Transformer protection RET670
Relion® 670 series Ver. 1.2

Features
• Fully IEC 61850 compliant
• Protection, monitoring and control integrated in one IED
• Extensive self-supervision including analog channels
• Six independent parameter setting groups
• Signal matrix for easy configuration of binary and analog signals
• Ethernet interface for fast and easy communication with PC
• Large HMI for visualization of single line diagrams
• User management and authority handling
• Multi-object capability for handling, for instance, a transformer and a line with a single IED

Pre-configured solutions
• Pre-configured and type tested solutions including default settings for:
  – Two winding transformer in single breaker arrangements
  – Two winding transformer in multi breaker arrangements
  – Three winding transformer in single breaker arrangements
  – Three winding transformer in multi breaker arrangements
  – Voltage control for up to two/four parallel transformers
  – Back-up protection for transformers and shunt reactors

Most important protection functions
• Transformer differential protection
  – Percentage bias restraint
  – Waveform and second harmonic restraint for transformer inrush
  – Fifth harmonic restraint for overexcitation
  – Automatic CT ratio matching and vector group compensation
  – High sensitivity for interturn faults
• High impedance differential protection
• Restricted earth-fault protection
  – Extremely fast operation
  – High and low impedance based
• Distance protection
  – Full-scheme distance protection with quadrilateral, mho- or series compensation characteristics for up to four zones and 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
  – Broken conductor check
  – 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 with definite and inverse time characteristics
  – Two step undervoltage protection with definite and inverse time characteristics
  – Overexcitation protection
  – Loss of voltage check
• Secondary system supervision
  – Fuse failure supervision
  – Current circuit supervision
• Frequency functions
  − Under- and overfrequency protection
  − Rate-of-change frequency protection
• Multi-purpose function
  − General current and voltage protection

Control functions
• 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 master-follower principle
• Apparatus control for up to 30 apparatus
• Ready to use interlocking module gear arrangements
• Several alternatives for reservation functionality
• Synchronizing, synchrocheck and energizing check
• Versatile switch with two positions
• Selector switch with up to 32 positions

Logic
• Tripping logic
• Trip matrix logic
• Configurable logic blocks

Monitoring
• Disturbance recorder
  − 100 disturbances
  − 40 analog channels (30 physical and 10 derived)
  − 96 binary channels
• Event list for 1000 events
• Disturbance report
• Event and trip value recorders
• Fault locator
• Event counters
• Supervision of AC and mA input quantities
• Small and large HMI in local language
• LED indications with 6 red and 9 yellow LEDs

Measurements
• U, I, P, Q, S, f and cos ϕ
• Differential voltage per zone
• AC input quantities with accuracy better than 0.5%
• 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 61850-9-2 LE Process bus
• Individually supervised redundant station bus with zero seconds recovery time
• IEC 60870-5-103 serial communication
• 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 PCM600

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 measurement transformers
• ADM module
• Up to 14 I/O modules in 1/1 x 19” case
• Binary input module, 30 mA and 50 mA, with 16 inputs
• Binary output module with 24 outputs
• Static binary output module with 12 outputs (6 static)
• Binary input/output module, 30 mA and 50 mA, with 8 inputs and 12 outputs
• mA input module with 6 transducer channels
• Accurate time-synchronization through GTM, GPS time module, SNTP, DNP 3.0 or IRIG-B-module
• Remote end data communication modules for C37.94, X.21 and G.703/G.703E1
• Connector types: compression type or ring-lug type
• COMBITEST test switch module

Technical details are available in the RET670 Product Guide.

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