Distribution automation
Global product offering

ABB delivers a full range of genuine IEC 61850 protection and control products also including network automation. ABB’s IEC 61850 compliant solutions offer a unified user-experience for operating power distribution systems from the secondary substation level up to the network control center level.

ABB distribution automation products are built to withstand the rigors of the most demanding environments including marine and offshore, industrial facilities such as mines and paper and petrochemical plants, as well as utilities in urban and rural locations.

<table>
<thead>
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<th>Relion series and supporting products</th>
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<tr>
<td>Relion® 605 series</td>
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<tr>
<td>601 provides basic protection and control for feeder and motor applications. It is very compact, easy to install and engineer, having a built-in test function. The use is convenient with basic settings and an alphanumerical display. It has a very wide auxiliary voltage range with a universal power supply module, reducing the variants needed. The relay is offered with an optional galvanic communication module including several protocols.</td>
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<td>603 is a current transformer powered numerical feeder protection relay including overcurrent and earth-fault protection. It is designed for applications where auxiliary power is not available or cannot be guaranteed, thereby making it an ideal choice for installation at remote locations. The relay is primarily used in ring main units and secondary distribution switchgear within distribution networks.</td>
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<tr>
<td>Relion® 611 series</td>
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<td>The protection relay line provides protection and control for the most typical applications including feeder, voltage and motor protection as well as a dedicated relay for high-impedance based differential protection. The relays are compact, easy to install and efficient to engineer with a matrix type of configuration. The relays are convenient to use due to the alphanumerical display and Web browser-based user interface. The withdrawable-unit design enables easier testing and speeds up maintenance activities. The communication capabilities of the relay ensure seamless system level integration.</td>
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<tr>
<td>Relion® 615 series</td>
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<td>The protection relay line provides protection and control for a complete range of applications including feeder, line differential, transformer, voltage, busbar, capacitor bank, motor, generator and interconnection protection as well as automatic voltage regulation for on-load tap changers. The 615 series offers a high functionality level in a compact format. Flexible engineering is enabled using the graphical application configuration functionality, and all relevant information including a single line diagram view is provided to the end user via the local graphical display. The relays offer easily settable state-of-the-art earth-fault protection. The integrated ARC flash protection enables detection of arc faults in the busbar, circuit breaker and cable compartments. The withdrawable-unit design enables easier testing and speeds up maintenance activities. The communication capabilities of the relays include a wide range of communication protocols and interfaces ensuring seamless system level integration. The 615 series is well prepared for digital switchgears and substations, with IEC 61850 Edition 1 and Edition 2 support, horizontal GOOSE messaging, redundant Ethernet communication including HSR and PRP protocols, and process bus according to IEC 61850-9-2 LE providing sampled measured values.</td>
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Relion series and supporting products

Relion® 620 series
The protection relay line provides protection and control for a complete range of applications including feeder protection, transformer protection including automatic voltage regulation for an on-load tap changer, voltage protection, busbar protection and motor protection including motor differential protection. The wider case of the relay enables a high number of binary inputs and outputs and control of several circuit breakers. Flexible engineering is enabled using the graphical application configuration functionality, and all relevant information including a single line diagram view is provided to the end user via the local graphical display. In addition, the 620 series relays include programmable push buttons on the local HMI.

The relays offer easily settable state-of-the-art earth-fault protection. The integrated ARC flash protection enables detection of arc faults in the busbar, circuit breaker and cable compartments. The withdrawable-unit design enables easier testing activities. The communication capabilities of the relays include a wide range of communication protocols and interfaces ensuring seamless system level integration. The 620 series is well prepared for digital switchgears and substations, with IEC 61850 Edition 1 and Edition 2 support, horizontal GOOSE messaging, redundant Ethernet communication including HSR and PRP protocols, and process bus according to IEC 61850-9-2 LE providing sampled measured values.

Relion® 630 series
The protection relay line provides full protection and control for demanding applications including feeder protection with line distance protection, transformer protection including automatic voltage regulation for an on-load tap changer, voltage protection, busbar protection, motor protection including motor differential protection, as well as generator and interconnection protection. The 630 series offers a high number of binary inputs and outputs and control of several circuit breakers.

The full engineering flexibility with the graphical application configuration functionality includes free selection of analog channels used for protection. The detachable local HMI includes a high resolution display that provides all relevant information to the end user. In addition, the 630 series relays include programmable push butte-os. The relays offer easily settable state-of-the-art earth-fault protection.

The communication capabilities of the relays include a wide range of communication protocols and interfaces ensuring seamless system level integration.

REX640
REX640 is a powerful all-in-one protection and control relay for use in advanced power distribution and generation applications with unmatched flexibility available during the complete life cycle of the device. The detached local HMI, introducing color touch screen, offers an innovative user interface providing information about the process status in an unseen clear and user-friendly manner. The pages in the local HMI can be fully customized for the specific needs at hand.

