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DATASHEET

Bay control REC670

Relion® 670 series version 2.2

Application

- Bay control for single breaker to 1½ CB diameter using single REC670
- Advanced control & monitoring functionality including automatic voltage control, phasor monitoring, circuit breaker & transformer monitoring, shunt capacitor bank protection
- Integrated back-up protection
- Easy integration to conventional or digital substations

Features

- Fully IEC 61850 compliant, Edition 1 and Edition 2
- Extensive I/O capability
- Protection, monitoring and control of several primary objects integrated in one IED
- Extensive self-supervision including analog channels
- Six independent parameter setting groups
- Ethernet interface for fast and easy communication with PC and SA system
- Large number of Ethernet ports to support several system topologies and redundancy methods
- Large HMI for visualization of single line diagrams
- Settings via IEC 61850 for some protections
- Cyber security support for compliance to
- NERC CIP and IEC 62351-8 with Centralized Account Management using Microsoft Active Directory

Pre-configured solutions

- Pre-configured and type-tested solutions including default settings for:
  - Single breaker
  - Double breaker
  - 1½ breaker for complete diameter
  - Single breaker with PMU functionality

Most important protection functions

- Differential protection
  - 3-phase high impedance differential protection
- Voltage functions
  - 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 check
- Current functions
  - Instantaneous phase- and residual overcurrent protection
  - Four step phase- and residual directional overcurrent protection
  - Average power based transient earth fault protection
  - Four step directional negative sequence overcurrent protection
  - Sensitive directional earth-fault protection
  - Broken conductor check
  - Over current protection with binary release
  - Thermal overload protection
  - Breaker failure protection
  - Stub protection
  - Pole discordance protection
  - Capacitor bank protection
  - Voltage controlled/restraint overcurrent protection

Capacitor bank unbalance protection

- A set of current and voltage based unbalance protection functions for shunt capacitor banks. Suitable for grounded, ungrounded single/parallel capacitor banks
  - Cascading failure protection
  - Current unbalance protection
  - Voltage unbalance protection
  - Phase voltage differential protection
- Power functions
  - Directional under- and overpower protection
- Secondary system supervision
  - Fuse failure supervision
  - Fuse supervision based on voltage differential
  - Current circuit supervision
  - Current/Voltage/Real Value based delta supervision
- Frequency functions
  - Under- and over frequency protection
  - Rate-of-change frequency protection
  - Frequency time accumulation protection
- Multi-purpose function
  - Multi-purpose filter with possibility to detect, alarm, and trip for special operating conditions, e.g.
  - Sub-Synchronous Resonance (SSR)
  - General current and voltage protection
- Scheme communication
  - Scheme communication logic
  - Current reversal and weak-end infeed logic
  - Local acceleration logic

Control functions

- Function instances included to cover a complete diameter with one REC670
- Control and interlocking for up to 30 switching devices
- Ready to use interlocking for different switchgear arrangements

- Several alternatives for reservation functionality
- Automatic voltage control for a single transformer
- Automatic voltage control for up to 8 parallel transformers in a group based on the minimum circulating current principle or master-follower principle
- Setpoint voltage can be controlled via IEC 61850
- Tap position reading via mA or BCD code
- Auto recloser for single or multiple breakers
- Synchronizing, synchro check and energizing check
- Selectable operator place allocation
- Software based multi-position selector switches

Logic

- Tripping and trip matrix logic
- Extensive math and logic block library for application customization

Monitoring

- Phasor monitoring for up to 8 phasor values
- Adjustable breaker monitoring with capability to handle multiple breaker types
- Estimation of transformer insulation loss of life based on top oil measurement or calculation
- Monitor mechanical stresses on transformer via advanced transformer through fault monitoring and reporting functionality
- Monitoring and reporting of currents and voltages during faults
- Disturbance recorder with disturbance report supporting COMTRADE 1999 and 2013 formats
  - 200 disturbances
  - 40 analog channels (30 physical and 10 derived)
    - 352 binary channels
  - All protection settings during a disturbance
- Event list for 5000 process and 10240 security events
- Event and trip value recorders
- Fault locator
- Event counters
- Current/Voltage based harmonic monitoring (up to 9th order) including total harmonic distortion
- Running hour meter
- Supervision of AC and mA input quantities
- Large HMI with virtual keyboard, function push buttons, and three colors LED indications with alarm descriptions

Measurements

- U, I, P, Q, S, f and cos Φ
- Frequency measurement with accuracy of ± 2 mHz
- Inputs for mA measuring

Metering

- Energy metering function for energy statistics
- Pulse counting support for energy metering

Communication

- IEC 61850-8-1 including GOOSE messaging
- IEC 62439-3 Parallel Redundancy Protocol (PRP)
- IEC 62439-3 High-availability Seamless Redundancy (HSR)
- IEEE 802.1D Rapid Spanning Tree Protocol (RSTP)
- IEC/UCA 61850-9-2LE Process bus for up to 8 MUs
- Phasor monitoring reporting via IEEE 1344 and IEC/IEEE 60255.118 (C37.118)
- IEC 60870-5-103, DNP 3.0, SPA, LON protocols
- Remote end communication for signal transfer
  - 64 kbps: 3 analogs & 8 binary or 192 binary
  - 2 Mbps: 9 analogs & 192 binary

Engineering, testing, commissioning and maintenance

- Protection and control IED manager, PCM600, for configuration, parameterization, Ethernet port/ protocol configured, online debugging and disturbance handling
- Forcing of binary inputs and outputs for faster and easier test and commissioning
- Flexible product naming by mapping utility IEC 61850 model to that of 670 series model

Hardware

- 1/1 x 19”, 3/4 x 19” or 1/2 x 19” 6U height case selected according to the number of required I/O modules
- Power supply modules from 24 to 250 V DC ± 20 %
- TRM modules each with 12 analog inputs protection class and optionally measurement
- 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 6 heavy-duty static and 6 change-over outputs
- Binary input/output module with 8 inputs and 12 outputs
- mA input module with 6 transducer channels
- Connector types: compression or ring-lug
- Accurate time-synchronization through PTP (IEC/IEEE 61850-9-3), GPS, SNTP, DNP 3.0, IEC 60870-5-103 or IRIG-B
- Remote end data communication modules for C37.94, galvanic X.21 up to 10 m, fiber for direct connection up to 130 km or via multiplexer
- Up to six Ethernet ports (optical LC or RJ45) that can be freely configured as single or redundant pairs

Accessories

- COMBITEST test system
- COMBIFLEX auxiliary relays
- Mounting kits

Documentation

- Role based documentation for high efficiency in engineering, commissioning, operations and maintenance

Technical details are available in the REC670 Product Guide.

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