

# Relion® 620 series

## Protection and control relays



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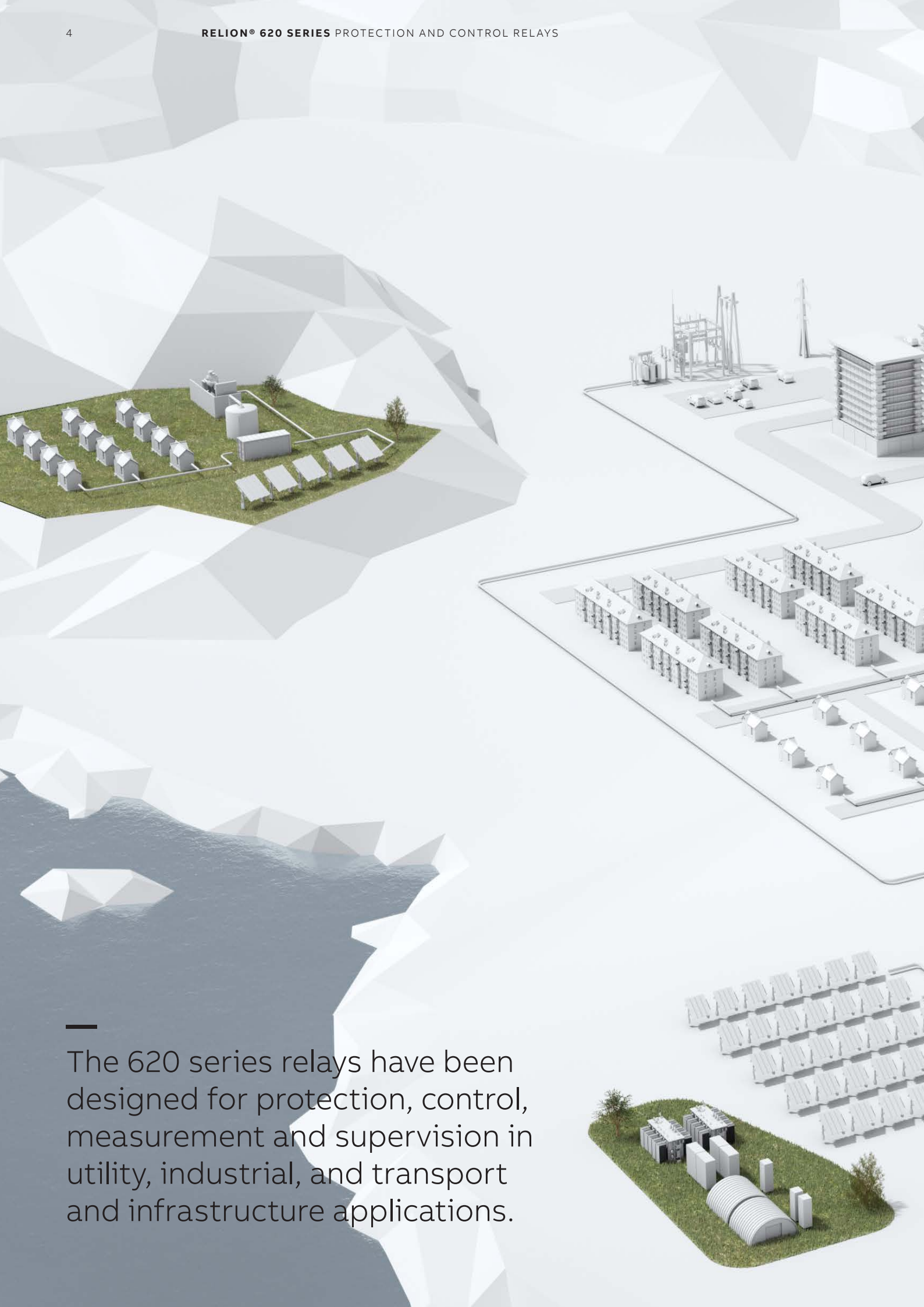
**ABB's Relion 620® series of relays offers a wide range of protection and control functionality, characterized by functional scalability and flexibility, for more advanced power distribution applications.**

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The 620 series relays have been designed for protection, control, measurement and supervision in utility, industrial, and transport and infrastructure applications.



