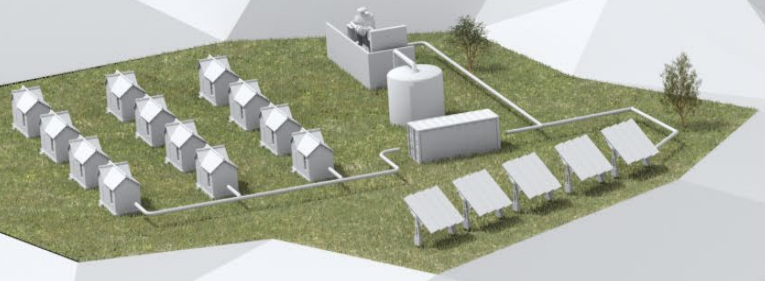
Relion® 630 series

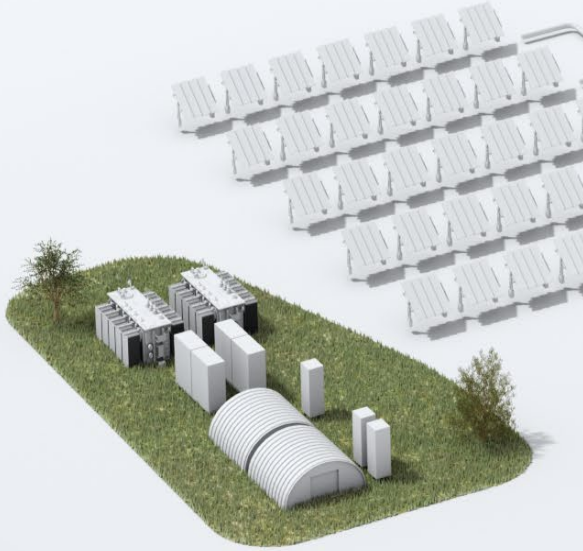
Protection and control relays

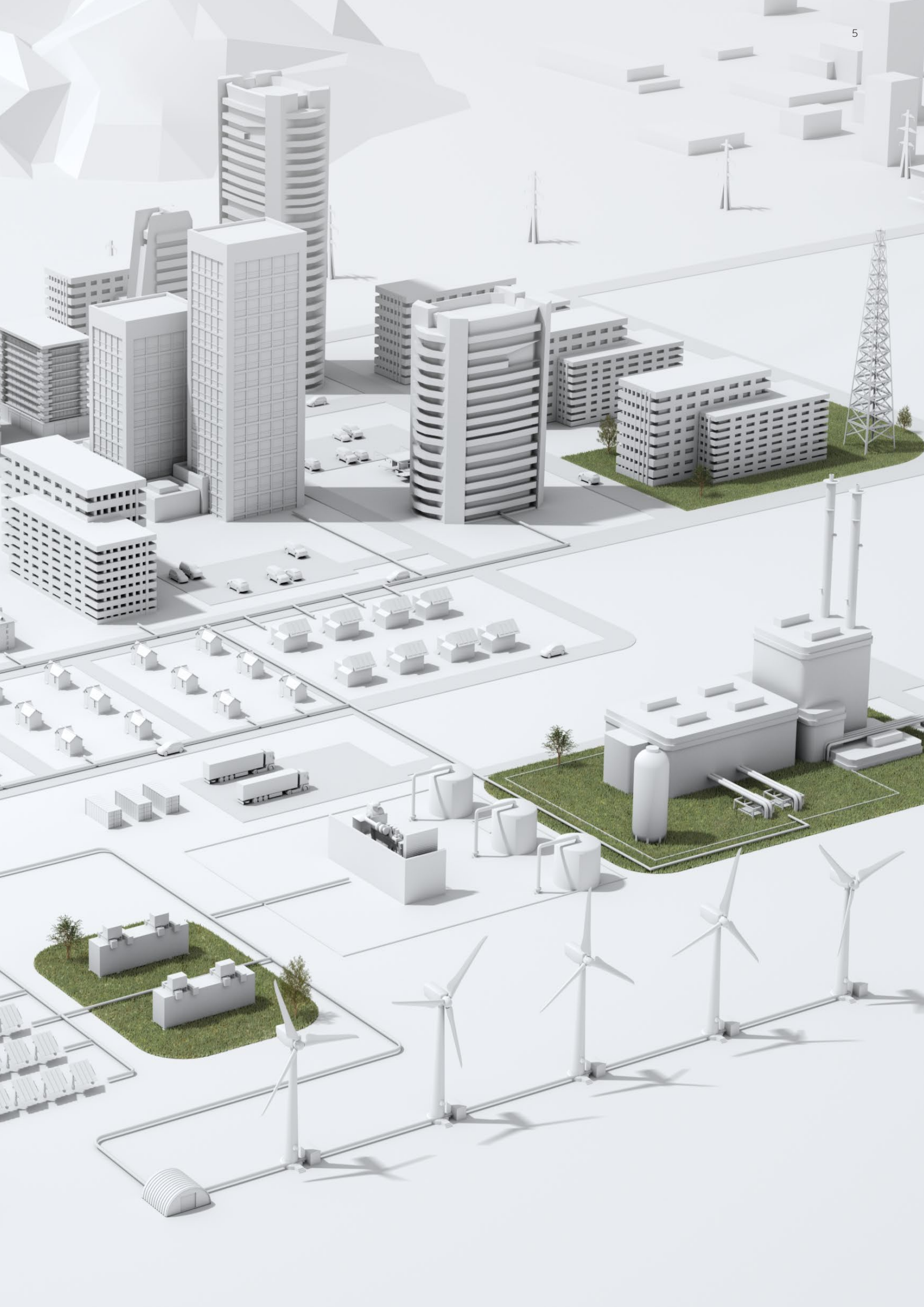
Functional scalability and flexible configurability make the Relion® 630 series of relays from ABB ideal for demanding power distribution applications.