REX640 comes with comprehensive base functionality as standard. However, it is possible to further adapt the product to meet special installation needs by including any number of the available optional application packages into a single REX640 relay. By applying the relevant application package(s), the REX640 can be used in different protection applications, from a simple feeder to demanding power transformer and synchronous machine applications. REX640 also introduces several application packages for extended control functionalities like automatic synchronizer for generators, Petersen coil controller and on-load tap changer controller.

Complying with the IEC 61850 standard is one of the core values of REX640. Full support for horizontal GOOSE communication as well as for sending and receiving sampled measured value streams as per IEC 61850-9-2 LE. Availability of the communication-based information can be secured with PRP or HSR protocols. The modular design and the freely configurable functionality of REX640 together with extensive hardware capabilities create a unique combination to match even the most demanding requirements.

RIO600
RIO600 Remote I/O unit is designed to expand the digital and analog I/O of ABB’s Relion® protection relays, provide I/O for the station automation device COM600 and in Grid Automation applications. The unit allows maximum I/O flexibility and provides seamless IEC 61850 connectivity between the substation binary and analogue signals. Compared to a traditional fully hard-wired substation, a solution using RIO600 helps in simplifying and decreasing the wiring inside the substation by digitizing the hardwired signals.

RIO600 enables accurate current and voltage measurements from the medium-voltage network utilizing ABB’s light weight sensor technology. Based on the measured values, RIO600 gives directional fault passage indication and reports it to the upper level system using Modbus TCP or IEC 61850 GOOSE communication. RIO600 also enables power flow and power quality monitoring. With state-of-the-art multi-frequency admittance (MFA) based earth fault indication also high-ohmic transient and intermittent type of earth faults can be reliably detected, even in compensated and isolated networks.

Arc fault protection
REA system
A fast and selectively operating arc fault mitigation system for air-insulated low voltage and medium voltage switchgears to protect human lives, prevent fire hazards and allow momentary power restoration. REA arc fault protection is based on optical detection of the intense light of an arc fault or on detection of light secured with detection of simultaneous phase or neutral overcurrent.

On detection of an arc fault, the REA system trips via high speed trip outputs in less than 2.5 ms all circuit breakers that feed the fault zone. The REA system uses two types of optical sensors for detecting light: a non-shielded, bare fiber sensor that detects light along its entire length and lens type point sensors with typically one sensor. The 94% or more detection efficiency is done with several one sensor installed per switchgear compartment. The REA 101 main module can operate as a stand-alone device or in combination with other REA 101 modules. Extension modules of type REA 103 or REA 107 allow the number of sensor fibers and/or lens-type sensors to be increased to extend the area of protection. Extension module type REA 105 has also fast trip outputs allowing protection schemes with increased selectivity to be created.
Centralized protection and control

SSC600  ABB Ability™ Smart Substation Control and Protection for electrical systems SSC600 is a smart substation device designed for protection, control, measurement and supervision of utility substations and industrial switchgear and equipment. The design of the device has been guided by the IEC 61850 standard for communication and interoperability of substation automation devices. It is fully integrable with Relion relays and IEC 61850 compatible merging units for creating a complete solution protecting a complete substation. Optional functionality is available at the time of order for both software and hardware covering different application needs.

SMU615  SMU615 is a dedicated substation merging unit intended for measuring current and voltage signals from the instrument transformers and merging them into the standard digital output format that other devices can further use for various power system protection application purposes. SMU615 itself includes no protection functionality but it offers the physical interface into the switchgear primary equipment, that is, circuit breaker, disconnector and earthing switch.

Engineering and test tools

PCM600  An easy-to-handle tool providing versatile functionalities required throughout the life cycle of ABB’s Relion® protection and control relays in transmission and distribution applications. PCM600 is IEC 61850 certified, which simplifies relay engineering and enables information exchange with other IEC 61850 compliant tools. The hierarchical presentation model that reflects the real system topology allows you to efficiently view and edit information about your power system. PCM600 provides efficient functionality for parameter setting, application configuration and communication engineering. With an intuitive and well-structured user interface PCM600 offers easy-to-use configuration capabilities for I/O mapping and signal mapping. The user interface, workflow and the IEC 61850 based data model in PCM600 are designed according to the same philosophy as the relay itself, ensuring smooth and seamless integration between the tool and the IEDs. PCM600 features facilities for engineering of IEC 61850 communication between bay and station levels and bay-to-bay GOOSE messaging for station-wide interlocking and control of parallel transformers.

RTB615  Relay test box for 615 series plug-in units. The 615 series relays can be withdrawn from its original case and inserted to RTB615 for testing. The test box supports periodical relay testing and commissioning of new or retrofit installations. It can also be used for demonstration or training purposes and as a support during the engineering phase. All the analog inputs and binary input and output interfaces of the relay are readily available on the RTB615 front plate to connect to the secondary injection device, for example, Omicron or Megger.

