SAMPLE SPECIFICATIONS

Relion REB500
General specifications

The IED shall support the following communication and time synchronization options:

- IEC 61850-8-1 including GOOSE and client-server MMS communication, with the possibility of changing from Edition 1 to Edition 2 or vice versa
  - MMS communication shall be supported for up to 8 different clients
- IEC 62439-3 parallel redundancy protocol (PRP) with zero second's recovery time in case of communication failure. PRP shall be supported for the engineering tool, MMS, GOOSE, FTP and SNTP services
- IEC 60870-5-103 communication protocol
- The IED shall support IEC 62351-8, and provide a full NERC-CIP level 5 cybersecurity compliance, including:
  - user authority and password management
  - centralized user authority and password management support
  - cybersecurity related logged events (user log-in; log-in unsuccessful; password changes, etc.)
- Time-synchronization through GPS, SNTP, IEC 60870-5-103, IRIG-B, or PPS
- The IED shall have an Ethernet interface for communication with the engineering tool

The IED shall support the following communication interfaces:

- An RJ-45 Ethernet interface on the front LHMI of the IED that can be used to connect the software engineering tool. This port shall also support DHCP standard
- A serial communication interface used for IEC 60870-5-103. This module shall be optical, supporting glass fiber: Optical serial port, type ST

The local HMI of the IED shall meet the following criteria:

- A display capable of providing an interface for monitoring switchgear. The display shall have up to 12 different pages for monitoring and controlling one or several bays, or for customized functionality like displaying measurements
- A back lit HMI to ensure readability in dark conditions
- Navigation buttons, virtual keyboard and configurable command buttons. Command buttons shall be freely configurable for shortcuts in the HMI tree, or for simple commands
- User defined dynamic three-color LEDs for indications and alarms
- Ethernet communication port for commissioning and test purposes
- Access to the various menus through the LMHI shall be password protected
The IED shall be able to display following quantities on the LHMI and on the substation automation system:

- Measured voltages, currents, protection zones

The IED shall have the following monitoring capabilities:

- Disturbance recorder at Central Unit
  - non-volatile memory capable of storing up to 40 disturbance recordings (depending on the selected sample rate and recording time)
  - recording of differential and restraint currents per phase (max. 4) and per bus zone (max 32)
  - 64 binary channels
  - disturbance recorder shall have a post-fault retriggering option
  - recordings shall be stored in the device in COMTRADE format
- Disturbance recorder at bay unit
  - non-volatile memory capable of storing up to 40 disturbance recordings
  - sample rate 2000/4000 Hz (@50 Hz), 2400/4800 Hz (@60 Hz)
  - 32 binary channels
  - disturbance recorder shall have a post-fault retriggering option
  - recordings shall be stored in the device in COMTRADE format
- Event list for 1000 process events and 2048 security events
- Self-supervision with internal event list function. The IED shall be capable of flagging error signals from time synchronization and individual error signals from I/O modules

The IED shall support the following logic functions:

- A substantial number of logic functions available at the bay unit, that are freely configurable and can be combined with the protection, control and monitoring functions inside the IED. These logic functions shall be:
  - starting and tripping logic, with settable pulse time and tripping program (single-phase, double-phase or three-phase), and with testing and simulation capabilities as per IEC 61850-7-1 Ed2
  - basic configuration function blocks, such as AND, OR, XOR, INVERTER, TIMER, flip-flop function blocks

The IED shall be able to support following hardware:

- A test switch in connection with the IED, including a solution for mounting the test switch in the same 19" rack as the IED to ensure a clear station layout
- The hardware configuration of the IED shall be flexible and expandable to allow coverage of all customer applications in a single unit
- Central Unit Rack casing 6U 3/4 x 19"
- Bay Unit Rack casing 6U 1/2 x 19"
- Power supply modules shall support DC voltages ranging from 48 V DC to 125 V DC, or from 110 V DC to 250 V DC / 100 VAC-240 VAC
• Possible connector choices shall be compression type or ring-lug type
• One of the following mounting alternatives shall be available: flush, rack or wall mounting
• Water and dust protection level shall be according to IEC 60529, with at least:
  o front IP40 (IP54 with sealing strip)
  o rear side IP20
• The hardware shall comply to IEC 60255-1
• The manufacturer shall offer 5 years of warranty
• The manufacturer shall ensure that if the IED fails while under warranty, a replacement product shall be shipped from the factory within 48 hours of receiving an order, and without the need to first return the failed IED
• The IED shall be parametrized and configurable using a single software tool. The same tool shall be used for IEC 61850 configuration, monitoring, disturbance recordings withdrawing, troubleshooting and migration of the project file and/or IED configuration to a newer version. The software tool shall be available free of charge

The IED shall be able to support modular and flexible architecture
• Multiple modes of installation
  o centralized layout:
    · installation of bay units and the central unit in one or several cubicles
  o distributed layout:
    · bay units are distributed with short connections to CTs, isolators, circuit breakers, etc.
• Interference-proof connections between bay units and the central unit by fiber-optic cables (max. 2000m)
• Replacement of existing busbar protection schemes without restrictions, e.g., in case of substation extensions
• Easily extensible
• Only one hardware version for
  o settable 1A and 5A rated current inputs
  o nominal frequencies of 50Hz and 60Hz
• A minimum number of spare parts required due to standardization and the low number of varying units