Transformer protection RET670
Relion® 670 series Ver. 2.1

Features
- Fully IEC 61850 compliant, Edition 1 and Edition 2
- Extensive I/O capability
- Protection, monitoring and control 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 Substation Automation System
- 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
- Protection of several primary objects with a single IED

Pre-configured solutions
- Pre-configured and type tested solutions for:
  - 2 winding transformer in single breaker
  - 2 winding transformer in multi breaker
  - 3 winding transformer in single breaker
  - 3 winding transformer in multi breaker
  - Voltage control for up to 2/8 parallel transformers
  - Back-up protection for transformers and shunt reactors

Most important protection functions
- Transformer differential protection
  - High sensitivity for interturn faults
  - Fast differential protection with up to 6 restraint CT inputs
  - Automatic CT ratio matching and vector group compensation
  - Waveform and second harmonic restraint for transformer inrush
  - Fifth harmonic restraint for overexcitation
- 3-phase high impedance differential protection
- Restricted earth-fault protection
  - Extremely fast operation
  - High and/or low impedance based
- Distance protection
  - Full-scheme distance protection with quadrilateral, mho- or series compensation characteristics with load encroachment
- Current
  - Instantaneous phase- and residual overcurrent protection
  - Four step phase- and residual directional/ non-directional overcurrent protection with definite and inverse time characteristics
  - Four step directional negative sequence overcurrent protection
  - Two step negative sequence non-directional overcurrent protection

- Sensitive directional earth-fault protection
- Thermal overload protection
- Breaker failure protection
- Pole discordance protection
- Capacitor bank protection

Power functions
- Directional under- and overpower protection

Voltage
- Two step phase- and residual overvoltage protection
- Two step undervoltage protection
- Overexcitation protection
- Loss of voltage check

Secondary system supervision
- Fuse failure supervision
- Fuse supervision based on voltage differential principle
- Current circuit supervision

Frequency functions
- Under- and overfrequency protection
- Rate-of-change frequency protection

Multi-purpose function
- Multi-purpose filter with possibility to detect, alarm, and trip for special operating conditions, e.g. SSR
- General current and voltage protection
- Voltage controlled/restraint overcurrent protection

Control functions
- Automatic voltage control for a single transformer
- Automatic voltage control for up to 8 parallel transformers 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
Control and interlocking for up to 30 switching devices
Ready to use interlocking for different switchgear arrangements
Several alternatives for reservation functionality
Selectable operator place allocation
Synchronizing, synchrocheck and energizing check
Software based multiple position selector switches

Logic
- Tripping logic
- Trip matrix logic
- Extensive logic block library for application customization

Monitoring
- Adjustable breaker monitoring with capability to handle multiple breaker types
- Disturbance recorder with disturbance report
  - 100 disturbances
  - 40 analog channels (30 physical and 10 derived)
  - 128 binary channels
- Event list for 1000 events
- Event and trip value recorders
- Fault locator
- Event counters
- Running hour meter
- Supervision of AC and mA input quantities
- Large HMI with virtual keyboard, function push buttons, and three color LED indications with alarm descriptions

Measurements
- U, I, P, Q, S, f and cos ϕ
- Frequency measurement with accuracy of ± 2 mHz
- Tap changer position
- 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 61850-9-2 LE Process bus
- IEC 60870-5-103 serial communication
- DNP 3.0, SPA, LON protocols
- Remote end communication for transfer of up to 192 binary signals in each direction

Engineering, testing, commissioning, and maintenance
- Forcing of binary outputs
- Protection and control IED manager PCM600 for setting, configuration and disturbance handling
- 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 module with 12 analog inputs and optional measurement transformers
- 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 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 type or ring-lug type
- Accurate time-synchronization through GPS, SNTP, DNP 3.0, IEC 60870-5-103, or IRIG-B
- Remote end data communication modules for C37.94, direct fiber up to 130 km or via multiplexer
- Supports highest EMC requirements
- Independent laboratory certified

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 RET670 Product Guide.

For more information please contact:

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