

Sample specification REC 670

The IED shall be suitable for control, monitoring and protection of circuit breakers, disconnectors and earthing switches for all types of switchgear configurations up to the highest voltage levels.

The IED shall have complete functionality for single, double and 1 ½ circuit breaker arrangements.

Optional back-up protection for increased functionality shall be available.

The IED shall be based on advanced and proven algorithms and an easy and efficient upgrade of the IED functionality shall be possible.

A tool for user friendly engineering and disturbance handling shall be available.

It shall be possible to use one IED per bay or the entire diameter, including breaker failure protection for all breakers, in a 1 ½ breaker arrangement or to use one common IED for up to four bays.

Interlocking modules for all types of switchgear arrangements shall be available in order to avoid damaging switchgear operations and to ensure personal safety. The IED shall support interlocking via stationbus and/or hardwired solutions.

At least five independent parameter-setting groups shall be included.

The IED shall have extensive self-supervision including analog channels.

In order to achieve cost effective engineering, testing and commissioning shall pre-configured, ready to use IEDs for different applications be available.

If needed, it shall be easy to modify the configuration.

At new installations or at extensions and replacements in existing installations shall it be possible to integrate the IED into a substation automation system.

It shall be possible to equip the IED with a large HMI for local control, visualization of up to four single line diagrams with positions indications of included breakers and disconnectors and overview of service values.

It should be possible to control up to 30 primary apparatuses with one IED and in order to ensure secure operations and avoiding of human mistakes the control shall be based on the select before execute principle.

The graphical display shall be easily configured by means of symbol library.

The IED shall facilitate user defined logic functions such as automatic control sequences by means of available logic elements. For example with one command perform a safe change of the connection of a selected line from one busbar to another busbar in a double busbar switchgear.

It shall also be possible to perform automatic power restoration that restore the power network after a disturbance.

Synchro/energizing check and synchronizing functions for single or multibreaker arrangements shall be available.

It shall be possible to have different settings for manual and automatic synchrocheck.

Auto-reclosing functions for high speed and delayed single and/or three phase reclosing for multibreaker arrangements shall be available.

It shall be possible to include back-up protection such as instantaneous overcurrent functions for phase and earth faults and time delayed directional/non-directional overcurrent functions with inverse and definite time characteristic with at least three steps for phase and earth-faults.

Scheme communication logic and current reversal and week-end infeed logic for directional residual overcurrent protection shall be possible to include.

Other current functions such as thermal overload with alarm and trip steps and breaker failure protection with short reset time shall also be possible to include in the IED.

Stub protection for multi-breaker arrangements and breaker pole discordance protection shall be available.

Over and undervoltage protection with at least two steps, over and underfrequency functions and rate-of-change frequency functions shall also be possible to include in the IED.

For secondary system supervision shall fuse failure and current circuit supervision be available.

The IED shall be provided with programmable logic for tripping and indications as well as a high number of logic blocks and timers for user adaptation.

Monitoring functions such as service values for U,I, with at least 0,25 % accuracy ,P,Q,S, with at least 0,5 % accuracy, frequency and power factor shall be included. Supervision of mA input signals from transducers shall be possible to include.

Pulse counter logic for counting of externally generated binary pulses from an energy meter shall be available.

A disturbance recorder which can handle at least 30 analog channels and at least 80 binary signals and that can record the last 50 disturbances shall be included.

It should be possible to record the sum of selected analog currents.

An event recorder that can handle up to 150 time tagged events per disturbance and that can record the last 50 disturbances shall also be included.

It shall be possible to retrieve the disturbance and event recorder information based on Comtrade format from a remote location.

An accurate fault locator with compensation for load current and mutual zero sequence impedance for double circuit lines shall be available.

The IED shall be provided with a front mounted human machine interface (HMI) and a galvanic isolated front port for connection of a personal computer.

The HMI shall include LEDs for status indication and at least 15 configurable LEDs for alarm indication.

The IED shall be provided with communication interface for connection to substation automation system and substation monitoring system.

IEC 61850-8-1 and IEC 60870-5-103 communication protocol shall be available. The IED shall meet the IEC 61850 standard in every respect and interoperability with other manufactures IEDs and tools shall be verified.

Binary signal transfer to remote end of at least 60 signals in each direction should be included.

It shall be possible to select different mounting alternatives such as rack, flush or wall mounting.

Depending of the required numbers of I/O modules in the IED shall 1/1 x 19", 3/4 x 19" and 1/2 x 19" cases be available.

Power supply modules from 24 to 250 DC +/- 20 % shall be available.

GPS time synchronization module with GPS receiver used for time synchronization shall be available.

A test switch for mounting in connection with the IED should be available.

One CD-ROM with manuals and Getting started guide shall always be included for each IED.