FT switches  ABB Flexitest™ switches, types FT-1 (10 pole, rear connected), FT-1F (10 pole, front connected), FT-1X (10 pole, extended terminals, rear connected), FT-14 (14 pole, rear connected), and associated Test Plugs, provide a safe, simple, fast and reliable method to isolate, test, and service installed equipment without disturbing the system. FT-19R, FT-19RX, FT-19RS, and FT-22RS Flexitest switch assemblies for rack and switchboard mounting also permit convenient isolation of switchboard relays, meters, and instruments allowing quick and easy multi-circuit testing by any conventional test method. These assemblies utilize FT-1 and/or FT-14 switches, depending on customers requirements.

Communication devices

Arctic

ARC600  The wireless controller ARC600 is a compact, all-in-one device for remote monitoring and control of secondary substations, network disconnectors, load-break switches and ring main units (RMU) in distribution networks. The controller allows the monitoring and control system, such as SCADA, to wirelessly monitor and control field devices over the wireless cellular network.

ARR600  The wireless I/O Gateway ARR600 provides wireless monitoring and control of field devices via cellular network from a central site or control center. The devices offer industrial quality connectivity for the IEC 60870 and Modbus based protocols. Field applications can be connected and controlled via built-in digital and analog I/O’s. Wireless I/O Gateway ARR600 exhibits integrated communication capability and seamless integration to SCADA systems.

ARG600  The wireless gateway ARG600 provides monitoring and control of field devices over a wireless cellular network from a central location. The gateway offers industrial quality connectivity for IEC 60870 and Modbus-based protocols, in addition to TCP/IP-based protocols.

ARM600  The M2M gateway ARM600 is a communication server, VPN concentrator and firewall. It is the interface between the central monitoring and control system (SCADA) and remote Arctic gateways and controllers. The ARM600 includes a device management application, Arctic Patrol, which features advanced condition monitoring and allows remote management of Arctic gateways and controllers.
Grid Automation solutions

RER620
RER620 is a dedicated recloser relay perfectly aligned for the protection, control, measurement, and supervision of utility distribution feeders and industrial power systems. RER620 provides protection for overhead lines and cable feeders in distribution substations. It can be applied for protection and control of grounded and ungrounded distribution systems. Offering time and instantaneous overcurrent, negative sequence overcurrent, phase discontinuity, breaker failure, embedded loop control performing automatic loop restoration functions (commonly accepted as a means to significantly improve circuit reliability and to provide more effective system operation), and voltage metering and protection.

REC615/RER615
REC615 and RER615 provide optimal functionality to enhance grid reliability with a wide range of protection functionality, remote control and monitoring, fault indication and power quality analysing functionality. The provided range of standard network communication protocols ensures seamless integration in the overall grid control system. REC615 is suitable for a wide variety of power distribution networks, which can include distributed power generation, secondary equipment such as medium voltage disconnectors, switches and ring main units. RER615 is designed as recloser controller in medium voltage secondary distribution systems, including radial, looped and meshed distribution networks, with or without distributed power generation.

Control cabinets
ABB’s smart control cabinets are based on standardized ready-to-be-deployed solutions. There are cabinet variants for both overhead line and underground cable networks. The control cabinet offerings are applicable to overhead line equipment such as switch disconnectors and reclosers and range from basic monitoring and remote control of switch disconnectors, to advanced earth-fault detection and leading-edge protection functionality for the reclosers.

For applications where only remote control and monitoring is needed, our comprehensive range of communication gateways and wireless controllers are found in the offering. Even the most demanding types of earth-faults can be detected or even isolated with ABB’s proven fault detection algorithms supported by ABB’s Relion® protection relays and RIO600 remote I/O unit.

To minimize the outage time and improve SAIDI and SAIFI values, control cabinets bring online monitoring possibilities of the of the primary devices, i.e., disconnectors, load-break switches, circuit breakers and reclosers and the RMU’s switches and circuit breakers. The control cabinet offering is suitable both for new installations and for retrofitting to existing assets.

Distribution Automation solutions

COM600
An all-in-one and versatile substation management unit that performs of a role of a communication protocol gateway, human machine interface (HMI) for monitoring and operations, with a capability to also run non-critical substation applications in medium voltage substations.

It is deployed together with protection relays, substation devices such as RTUs, meters and PLCs in dedicated cabinets or in a switchgear and help realize smart substation and grid automation solutions in the utility and the industrial distribution networks by using process information and data device acquired over Ethernet or serial based standard communication protocols to execute specific substation tasks.

As a substation computer, it comes with a robust IEC 61850-3 based design capable of hosting a high definition display interface and with pre-configured and user configurable cyber security features.

