Substation Automation: Feeder Meter Monitoring Using SYNC 2000

Application Note

Application Description

Substation Automation (SA) is a system to enable an electric utility to remotely monitor, control and coordinate the distribution components installed in the substation. Data communication between the control centre and IEDs in remote locations and among the IEDs becomes an important issue to realize the substation automation functions. Various protocols are used for tele-control purpose, but none of them fully support the interoperability among IEDs supplied by different vendors in the substation.

With the emergence of IEC61850 standard, all substation automation is mandated to meet this at bay level for new substation, station level for existing and new substation and process level for substation planned to come up.

Figure 1: Substation Switchgear Panel

New bays and existing bays have power meters communicable over modbus, of which data need to be integrated with SCADA system on IEC61850 bus.

Application Solution

The solution is designed in a decentralized architecture to optimize communication, cabling and to achieve better management of data. Data acquisition units are categorically mapped to different functional and logical points in IEC61850.

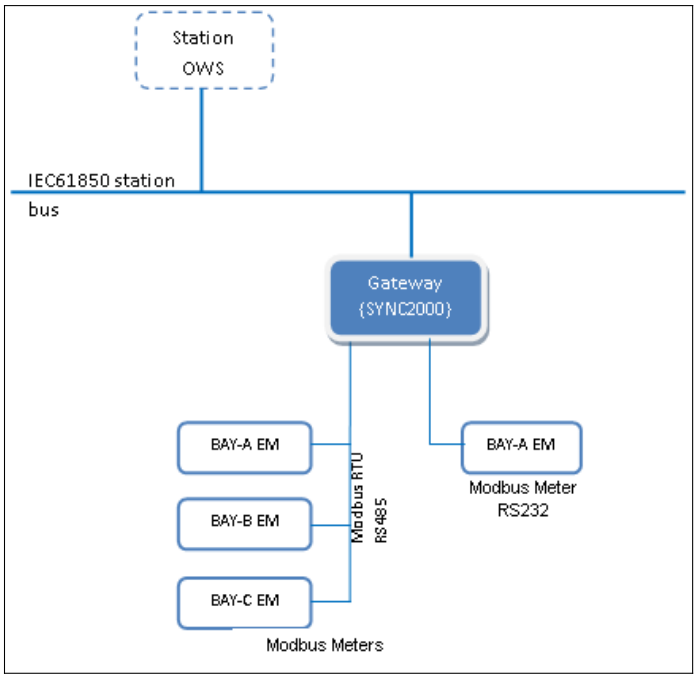

Figure 2: Application Solution

Feeder meters will be present at each feeder bays for measuring voltage, current, frequency and power. These meters will be communicable on Modbus protocol. These meter data also need to be monitored on SCADA through IEC61850 station bus. This requirement is can be easily complied using protocol gateway which can communicate with meter on Modbus, and provide data to SCADA on IEC61850. Protocol gateway can be mounted on a panel and all feeder meter on same voltage level can be connected in single RS485 loop with the gateway. Gateway shall have multiple serial port to connect to meters on multiple voltage level.

Modbus master driver running inside RTU should have capability to communicate on RTU/ASCII format, fetch the data on pre-configured interval and convert it into IEC61850 standard format. RTU acting as a proxy IEC61850 IED shall be able to model each existing IEDs in different logical devices. Status of each device shall also be able to monitor in addition to the real time data server by each IED.

Features

- Configurable RS232/485 interface in gateway
- Parallel connectivity to the end devices for parameterization and disturbance upload
- Fibre Optic Ethernet option
- Wide range of AC and DC power supply helps to use for transmission and distribution substation

Products Used

Products used for transmission substation Automations are:

- SYNC2000 as protocol converter/DCU for serving meter data on IEC61850

Advantages

- Multi master communication capability
- Time synchronization of DCU is done on SNTP protocol
- Time synchronization of meter using Modbus register writing
- IEC 61850-3 Compliant Hardware
- KEMA Certified IEC 61850 Server
- Time stamping from single location