Table of contents



The 630 series covers protection and control relays designed for feeder, motor, transformer and generator management in utility, industrial, and transport and infrastructure applications.





630 series
Flexibility for demanding utility and industrial power distribution systems

The 630 protection and control series of relays is a member of ABB's Relion® product family. The 630 series relays are characterized by their functional scalability and flexible configurability.

Flexible adaptation to application-specific requirements
The 630 series relays can be used in either single or double-busbar applications with one or two breakers and numerous switching devices. They also support a substantial number of both manually and motor-operated disconnectors and earthing switches. Consequently, the 630 series relays can be used to control various types of switchgear.

The 630 series relays offer predefined configurations, designed to match the most typical protection and control requirements for fast and easy setup. The pre-configurations can be used as such or easily tailored to meet application-specific requirements – with freely selectable functions – using the IEC 61850-compliant Protection and Control IED Manager PCM600.

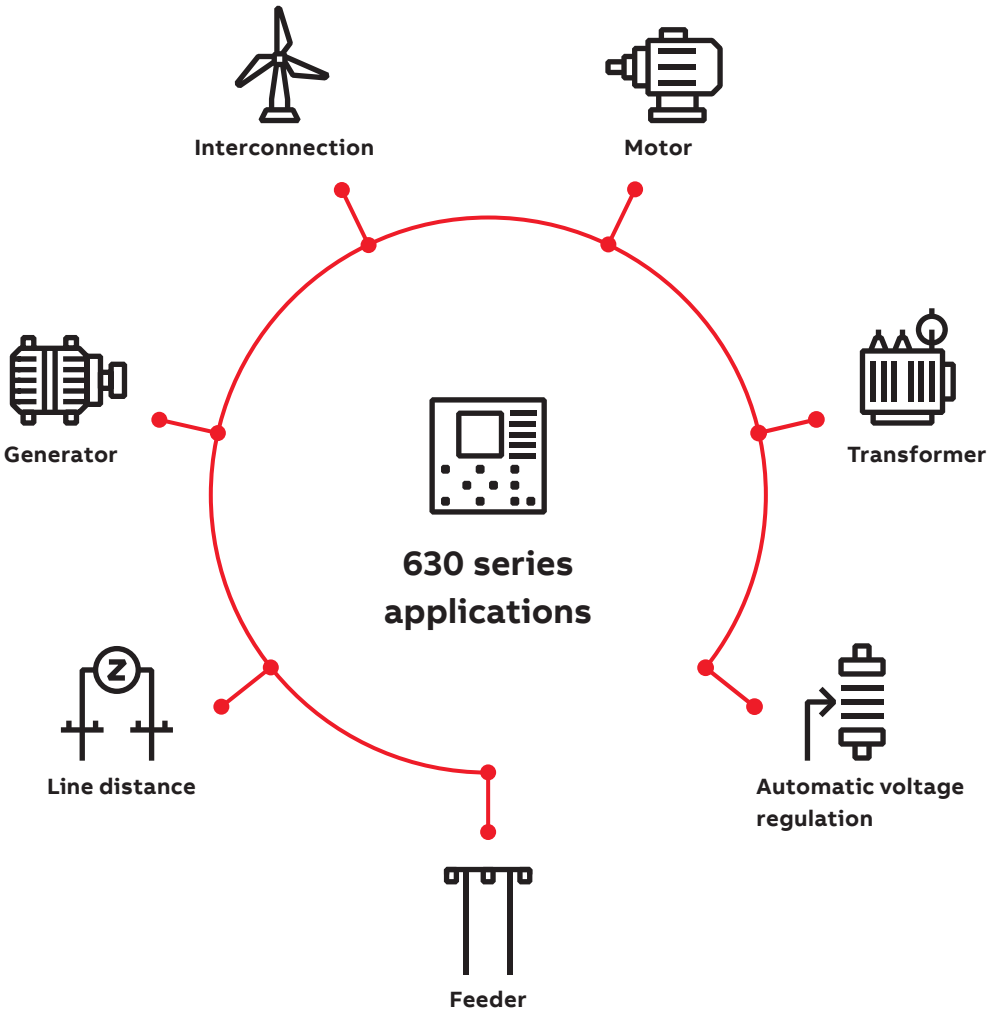
Human-machine interface
The 630 series relays are equipped with a large graphical display that can show customizable single-line diagrams (SLD) with position indication for the circuit breaker, disconnectors and the earthing switch. Also measured values provided by the configuration can be displayed. The SLDs can be flexibly adjusted to meet user requirements using PCM600 and accessed not only locally but also via the web browser-based human-machine interface (HMI).

The 630 series HMI is distinguished by fifteen three-color LEDs and five configurable push buttons that can be used as control buttons for various tasks, such as blocking, adjusting setting groups or triggering the disturbance recorder. The five push buttons can also be conveniently used as menu shortcuts. Another distinguishing feature is the detached HMI, as an option to the integrated HMI, which is highly beneficial from a wiring perspective due to the large number of IOs the 630 series relays are equipped with.

Standardized communication
