PCS-9799
Station Manager

The PCS-9799 Station Manager is designed for the highest standards of performance, safety and reliability to meet requirements of a complex substation automation system (SAS). As a part of the SAS, it works as a station communication manager, which collects, stores and maps signals of relays, measurement units, control units and other IEDs in the substation to higher-level systems such as control center (CC) and distributed control system (DCS).

The PCS-9799 supports several protocols, such as IEC 61850 Edition 2, IEC 62439-3 PRP and HSR, IEC 60870-5-101/104, IEC 60870-5-103, Modbus and DNP3.0. Data can be transmitted to and received from analog channel, digital channel or network connected to CC, DCS or other system. The direct transmission mode and the device independent avoid any interaction or influence with the substation SCADA (Supervisory Control And Data Acquisition) system.

Furthermore, the PCS-9799 can runs as a data acquisition and logic treatment platform and provides various and flexible advanced function extensions.

The PCS-9799 Station Manager is applicable to:

- Power system
  Conventional substation and digital substation of various voltage levelsNew-build substation SAS implementation and old substation reconstruction or upgrade

- Transport system
  Subway, light-rail and electrified railway system

- Industrial system
  Industrial automation applications: mine, petrochemical industry, metallurgy, etc.
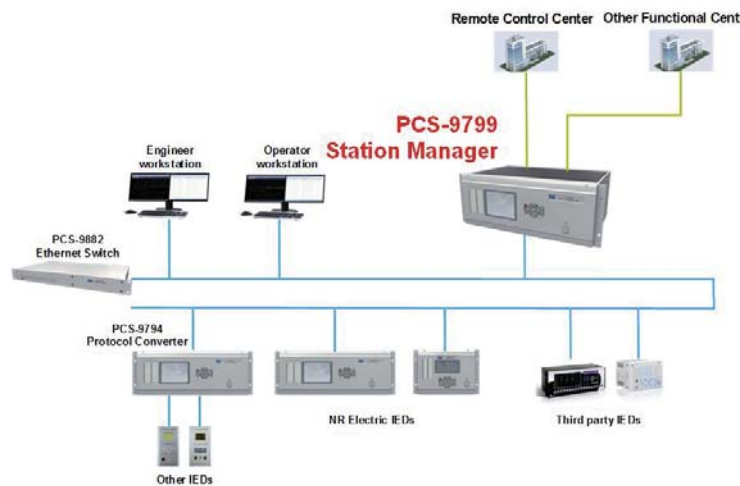
Automation System

Figure 1 Typical application

Functions

- Relay information acquisition
  Through serial or Ethernet port, this device can communicate with protection relays to gather their information such as SOE records, tripping signals, supervision alarms, etc.

- Measurement & control IED information acquisition
  Through serial or Ethernet port, this device can communicate with measurement & control IEDs and intelligent meters to gather their information such as sampled values, binary status, energy metering signals, etc. Meanwhile, control and regulation operation could be done.

- Auxiliary IED information acquisition
  In addition, this device can gather information of other auxiliary devices, such as energy meter, which is useful or crucial for substation.

- Remote control center communication
  This device can realize the communication with multiple remote control centers with different protocols. The mapping transmission tables for different centers can be customized independently.

- Signal synthesis
  The signal synthesis function is supported with the help of the configuration tool PCS-COMM. Logical and mathematic operation of data such as AND, OR, NOT, XOR, +, -, × and ÷ can be proceed for the transmission to remote control center.

- Local binary output
  Several output contacts are equipped with the optional IO module to realize logic output. These outputs are configurable through the auxiliary software.

- Configurable LED indication
  Several LEDs are equipped on the device HMI panel to indicate a binary signal, such as alarm, communication state, switchgear position, etc. Some of them are defined by default while the others are configurable in 3 colors (green, red and yellow) through the auxiliary software.

- Manipulation authority
  All device critical manipulations, such as remote control and setting modification, need a user authority check. The authority password is configurable via local LCD.

- Command record and query
  This device records all the commands and operations, which include control selection, control execution, regulation, setting modification selection, setting modification execution, signal reset, etc. All these records can be viewed and queried with filter.

- History event record
  This device automatically records the events during its service, which include self running state change, alarm from connected IED, communication failure alarm, etc.

