



Substation Automation Products

# Bay control REC670

## Increased grid reliability

# For optimized control and reliable operation of your switchyard

**The REC670 IED (Intelligent Electronic Device) is designed for the control, monitoring and protection of circuit breakers, disconnectors, and grounding switches in any type of switchgear and different switchgear configurations. It provides extensive application opportunities and various levels of back-up protection, including breaker failure and line over current.**

Using the configuration application tool, the REC670 IED can be configured to provide other substation control functions such as transformer tap changer control and capacitor bank protection and control. With versatile functionality, the REC670 IEDs can be applied to both single and multiple bay arrangements.

REC670 is designed for IEC 61850, implementing all the aspects of this standard, which ensures open, future-proof and flexible system architectures, with state-of-the-art performance.

Furthermore, the REC670 IED integrates advanced voltage control for all transformers in a substation in a single IED. This eliminates the need for dedicated voltage control devices in cases where the transformer protection is not equipped with voltage control.



## Increase grid reliability – invest in full control of your assets

- REC670 increases personnel safety and secure operation in all types of control applications in any substation
- REC670 increases productivity and quality from design to operation and maintenance of your installation
- Instead of modifying the process, let REC670 adapt to it
- REC670 prevents operational mistakes and reduces outage time
- REC670 enables significant savings in configuration, setting, erection, commissioning and maintenance cost as well as in space requirements

### Outstanding control capabilities

The REC670 IEDs can be easily configured to meet the specific requirements of your switchyard. You can also increase the functionality of your REC670 IEDs with optional back-up protection functions or provide alternate automated control functions.

The REC670 IEDs feature a [large HMI for local control and instant access to important data](#), such as settings, events and disturbance information. You can control and visualize locally [up to 30 primary apparatuses with a single REC670 IED](#). The control is based on the select before operate principle, which ensures secure operation and helps avoid human mistakes.

The large HMI provides a quick overview of the status of the bay with position indications and service values. You can select the control screen as a default screen. This way, you can quickly execute control commands. Using a symbol library you can easily configure the graphical display to correspond to your substation.

The two-position versatile switch and the 32-position selector switch functions enable you to easily manage switching operations via an icon on the IED HMI.

The versatile switch function allows you to directly change, for instance, the autorecloser function from on to off or vice versa without changing the configuration. The function also presents an indication of the selected position.

The selector switch replaces an external mechanical selector switch and allows you to directly select the position you desire, for instance, to change the autorecloser mode between 1-pole, 3-pole or 1- & 3-pole modes. In addition to the IED HMI, these switch functions can be operated from a remote system.

REC670 handles a large number of analog signals from CTs and VTs. [The outstanding I/O capability enables control of several bays with complete measurement with only one IED](#). For instance, one REC670 IED is capable of handling control of all apparatuses in one entire diameter in 1 1/2 breaker arrangement, including breaker failure protection for all breakers. [The REC 670 thus simplifies the system design and ensures extremely cost-efficient solutions for any substation at any voltage level supporting different protection and control philosophies.](#)

### Secure interlocking

The advanced interlocking functionality of REC670 allows you to avoid dangerous or damaging switch-gear operations and to assure personnel safety. REC670 performs secure [bay and station wide inter-locking using easy-to-use reservation functionality](#). Reservation prevents simultaneous operation of disconnectors and grounding switches and ensures that the interlocking information is correct at the time of operation. Ready-made and tested inter-locking modules are available for almost any type of switch-gear arrangement. The modules can also be adapted to your specific interlocking conditions.