The 630 series relays fully support Edition 1 of the IEC 61850 standard for communication and interoperability of substation automation devices. The relays also support the DNP3 (TCP/IP) and IEC 60870-5-103 communication protocols and are able to use two protocols simultaneously. The supported communication protocols, including IEC 61850, offer seamless connectivity to various station automation and SCADA systems.

The implementation of the IEC 61850 standard covers both vertical and horizontal communication, including GOOSE messaging according to IEC 61850-8-1 with both binary and analog signals. Analog GOOSE messaging enables fast transfer of analog measured values over the station bus. This facilitates, for example, sharing of RTD input values, such as surrounding temperature, with other relays. GOOSE messaging is an alternative to traditional hardwiring signaling for exchanging interlocking information between the relays. For time-critical applications, the 630 series relays support synchronization over Ethernet using SNTP or over a separate bus using IRIG-B.

Life cycle services
ABB offers full support for all protection and control relays throughout their entire lifecycle. Our extensive life cycle services include training, customer support, maintenance and modernization.



Main customer benefits

- Flexible solution for demanding utility and industrial power distribution systems with integration of protection, control, monitoring and supervision in one relay
- Wide application coverage – feeder, transformer, motor and generator protection and control
- Functional scalability and flexible configurability – easy tailoring of convenient pre-configurations to application-specific requirements with freely selectable functions
- Fast GOOSE messaging according to IEC 61850 for less interpanel wiring and supervised communication
- Detached HMI – as an option to the integrated HMI – beneficial from a wiring perspective because of the large amount of IOs
- Large graphical display for showing customizable SLDs, accessible either locally or through a web browser-based HMI
- Extensive life cycle services

Feeder protection and control REF630

REF630 has been designed to protect overhead line and cable feeders in utility and industrial power distribution systems, including radial, looped and meshed distribution networks, with or without distributed power generation.

