Generator protection REG650
Relion® 650 series Ver. 1.3

Features
• Fully IEC 61850 compliant
• Parallel Redundancy Protocol (PRP) according to IEC 62439-3 Ed.2
• Protection, control and monitoring integrated in one IED
• Extensive self-supervision including analog channels
• Four independent parameter setting groups
• Large HMI for visualization of single line diagrams and on-line measurements
• Ethernet interface for fast and easy communication with PC
• Accurate time synchronization via SNTP, DNP 3.0, IEC 60870-5-103 and IRIG-B serial interface
• Signal matrix for easy configuration of binary and analog signals
• User management and authority handling
• Activity logging
• Available in customized and configured solutions

Configured solutions
• Generator differential protection including all other necessary protection functions for a synchronous machine
• Unit (transformer) differential protection including all other necessary protection functions for a synchronous machine

Most important protection functions
• Differential protection
  – Generator differential protection or transformer differential protection
  – 1-phase high impedance differential protection
• Impedance protection
  – Underimpedance protection for generators and transformers with load encroachment
  – Loss of excitation
  – Out-of-step protection
• Current
  – Voltage-restrained time overcurrent protection
  – Negative sequence overcurrent protection for machines
  – Accidental energizing protection for synchronous generator
  – Four step directional phase overcurrent protection with definite and inverse time characteristics
  – Four step residual non-directional/directional overcurrent protection with definite and inverse time characteristics and with voltage, current or dual polarization, based on zero sequence or negative sequence quantities
  – Rotor earth-fault protection using COMBIFLEX RXTTE4 injection unit
  – Sensitive directional residual overcurrent and power protection
  – Thermal overload protection
  – Breaker failure protection
  – Pole discordance protection
• Power functions
  – Directional under- and overpower protection
• Voltage
  – 100% stator earth-fault protection, 3rd harmonic-based
  – 95% stator earth-fault protection
  – 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
• Frequency protection
  – Under- and overfrequency protection
  – Rate-of-change frequency protection
• Secondary system supervision
  – Fuse failure supervision
  – Breaker close/trip circuit monitoring

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Control functions
• Synchrocheck, energizing check and synchronizing
• Selectable operator place allocation
• Versatile switch with two positions
• Control of up to two circuit breakers from local/remote
• Selector switch with up to 32 positions

Logic
• Tripping logic
• Trip matrix logic
• Configurable logic blocks
• Configurable logic blocks with quality and time

Monitoring
• Disturbance recorder
  – Up to 3 seconds of data before the trigger
  – 100 disturbances
  – 40 analog channels (30 physical and 10 derived)
  – 96 binary channels
• Event list for 1000 events
• User activity logging for 2048 entries
• Disturbance report
• Event and trip value recorders
• Event counters
• Supervision of AC input quantities
• Indication of up to 135 binary signals via 15 three-color-state indication LEDs
• Insulation gas monitoring function
• Insulation liquid monitoring function
• Circuit breaker condition monitoring
• Station battery supervision

Measurements
• U, I, P, Q, S, f and cos φ
• AC input quantities with accuracy better than 0.5%

Metering
• Energy metering function for energy statistics
• Pulse counting support for energy metering

Communication
• IEC 61850-8-1 including GOOSE messaging
• DNP 3.0 slave protocol
• IEC 60870-5-103 serial communication
• Parallel Redundancy Protocol (PRP) according to IEC 62439-3 Ed.2

Setting, configuration and disturbance handling
• Protection and control IED manager PCM600

Hardware
• 1/1 x 19” width, 3U height case
• 20 analog inputs (10+1 CT and 9 VT inputs) in configured solutions
• Universal 1A/5A CT inputs
• Choice of communication and processor module with
  – 12 binary inputs, TCP/IP optical, IRIG-B, galvanic
  – TCP/IP optical with PRP redundancy, IRIG-B, galvanic
  – RS485 and optical serial communication ports
• Binary input/output modules with 9 inputs and 9 outputs
• Possibility to add one optional binary input/output module in configured solutions
• I/Os customizable to
  – 10 analog inputs (selected combinations of CT/VT inputs) and up to four binary input/output modules
  – 20 analog inputs (selected combinations of CT/VT inputs) and up to two binary input/output modules
• Power supply modules from 24 to 30 V DC, 48 to 250 V DC or 100 to 240 V AC with 9 outputs, 3 of which with trip circuit supervision
• Connector types: compression type or ring-lug type

Technical details are available in the REG650 Product Guide.

For more information please contact:

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