### Features

- Fully IEC 61850 compliant
- Control, monitoring and protection integrated in one IED
- Extensive self-supervision including analog channels
- Six independent parameter setting groups
- Large HMI with up to six LCD pages for local control and visualization of single line diagrams
- Ethernet interface for fast and easy communication with PC
- Signal matrix for easy configuration of binary and analog signals
- User management and authority handling

### Pre-configured solutions

- Pre-configured and type-tested solutions including default settings for:
  - Single breaker with selective single or three phase tripping
  - Double breaker with selective single or three phase tripping
  - 1 1/2 circuit breaker arrangements with selective single or three phase tripping

### Control functions

- Apparatus control for up to six bays and 30 apparatuses
- Function instances included to cover a complete diameter with one REC 670
- Ready to use interlocking modules for different switchgear arrangements
- Several alternatives for reservation functionality
- Synchronizing, synchro-check and energizing check
- Auto-recloser
- Automatic voltage control for a single transformer
- Automatic voltage control for up to four/eight parallel transformers based on the minimum circulating current principle or the master-follower principle
- Versatile switch with two positions
- Selector switch with up to 32 positions

### Protection functions

- Current
  - Instantaneous phase- and residual overcurrent protection
  - Four-step phase- and residual overcurrent protection
  - Sensitive directional ground-fault protection
  - Broken conductor
  - Thermal overload protection
  - Breaker failure protection
  - Stub protection
  - Pole discordance protection
- Voltage
  - Two step phase- and residual overvoltage protection with definite and inverse time characteristics
  - Two step undervoltage protection with definite and inverse time characteristics
  - Voltage three-phase differential for capacitor banks
  - Loss of voltage
- Secondary system supervision
  - Fuse failure supervision
  - Current circuit supervision

### Logic

- Tripping logic
- Trip matrix logic
- Configurable logic blocks

### Monitoring

- Disturbance recorder
  - 100 disturbances
  - 40 Analog channels 30 physical and 10 derived
  - 6 Binary channels
- Event list for 1,000 events
- Disturbance report
- Event and trip value recorders
- Fault locator
- Event counters
- Supervision of AC and mA input quantities
- Small and large HMI
- LED indications with 6 red and 9 yellow LEDs

### Metering

- V, I, P, Q, S, f, and  $\cos\varphi$
- AC input quantities with accuracy better than 0,5%
  - Inputs for mA measuring
  - Energy metering function
  - Pulse counting support for energy metering

### Communication

- IEC 61850-8-1 including GOOSE messaging
- IEC 60870-5-103
- DNP 3.0 slave protocol
- LON
- SPA
- Remote end communication for transfer of 192 binary signals

### Setting, configuration and disturbance handling

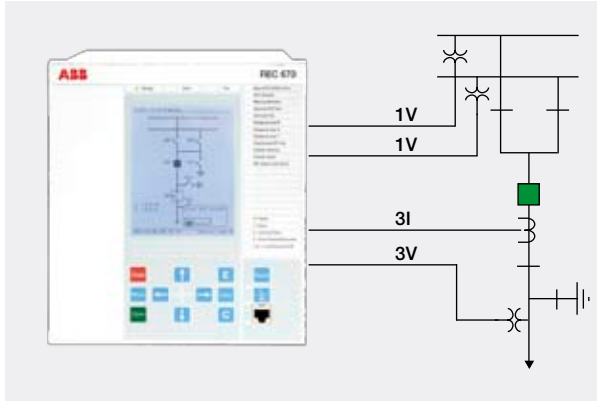
- Protection and Control IED Manager PCM 600

### Hardware

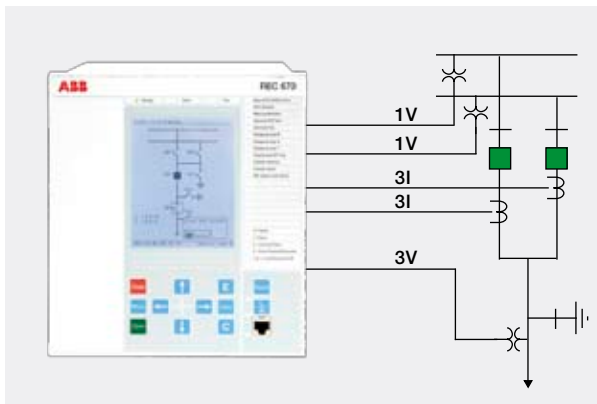
- 1/1 x 19", 3/4 x 19" or 1/2 x 19" case selected according to the number of required I/O modules
- Power supply modules from 24 to 250 V DC  $\pm$  20%
- Up to 14 I/O modules in 1/1 x 19" case
- Binary input module with 16 inputs
- Binary output module with 24 outputs
- Static binary output module with 12 outputs (6 static)
- Binary input/output module with 8 inputs and 12 outputs
- mA input module with 6 transducer channels
- Accurate time-synchronization through GPS module or IRIG-B-module
- Remote end data communication modules for C37.94 and G.703
- Test switch module

Technical details are available in the REC670 Buyer's Guide.