## 620 series

# Flexibility for utility and industrial power distribution systems

The 620 protection and control series of relays is a member of ABB's Relion® product family. The 620 series relays are characterized by their compactness, functional scalability and withdrawable plug-in unit design.

### **Flexible adaptation to application-specific requirements**

The wide functionality offering, combined with the ability to run large configurations, makes the 620 series relays ideal for protection and control in more advanced power distribution applications. They offer extensive possibilities to easily tailor the configurations to application-specific requirements using the IEC 61850-compliant Protection and Control IED Manager PCM600.

### **Human-machine interface**

The 620 series relays are equipped with a large graphical display that can show customizable single-line diagrams (SLD) with position indication for switching devices. Also measured values provided by the configuration can be displayed. The SLDs can be customized using PCM600 and can have multiple pages for easy access to selected information. The SLDs can be accessed not only locally but also via the web browser-based HMI.

The 620 series HMI is distinguished by sixteen configurable two-state push buttons that can be used as additional alarm LEDs or control buttons for various tasks, such as blocking, adjusting setting groups or triggering the disturbance recorder.

### **Standardized communication and redundancy**

The 620 series relays fully support the IEC 61850 standard for communication and interoperability of substation automation devices, including fast GOOSE messaging and now also IEC 61850-9-2 LE process bus and Edition 2, offering substantial benefits in terms of extended interoperability. The relays further support both the parallel redundancy protocol (PRP) and the high-availability seamless redundancy (HSR) protocol, together with the DNP3, IEC 60870-5-103 and Modbus® protocols.

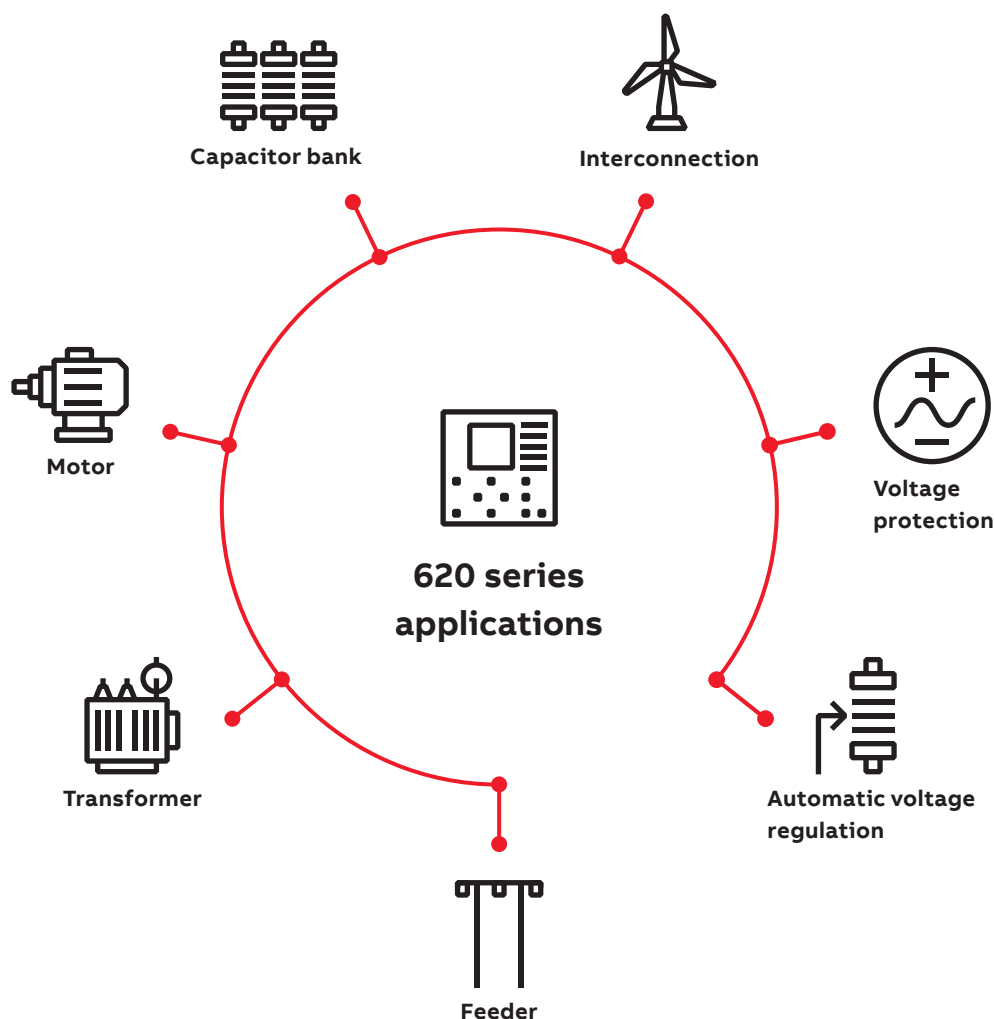
With the protocol adapter SPA-ZC 302, Profibus DVP1 can also be used. The relays are able to use two communication protocols simultaneously.

