Application
- Protection, control and monitoring of transmission lines, catenaries or transformers in two-and single phase 16.7/50/60 Hz railway applications
- Supports isolated, compensated or solidly earthed networks
- Transformer energizing functionality in 16.7 Hz system for smooth energizing of transformers to minimize stress on equipment and power system
- Additionally supports circuit breaker/disconnector control, circuit breaker condition monitoring
- Easy integration to conventional or digital substations

Features
- Fully IEC 61850 compliant, Edition 2 only
- Extensive I/O capability
- Protection, monitoring and control of several primary objects 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 SA system
- Large number of Ethernet ports to support several system topologies and redundancy methods
- Large HMI for visualization of single line diagrams
- Cyber security support for compliance to NERC CIP and IEC 62351-8 with Centralized Account Management

Product offering
- Product can be chosen for
  - Transformer protection or Line protection or Catenary protection
  - Control application as standalone or integrated with Transformer/Line/Catenary protection

Most important protection functions
- Transformer differential protection
  - Two to two phase coupling transformers
  - Two to one phase railway power transformers
- Restricted earth-fault protection
- Line distance protection
  - Full-scheme distance protection with quadrilateral or Mho characteristics for up to six zones with load encroachment discrimination
  - Selective load encroachment discrimination
  - Catenary phase selection and automatic switch on to fault logic
- Complete distance protection for two catenaries
- Voltage functions
  - Two step phase- and residual overvoltage protection
  - Two step under voltage protection
- Current functions
  - Instantaneous phase- and residual overcurrent protection
  - Two step phase- and residual directional overcurrent protection
  - Sensitive directional earth-fault protection
  - Transformer tank overcurrent protection
  - Over current protection with binary release
  - Thermal overload protection for lines and transformers
  - Breaker failure protection
- Secondary system supervision
  - Fuse failure supervision
  - Current circuit supervision
  - Current/Voltage/Real Value based delta supervision
- Frequency functions
  - Under frequency protection
- Scheme communication
  - Scheme communication logic
  - Phase segregated scheme communication logic for distance protection
  - Current reversal and weak-end infeed logic

Control functions
- Autorecloser for single or multiple breakers
- Synchronizing, synchrocheck and energizing check
  - Tap position via mA or BCD code
  - Control and interlocking for up to 15 switching devices
  - Transformer energizing functionality in 16.7 Hz
  - Selectable operator place allocation
  - Software based multi-position selector switches
**Logic**
- Tripping and 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)
  - 352 binary channels
- All protection settings during a disturbance
- Event list for 1000 events
- Event and trip value recorders
- Fault locator for up to 10 line sections
- Event counters
- Current/Voltage based harmonic monitoring (up to 5th order) including total harmonic distortion
- 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
- 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 62439-3 High-availability Seamless Redundancy (HSR)
- IEC/UCA 61850-9-2LE Process bus for up to 8 MUs
- IEC 60870-5-103, DNP 3.0, SPA, LON protocols
- Remote end communication for signal transfer
  - 64 kbps: 3 analogs & 8 binary or 192 binary
  - 2 Mbps: 9 analogs & 192 binary

**Engineering, testing, commissioning and maintenance**
- Protection and control IED manager, PCM600, for configuration, parameterization, Ethernet port/protocol configuration, online debugging and disturbance handling
- Forcing of binary inputs and outputs for faster and easier test and commissioning
- 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 modules each with 12 analog inputs protection class and optionally measurement
- 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 or ring-lug
- Accurate time-synchronization through PTP (IEC/IEEE 61850-9-3, GPS, SNTP, DNP 3.0, IEC 60870-5-103 or IRIG-B)
- Remote end data communication modules for C37.94, galvanic X.21 up to 10 m, fiber for direct connection up to 130 km or via multiplexer
- Up to six Ethernet ports (optical LC or RJ45) that can be freely configured as single or redundant pairs

**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 RER670 Product Guide.