Application
REF630 has been designed to be the main protection for overhead lines and cable feeders, in either isolated neutral, resistance-earthed, compensated or effectively earthed distribution networks. The comprehensive feeder management relay offers four predefined configurations, intended for open/closed ring feeder applications, radial overhead/mixed line feeder applications, ring/meshed feeder applications and bus sectionalizers.

The earth-fault protection has been significantly extended, now including not only directional and non-directional, transient/intermittent, wattmetric and admittance-based, but also both harmonics and multifrequency admittance-based earth-fault protection. The new additions take the earth-fault protection to new heights, creating an extensive earth-fault protection portfolio. In addition, the sensitivity of the intermittent earth-fault protection has been significantly improved and reactive power undervoltage protection added.

REF630 also includes a fault locator that locates short circuits in radial distribution networks and earth faults in effectively and low-resistance earthed ones. If the fault current is as high as or higher than the load current, earth faults in isolated neutral distribution networks will also be located.

—

Extensive earth-fault protection for distribution networks

Functionality	REF630
Control	●
Overcurrent protection	●
Earth-fault protection	●
Advanced earth-fault protection for high-impedance networks	●
Thermal overload protection	●
Multipurpose protection with RTD/mA	○
Voltage protection	●
Frequency protection	●
Distance protection	○
Fault locator	○
Power protection	●
Load-shedding	●
Synchro-check	○
Auto-reclose	●

● = Supported ○ = Optional add-on

Product highlights
- Extensive earth-fault protection portfolio with unique multifrequency admittance-based protection for higher sensitivity and selectivity
- Advanced and fast fault location of short circuits and earth faults

Transformer protection and control RET630

RET630 has been designed to protect power and step-up transformers in utility and industrial power distribution systems. RET630 is also ideal for transformer bay control.

Application
RET630 has been designed to be the main protection and offer full protection for two-winding power transformers. The comprehensive transformer management relay offers two predefined configurations, of which one is intended for two-winding, high and medium-voltage (HV/MV) transformer applications not requiring restricted earth-fault protection, and the other for such applications requiring it.

Protection and control with voltage regulation for two-winding power transformers

Functionality	RET630
Control	•
Overcurrent protection	•
Earth-fault protection	•
Thermal overload protection	•
Multipurpose protection with RTD/mA	○
Voltage protection	•
Frequency protection	•
Differential protection for two-winding transformers	•
Low-impedance restricted earth-fault protection	•
High-impedance restricted earth-fault protection	•
Automatic voltage regulation	○
Synchro-check	•

• = Supported ○ = Optional add-on

Hot spot and aging rate monitoring is introduced, which allows calculating the hot spot temperature of the transformer winding and the momentary aging rate. As a result, the impact of thermal stress on the lifetime of the transformer can be determined.

RET630 also features an integrated voltage regulator. The voltage regulator allows automatic and manual voltage regulation of power transformers with a motor-driven on-load tap changer.

An optional RTD/mA module offers eight analog RTD or mA measuring inputs and four mA outputs. The RTD and mA inputs can be used for measuring the oil temperature at the bottom and top of the transformer tank and the ambient temperature, thus extending the functionality of the thermal overload protection and preventing premature aging of the transformer windings. The RTD and mA inputs can also be used for tracking the position of the on-load tap changer. The four mA outputs can be used for transferring freely selectable measured or calculated analog values to devices provided with mA inputs.

Product highlights
- Extensive range of protection and control functionality for two-winding HV/MV power transformers, including advanced and fast differential protection with high inrush stability
- Support for various neutral earthing options, matching either high-impedance or numerical low-impedance restricted earth-fault principles
- Automatic voltage regulation of power transformers with a motor-driven on-load tap-changer

Motor protection and control REM630

REM630 has been designed to protect medium-sized and large asynchronous and synchronous motors in the manufacturing and process industry.

