Bay control REC650
Relion® 650 series Ver. 1.3

Features
• Fully IEC 61850 compliant
• Parallel Redundancy Protocol (PRP) according to IEC 62439-3 Ed.2
• Control, monitoring and backup protection integrated in one IED
• Extensive self-supervision including analog channels
• Four independent parameter setting groups
• Large HMI for local control, 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
• Single busbar, single breaker bay with three-phase tripping
• Double busbar, single breaker bay with three-phase tripping
• Buscoupler bay with bus earthing switches with three-phase tripping

Control functions
• Apparatus control for one bay and up to 8 apparatus
• Ready to use interlocking modules
• Simpler and safe reservation functionality
• Three-phase autorecloser
• Synchronizing, synchrocheck and energizing check
• Selectable operator place allocation
• Versatile switch with two positions
• Selector switch with up to 32 positions

Protection functions
• Current
  – Instantaneous phase overcurrent protection
  – Instantaneous residual overcurrent protection
  – Four step directional phase overcurrent protection with definite and inverse time characteristics with 2nd harmonic blocking
• Power functions
  – 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 with 2nd harmonic blocking
  – Sensitive directional earth-fault protection
  – Two step negative sequence based directional overcurrent protection
  – Broken conductor check
  – 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
  – Loss of voltage check
• Frequency protection
  – Under- and overfrequency protection
  – Rate-of-change frequency protection
• Secondary system supervision
  – Current circuit supervision
  – Fuse failure supervision
  – Breaker close/trip circuit monitoring
Logic
- Tripping logic
- Trip matrix logic
- Configurable logic blocks
- Configurable logic blocks with quality and time

Monitoring
- Disturbance recorder
  - 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
- Fault locator presenting distance to fault in percentage/kilometers/miles
- Trip circuit supervision
- 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
- 10 analog inputs (5 CT and 5 VT or 6 CT and 4 VT inputs) depending on the configured solution
- Universal 1A/5A CT inputs
- Choice of communication and processor module with
  - 12 binary inputs, TCP/IP optical, IRIG-B, galvanic
    - RS485 and optical serial communication ports
  - 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
  (single busbar, single breaker bay with three-phase tripping configured solution)
- 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 REC650 Product Guide.

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