For redundant Ethernet communication, the 620 series relays offer either two optical or two galvanic Ethernet network interfaces. A third port with a galvanic Ethernet network interface provides connectivity of any other Ethernet device to an IEC 61850 station bus inside a switchgear bay. The redundant Ethernet solution can be built on the Ethernet-based IEC 61850, Modbus® and DNP3 protocols.

The implementation of the IEC 61850 standard covers both vertical and horizontal communication, including GOOSE messaging with both binary and analog signals as well as parameter setting according to IEC 61850-8-1. In addition, IEC 61850-9-2 LE process bus with sending sampled values of both analog voltages and currents and receiving sampled values of voltages is introduced. The sampled values can be used, for instance, for synchro-check to ensure safe interconnection of two networks, in both in conventional instrument transformer as well as sensor-based applications. For process bus applications, which require high-accuracy time synchronization, IEEE 1588 V2 is used, with a time stamp resolution of not more than four microseconds. IEEE 1588 V2 is supported in all variants with a redundant Ethernet communication module. In addition, the 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

- Compact and versatile solution for utility and industrial power distribution systems with integration of protection, control, monitoring and supervision in one relay
- Wide application coverage – feeder (including basic motor, interconnection, capacitor bank, busbar and arc protection), transformer as well as motor protection and control
- Extensive range of protection and control functionality, either with sensors or conventional instrument transformers
- Withdrawable plug-in unit design for swift installation and testing
- IEC 61850 Edition 2 and Edition 1 support, including HSR and PRP, GOOSE messaging and IEC 61850-9-2 LE for less wiring and supervised communication
- IEEE 1588 V2 for high-accuracy time synchronization and maximum benefit of substation-level Ethernet communication
- Large graphical display for showing customizable SLDs, accessible either locally or through the web browser-based HMI
- Extensive life cycle services



# Feeder protection and control

## REF620

REF620 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

REF620 has been designed to be the main overcurrent and earth-fault protection for overhead lines and cable feeders, in either isolated neutral, resistance-earthed, compensated or effectively-earthed networks. The feeder management relay can be used in various single or double-busbar applications, with either one or two breakers and numerous switching devices. It also supports a substantial number of both manually and motor-operated disconnectors and earthing switches.

A fault locator which locates short circuits in radial networks and earth faults in effectively and low-resistance earthed ones is introduced.

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Compact protection and control for a wide variety of feeder applications

If the fault current is as high as or higher than the load current, earth faults in isolated neutral networks will also be located.

The already impressive earth-fault protection portfolio has been further expanded and now includes a unique multifrequency admittance-based protection for higher sensitivity and selectivity, in response to the requirements of today's growing cable networks. The new earth-fault protection is intended for all types of earth faults – continuous, transient and intermittent – and combines both reliability and sensitivity in one function.

To further ensure grid stability and reliability, an interconnection protection package is introduced. REF620 is continuously monitoring distributed generation units such as solar or wind farms, both to determine whether and when to disconnect them from the grid as well as to detect islanding from the grid. Other additions include, for instance, high-impedance based busbar protection, protection of single and double star-connected capacitor banks with a compensated or an isolated neutral, as well as a power protection package for basic motor protection. To minimize the effects of an arc fault, REF620 can be equipped with high-speed outputs decreasing the operate time by four to six milliseconds compared to conventional outputs.

