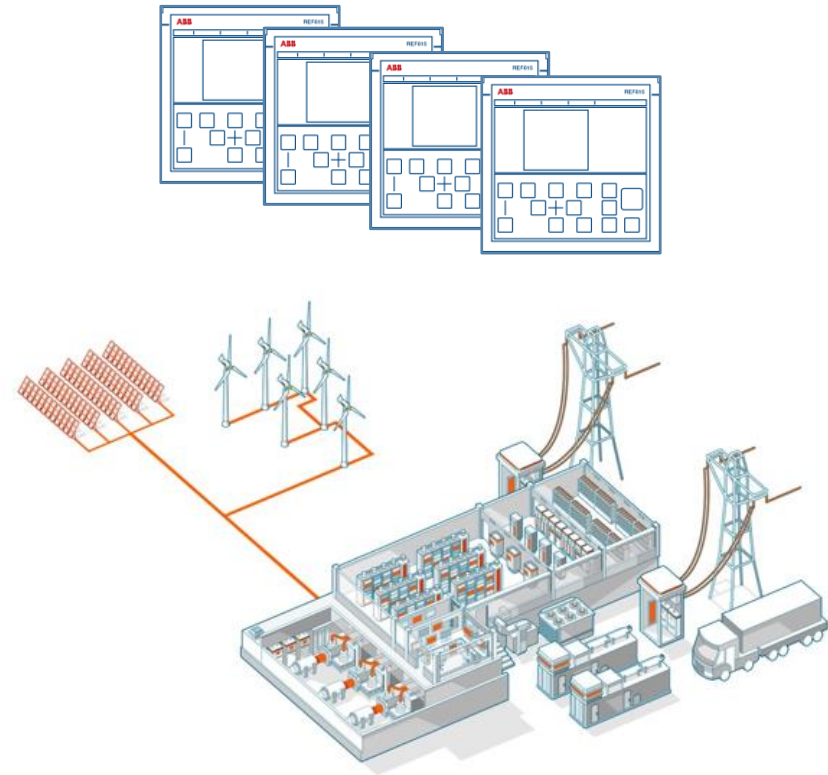
Role-based access control – authorized relay configuration and operation

# Relion® for data centers

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



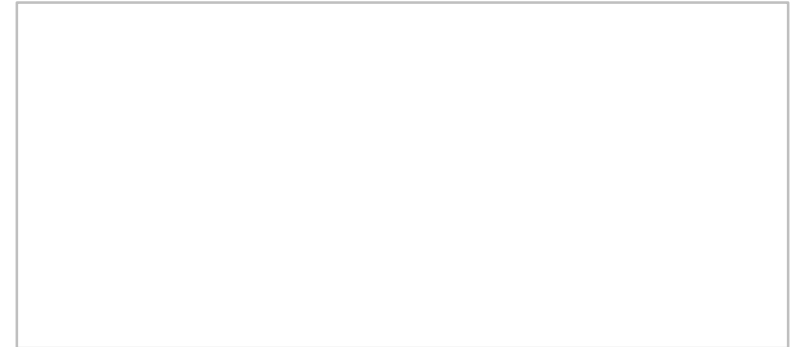
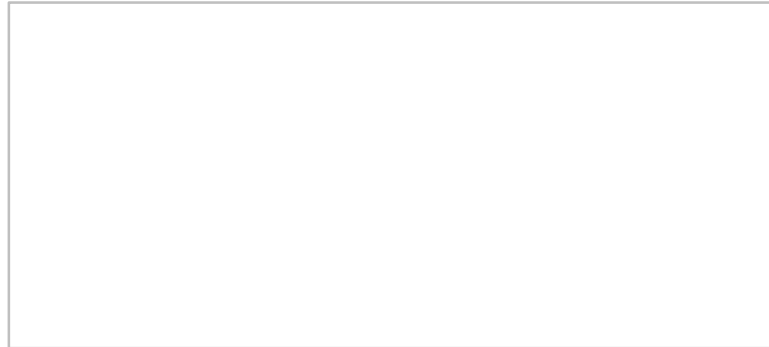
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# Relion® for data center applications

## References

### Relion® 615 and 620 series

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

[YouTube](#)

[Pdf-file](#)



**AABB**