Line distance protection REL650
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

- Single breaker with single-phase tripping
- Single breaker with three-phase tripping
- Double breaker with three-phase tripping

Most important protection functions

- 5 zone full-scheme line distance protection
  - Quadrilateral or mho characteristic, or both
  - Scheme communication logic
  - Load encroachment discrimination
  - Selective phase selection and automatic switch on to fault logic
  - Current reversal and weak end infeed logic
  - Power swing detection and blocking
  - Phase preference logic
- Current
  - Instantaneous phase overcurrent protection
  - Instantaneous residual overcurrent protection
  - Four step non-directional/directional phase overcurrent protection with definite and inverse time characteristics with 2\textsuperscript{nd} harmonic blocking
  - 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 2\textsuperscript{nd} harmonic blocking
  - Two step negative sequence based directional overcurrent protection
- Directional residual overcurrent protection with scheme communication logic
- Sensitive directional earth-fault protection
- Two step undercurrent protection
- Broken conductor check
- Thermal overload protection
- Breaker failure protection
- Stub protection
- Pole discordance 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
  - Loss of voltage check
- Frequency protection
  - Under- and overfrequency protection
  - Rate-of-change frequency protection
- Power system supervision
  - Loss of voltage check configured based on undervoltage protection
  - Dead line detection included in fuse failure supervision and switch on to fault logic
- Secondary system supervision
  - Current circuit supervision
  - Fuse failure supervision
  - Breaker close/trip circuit monitoring
Control functions
• Selective single-phase and three-phase autorecloser
• Synchronizing, synchrocheck and energizing check
• Selectable operator place allocation
• Control of up to two circuit breakers from local/remote
• Versatile switch with two positions
• 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
  – 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
• Fault locator presenting distance to fault in percentage/kilometers/miles
• Event counters
• Supervision of AC input quantities
• Insulation gas monitoring function
• Insulation liquid monitoring function
• Circuit breaker condition monitoring
• Station battery supervision
• Indication of up to 135 binary signals via 15 three-color-state indication LEDs

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 inputs) or 20 analog inputs (10 CT and 10 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 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 two optional binary input/output modules depending on the selected 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 REL650 Product Guide.

For more information please contact:

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