SUE 3000
The SUE 3000 High Speed Transfer Device guarantees an optimum safeguarding of energy supply. The device ensures the continued supply to the consumer through automatic transferring to a stand-by feeder and protects the subsidiary process from expensive stoppage times. Furthermore, through the possibility of manually-initiated transfers – for targeted clearings, for example – the operation of the installation is considerably simplified. In conjunction with conventional circuit-breakers and protection devices total transfer times in the range of less than 100 ms will be achieved (counting from the occurrence of the fault in the main feeder until the circuit-breaker of the standby feeder is closed). For smooth operation of motor-driven consumers, a transfer in this range will usually be sufficient and non-critical.

For demanding applications requiring transfer systems that provide transfer times within 1 ½ cycle the SUE 3000 can be extended with additional components and performance-enhancing features, to create the High Speed Transfer System (HSTS). This system with optimized medium voltage circuit breaker VM1-T and switchbay protection and control unit REF542plus, achieves transfer times of 30 ms. This result in a transfer time that permits sensitive industrial processes to continue in operation without any interruption.

cPMS/PML630
A comprehensive, freely-configurable load-shedding device that protects industrial and utility power networks with multiple power sources and critical loads against power outages and blackouts. It responds to power network disturbances and loss of available power by cutting off loads in a fast, accurate and selective manner and in the process, ensuring availability of power supply for critical loads. Such an action results in the least possible interruption to the duration and frequency of production downtime in an industrial deployment and power outage in a power distribution network.

Besides fast load-shedding, it also supports load-shedding based on power source overloading, power demand violation, frequency and manual actions. The execution of the application is aided by inputs and outputs exchanged with protection relays compliant to the IEC 61850 standard. It provides full engineering flexibility with an automated application configuration. The detachable local HMI includes a high resolution display provides all relevant information to the end user. In addition, the device includes programmable push buttons.
Relay retrofit program

Relay Retrofit Program (RRP) focuses on the smooth and controlled replacement of existing protection relays with modern protection and control IEDs. The program includes all the devices, accessories, hardware and software tools and documentation (manuals) needed for a timely scheduled and controlled execution of retrofit projects. The various phases of the retrofit project can be accurately scheduled and timely executed to minimize downtime of the production or power distribution processes. Further, the relay retrofit program can be used to improve the protection system by implementing new functionality, such as arc fault protection, and by enhancing the horizontal and vertical transfer of information.

PCMU

The Pre-Configured Matching Unit (PCMU) represents the best choice to replace ABB legacy relays. It ensures a reliable, seamless upgrade due to the risk reduction only a wire-like solution can provide. It also offers the lowest possible cost of installation in the market by using the existing wiring and connecting it to the wire-like terminals. Additionally the time to update drawings after installation is virtually eliminated since no changes in wiring are required. ABB's PCMUs are the best choice for to replace ABB legacy relays such as MSOC, DPU, DPU200, TPU2000, IMPRS, and Pro*Star.

REF615R

REF615R is a dedicated feeder relay, perfectly aligned for protection, control, measurement, and supervision of utility substations and industrial power systems. The 19 inch rack mount form of ABB's Relion® REF615 utilizes the same form and fit as the DPU2000R relay and provides exact wire-alike matching rear terminals, making the REF615R the ideal solution for upgrading to the industry's latest technologies. Engineered from the ground up, the 615 series has been designed to unleash the full potential of the IEC 61850 standard for communication and interoperability of substation automation devices while providing Modbus and DNP simultaneously in one standard configuration. Some SCADA integration work may be required when replacing the DPU2000R.

Service

Life cycle services

ABB offers full support for all protection and control relays throughout their entire life cycle. Our extensive life cycle services include, customer support, maintenance and modernization, in order to ensure safe, reliable and cost effective protection solutions with predictable maintenance costs. Our maintenance services range from preventive maintenance, developed to ensure reliable operation for aging protection equipment, to spare parts, refurbished spare devices and repair service. Our spare parts service ensures only genuine spare parts are supplied, and not only for the latest but also for protection relays as old as 40 years. An alternative to sending the relay for repair is ordering a refurbished spare device, which is also an ecological choice. Modernization offers a cost-effective and smooth upgrade of your entire protection and control system, without having to replace the entire switchgear. By updating or replacing the protection relays, the switchgear lifetime can be significantly extended. Modernization also ensures your protection and control system meets the latest standards and represents the latest technology. ABB's modernization services include software updates, product upgrades, replacements (retrofits) and also recycling, making it an economical and environmentally friendly choice.

Trainings

Distribution Automation training and learning centers offer a wide range of courses: from the basics of the relay operation to the detailed learning of the modern medium voltage protection and control products. By knowing devices and equipment you are able to use them more efficiently and also receive more specific information from your network.