### Product highlights

- Extensive range of protection and control functionality, either with sensors or conventional instrument transformers
- Several optional functionality packages – interconnection protection for distributed power generation, capacitor bank, basic motor and arc protection
- 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

Functionality	REF620
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	•
Fault locator	○
High-impedance differential protection	•
Interconnection protection	○
Power protection	○
Capacitor bank protection	○
Arc protection	○
Load-shedding	•
Synchro-check	•
Auto-reclose	•

• = Supported ○ = Optional add-on



# Transformer protection and control

## RET620

RET620 has been designed to protect power and step-up transformers, including power generator-transformer blocks, in utility and industrial power distribution systems. RET620 is also ideal for voltage regulation.

### Application

RET620 has been designed to be the main protection for two-winding power transformers and power generator-transformer blocks.

The transformer management relay can be used in various single or double-busbar applications, with either one or two breakers and numerous switching devices. It also supports a substantial number of both manually and motor-operated disconnectors and earthing switches.

RET620 features three-phase transformer differential protection, one multi-slope stabilized (biased) stage and one instantaneous stage, providing a fast and selective protection for

phase-to-phase short circuits, winding interturn faults and bushing flash-overs. There is also a choice between either low or high-impedance restricted earth-fault (REF) protection.

In addition to transformer protection and control, RET620 offers voltage regulator control. The voltage regulator has been designed for power transformers with a motor-driven on-load tap-changer and offers both manual and automatic tap-changer control. To minimize the effects of an arc fault, RET620 can be equipped with high-speed outputs decreasing the operate time by four to six milliseconds compared to conventional outputs.

### Product highlights

- Extensive range of protection and control functionality for two-winding 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

Compact protection and control with voltage regulation for two-winding power transformers

Functionality	RET620
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	•
Power protection	•
Automatic voltage regulation	○
Arc protection	○
Load-shedding	•
Synchro-check	•

• = Supported    ○ = Optional add-on

# Motor protection and control

## REM620

REM620 has been designed to protect medium-sized and large asynchronous and synchronous motors in the manufacturing and process industry.

### Application

REM620 has been designed to be the main protection for medium-sized and large asynchronous motors requiring differential protection. The coverage is now extended to include synchronous motors. In addition, support for sensor-based phase current and voltage measurement is introduced, specifically intended for basic motor applications.

The motor management relay is typically used with medium-sized and large circuit-breaker or contactor-controlled MV motors and contactor-controlled LV motors in a variety of drives. The drives include both continuously and intermittently operated motor drives

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Compact protection and control for asynchronous and synchronous motors

with varying load, such as pumps and conveyors, crushers and choppers, mixers and agitators, fans and aerators.

REM620 offers either stabilized and instantaneous differential protection or now alternatively high-impedance/flux-balance based differential protection. As an option, REM620 can be provided with RTD and mA inputs for temperature measurement of motor bearings and stator windings. As a result, the functionality of the thermal overload protection is extended and premature aging of the motor windings thus prevented. The RTD and mA inputs can also be used, for example, for measuring the ambient air or coolant temperature. To minimize the effects of an arc fault, REM620 can also be equipped with high-speed outputs decreasing the operate time by four to six milliseconds compared to conventional outputs.

### Product highlights

- Motor protection both during motor start-up and normal run, with protection and fault clearance also in abnormal situations – either with sensors or conventional instrument transformers
- Extensive motor protection for medium-sized and large asynchronous and synchronous motors requiring differential protection – with conventional instrument transformers
- Extensive motor supervision capabilities via RTD and mA measurements

Functionality	REM620
Control	•
Overcurrent protection	•
Earth-fault protection	•
Thermal overload protection	•
Multipurpose protection with RTD/mA	○
Voltage protection	•
Frequency protection	•
Differential protection for machines	•
Power protection	○
Protection for asynchronous motors	•
Protection for synchronous motors	○
Arc protection	○
Synchro-check	•

• = Supported    ○ = Optional add-on





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