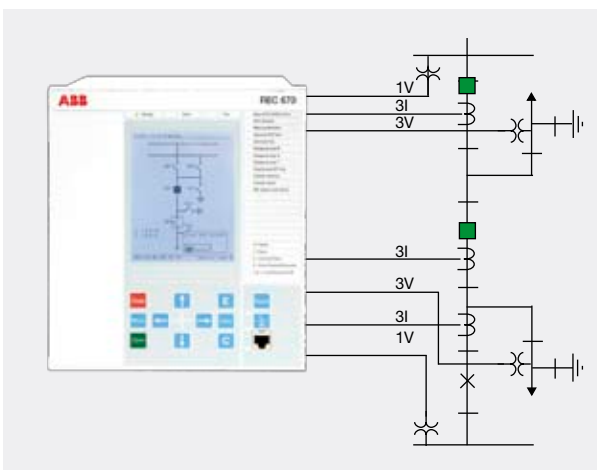
# Application examples



REC670 in a single circuit breaker arrangement.



REC670 in a double circuit breaker arrangement.



One REC 670 IED is capable of handling control of all apparatuses in one entire diameter in 1 1/2 breaker arrangement.

The powerful REC670 supports [interlocking both via a station bus and hardwired signals](#). REC670 IEDs [utilize GOOSE messaging](#) based on the IEC 61850 standard to perform horizontal communication and interlocking. This provides a cost-efficient solution for the interlocking.

### Operational reliability

In addition to the interlocking, the output relays of the IED feature an [integrated continuous supervision function to ensure high security against unwanted operation](#). The status of the output relays is supervised and in case of a discrepancy, an error will be reported.

The REC670 IEDs are designed with the same technology as ABB's other 670 protection and control IEDs. [Meeting the stringent EMC requirements set for protection relays, REC670 provides secure control of your primary equipment.](#)

### Cost savings through integrated functionalities

REC670 integrates [breaker failure protection for breakers in any type of breaker arrangement in a single device](#). Furthermore, integrated synchronizing functions, auto-reclosing and back-up protection functionality for multiple bay arrangements will save both space and money.

In addition, the integrated local HMI eliminates extensive cabling since the traditional mimic board with related interposing relays is not needed.

### Fast and efficient system integration

The REC670 IEDs provide a compact, bay-oriented control solution with communication capabilities replacing conventional control circuits. Due to their [full IEC 61850 compliance](#), they can be easily integrated with any IEC 61850 compliant system. In addition, they can exchange information and cooperate with other vendors' IEC 61850 compliant IEDs.

The REC670 IEDs are [more than just devices](#). They utilize ABB's unique connectivity package concept, which simplifies the system engineering and reduces the risks of errors in system integration. This package contains a complete description of the specific IED, consisting of data signals, parameters, addresses and IED documentation.

The signal data is configured automatically based on the information provided by the connectivity package allowing efficient integration of the IEDs in ABB's MicroSCADA Pro automation system.

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# Contact us

**ABB Inc.**

3450 Harvester Road  
Burlington, ON L7N 3W5, Canada  
Toll Free: 1-800-HELP-365

**ABB Inc.**

940 Main Campus Drive  
Raleigh, NC 27606, USA  
Toll Free: 1-800-HELP-365

**ABB México**

S.A de C.V. Blvd.  
Centro Industrial No. 12  
54073 Tlaineapantla  
Edo. de México, México  
Phone: (+1) 440-585-7804

[www.abb.com/substationautomation](http://www.abb.com/substationautomation)