Application
REM630 has been designed to be the main protection for both asynchronous and synchronous motors and their drives, offering full protection during motor start-up and normal drive operation. The comprehensive motor management relay is typically used with circuit breaker and contactor-controlled, medium-sized and large motors with varying load in drives such as pumps, fans, compressors, mills and crushers. REM630 offers two predefined configurations, of which one is intended for medium-voltage asynchronous motor applications and the other for asynchronous and synchronous motor applications requiring differential protection.

An optional RTD/mA module offers eight analog RTD or mA measuring inputs and four mA outputs. The RTD and mA inputs can be used for temperature measurement of motor bearings and stator windings, thus extending the functionality of the thermal overload protection and preventing premature aging of the motor windings. They can also be used for measuring the ambient air or coolant temperature. The four mA outputs can be used for transferring freely selectable measured or calculated analog values to devices provided with mA inputs.

—

Protection and control for asynchronous and synchronous motors

Product highlights
- Motor protection both during motor start-up and normal run, with protection and fault clearance also in abnormal situations
- Extensive motor protection for medium-sized and large asynchronous and synchronous motors requiring differential protection
- Extensive motor supervision capabilities via RTD and mA measurements

Functionality	REM630
Control	●
Overcurrent protection	●
Earth-fault protection	●
Thermal overload protection	●
Multipurpose protection with RTD/mA	○
Voltage protection	●
Frequency protection	○
Differential protection for machines	○
High-impedance differential protection	●
Protection for asynchronous motors	●
Protection for synchronous motors	○
Power protection	●

● = Supported ○ = Optional add-on

Generator protection and control REG630

REG630 has been designed to protect small and medium-sized power generators and power generator-transformer blocks in utility and power distribution systems.

Application
REG630 has been designed to be the main protection for synchronous generators, offering full protection during start-up and normal run for both the generator and the prime mover. The comprehensive generator management relay is typically used in small and medium-sized diesel, hydroelectric, combined heat and power (CHP), and steam power plants. REG630 offers one predefined configuration, intended for directly connected generator sets.

Complete generator protection and control with extensive interconnection protection for distributed generation

Functionality	REG630
Control	•
Overcurrent protection	•
Earth-fault protection	•
Thermal overload protection	•
Multipurpose protection with RTD/mA	○
Voltage protection	•
Frequency protection	•
Differential protection for two-winding transformers	○
Differential protection for machines	•
High-impedance differential protection	•
High-impedance restricted earth-fault protection	•
Interconnection protection	•
Protection for synchronous generators	•
Power protection	•
Synchro-check	•

• = Supported ○ = Optional add-on

REG630 has been extended with low-voltage ride-through, reactive power undervoltage and voltage vector shift protection to further ensure grid stability and reliability, and thus avoid grid collapse. The low-voltage ride-through protection allows monitoring of distributed generation during low-voltage fault ride-through, in order to determine whether and when to disconnect, for instance, a solar or wind farm from the grid. Also the reactive power undervoltage protection does the same but specifically at the grid connection point, whereas the voltage vector shift protection detects islanding from the grid.

An optional RTD/mA module offers eight analog RTD or mA measuring inputs and four mA outputs. The RTD and mA inputs can be used for temperature measurement of generator bearings and stator windings, thus extending the functionality of the thermal overload protection and preventing premature aging of the generator windings. They can also be used for measuring the ambient air or coolant temperature. The four mA outputs can be used for transferring freely selectable measured or calculated analog values to devices provided with mA inputs.

Product highlights
- Extensive range of protection functionality for both synchronous generators and interconnection points of distributed generation units
- Extensive generator protection with 100% stator earth-fault, generator differential and underexcitation protection
- Advanced interconnection protection fulfilling the latest grid codes for higher grid stability and reliability

—
ABB Distribution Solutions
P.O. Box 699
FI-65101 VAASA, Finland
Phone: +358 10 22 11
Fax: +358 10 22 41094

—
ABB India Limited, Distribution Automation
Maneja Works
Vadodara – 390013, India
Phone: +91 265 272 4402
Fax: +91 265 263 8922

abb.com/mediumvoltage

Additional information
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

2NGA000219 REV A EN 11-2019