PCS-221
Merging Unit

Merging units are used to sample AC analog values and transmit the sampled values(SV) to protection devices, bay control units(BCU) or electric meters through optical communication channels based on the IEC61850-9-2 protocol.

Functions

- IEC61850-9-2 sampled value transmission

- GOOSE transmission/reception

- GMRP function

- Voltage and current synchronization

- IEC61850-9-2 voltage sampled value reception from a busbar MU

- Voltage transfer

- Data synchronization

Features

- A high performance multi-DSP hardware structure is adopted in this device. Therefore, the device can process real-time data with high speed and high precision.

- Modularized hardware design allows for easy upgrade or maintenance of the device by qualified service technicians.

- Various function optional modules satisfy various scenarios according to the different requirements of each user.

- The adoption of high precision 16 bits A/D converter ensures high precision measurement calculations. Two A/ D converters are integrated in a single AC sample channel, and the sampling rate is 80 samples per fundament wave cycle. The real-time data calculation can be completed within one sampling period.

- A friendly and convenient human machine interface (HMI) display is provided for the user to view the status of the device.

- Various methods of GPS time synchronization are contained in this device. These includeIEEE1588, pulse per second (PPS) and IRIG-B synchronization.

- This device can support several communication protocols, which are adopted in the modern digital substation. For example, IEC61850-9-2LE and IEC61850-8 (GOOSE).

- Perfect event recording function: 128 latest binary bit change reports, and128 latest device self supervision reports.

Digital Substation

Data Synchronization

Input sampling signals, such as three-phase current and voltage, need to be synchronized if the merging unit is connected to several electronic CTs/VTs and electro-magnetic CTs/VTs. This can be solved either by GPS PPS, or by angle adjustment interpolation. The GPS PPS signal can gradually adjust the sampling interval of all intelligent sampling modules through the merging unit to realize synchronous sampling automatically. However, the synchronization accuracy of this method relies on the integrality and the accuracy of GPS PPS.

Any loss of GPS PPS may directly influence the synchronization accuracy. The other way to synchronize the data sampling is using angle adjustment interpolation, which does not rely on the GPS signal, thus has higher reliability. In practice, the mentioned two methods can be used in combination to achieve better accuracy.

Connection to Protection & Control Devices

Merging units and protection & control devices are usually connected through optical fibers based on IEC61850-9-2 protocol. When the IEC61850-9-2 protocol is adopted, it is compatible with both Ethernet communication and point-to-point communication. The point-to-point communication is usually applied to the protection and control devices, which have high requirements on real-time data sampling. The Ethernet network communication can be applied to bay control units and metering devices, which have less requirements on real-time data sampling. In point-to-point communication, it is much easier to use Manchester code than Ethernet technology.

Model	Description	Functions and Features
PCS-221G	Merging unit for transmission line, main transformer application	regular data sampling
PCS-221N	Merging unit for busbar application	regular data sampling
PCS-221C	Merging unit for transmission line, main transformer application	digital data sampling for GIS application
PCS-221D	Merging unit for busbar application	digital data sampling for GIS application
PCS-221E	Merging unit for transmission line, main transformer application	digital data sampling for AIS application