- Double device redundancy strategy
  Several device redundancy strategies are supported. The 2 devices are completely electrically independent. Their power supplies, communication ports and programs run independently. The inter-device exchange is realized by electrical and network connection.

- Time synchronization
  This device supports GPS (Global Positioning System) and BDS (BeiDou Navigation Satellite System) timing signal reception.

  This device provides both reception and transmission RS-485 ports for IRIG-B signal in order to synchronize connected IEDs and to unify their clocks in one substation. It supports several time synchronization formats, including IRIG-B, Pulse Per Second (PPS), network SNTP and IEEE1588.

- On-line maintenance and monitoring
  This powerful function enables the engineer to monitor the running status of this device through network, including running information print, message display of Ethernet port and serial port, on-field configuration, database view, virtual measurement, file transmission, remote rebooting, etc. With all these advanced functions, the substation upgrade becomes convenient.

- Self-diagnostic
  During service, the device keeps a full supervision on its software and hardware, once an abnormality is found, the device will be self-blocked to ensure no maloperation is conducted, meanwhile, an alarm will be sent out both digitally and hardware output as alarm. If the device is dual equipped, at this time, if the abnormal device is on-duty then it will not only block itself but also activate the backup device to take over all the tasks to ensure the substation is still running normally. Meanwhile, the storage memory is checked regularly. If the storage memory minimum threshold is reached, legacy data delete strategy will proceed automatically.

- PRP and HSR
  This device supports the Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR) protocol.

Features

- High performance hardware architecture
  - Dual 800MHz CPUs, 2GB RAM, optional 4G micro SD or 128G SSD storage memory for historical data

  - Capable for data management and communication of the SAS for whole substation or power plant

  - CPU usage ≤ 25% during normal service; CPU usage ≤ 50% during massive data treatment

- Communication ports:
  - The 4U 19" chassis supports up to 48 Ethernet ports and 15 serial ports
  - The 4U 9.5" chassis supports up to 12 Ethernet ports and 15 serial ports
  - Support of 2 electrical or optical ports for PRP/HSR communication

- Air cooling architecture is adopted to avoid wearing part and vibration (the use of fan motor).

- Non-rotating storage is adopted to avoid vibration

- A fully closed chassis with a complete panel

- Completely separated spaces for electronic and electrical systems

- Designed with anti-interference measures to enhance the device EMC.

- Flexible installation size
  Two different chassis sizes are supported, 4U 19" (large space occupation and more modules for configuration) and 4U 9.5" (small space occupation and less but flexible module configuration), to adapt to different installation requirement.

- Power supply redundancy
  Dual power supply module is an option. The extra power supply module will be placed at the other side of the device rack and works independently.

- Real-time database
  - The database is compatible with data model IEC 61850 and IEC 103
  - Support of multiple models including primary/secondary equipment model, association model, primary schematic diagram model, etc.
  - Full modeling view and data information
  - Unified data acquisition and transmission

- History database
  - Embedded history database

- Optional capacity: 4GB micro SD or 64GB SSD (Solid State Drive)
- Multiple data storage types including historical SOE records, operation reports, wave files, etc.

- Multiple communication protocol support
  - Standard package
    - For server: IEC 60870-5-101/104, DNP, Modbus
    - For client: IEC 60870-5-103, DNP, Modbus
  - Advanced package
    - IEC 61850 Ed1 server & client
    - IEC 61850 Ed2 server & client
    - IEC 61850 client with IEC 62351
  - Customized package
    - Other customized protocol

- Real-time data transmission
  Internal SOE transmission delay <100ms

- Response to control centre
  The response success rate from device to control centre ≥ 99%

- Unified substation model transmission
  - The data model transmission between substation and control center is realized by using the SCD file.
  - Support of most international standard protocols including IEC 60870-5-101/104, IEC 60870-5-103, IEC 61850, etc.

- Powerful auxiliary configuration tool
  - Highly integrated configuration functions
  - Full substation configuration support including project implementation, running, maintenance, analysis, diagnostic and debugging.

- System scale
  - Up to 300 IEDs
  - Up to 16 control centers
  - Database supports max. 200,000 signals

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