
# PCS-9656

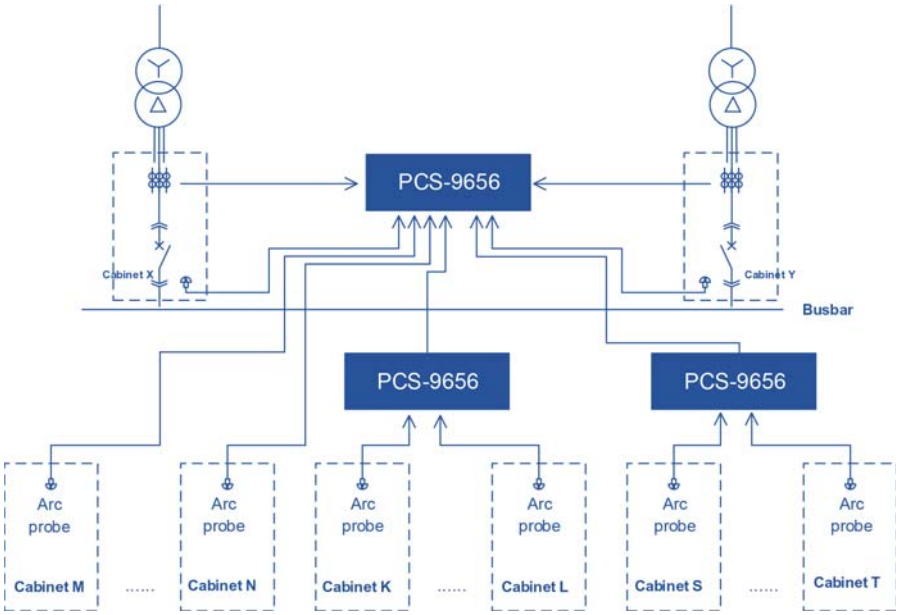
## Arc Flash Relay

The PCS-9656 relay provides a fast busbar protection in substations, power plants and industrial enterprises. In case of short circuit faults in switchgear, the arc faults in the protected area which is covered by arc sensors can be quickly cleared via arc protection, avoiding harm to personnel and assets. The arc protection uses arc sensors to detect the arc light caused by short circuit faults.

PCS-9656 relay can acquire the incoming line currents and arc flash signals via localized arc sensors to reliably discriminate the arc faults. Up to 4 group of current inputs (one group contains A,B,C phases current) can be integrated in one unit. It integrates the protection calculation, tripping output, event recording, and human-machine interaction etc. This device can be installed in a protection panel or local switchgear.

Arc sensor is locally installed in appropriate points in the case of the cubicles inside of the switchgear, to transmit arc signals to arc protection, which will perform optic-electric conversion. The optical signal transmission between sensors and arc protection can avoid electromagnetic interference and improve reliability during transmission.






**Functional Block Diagram**

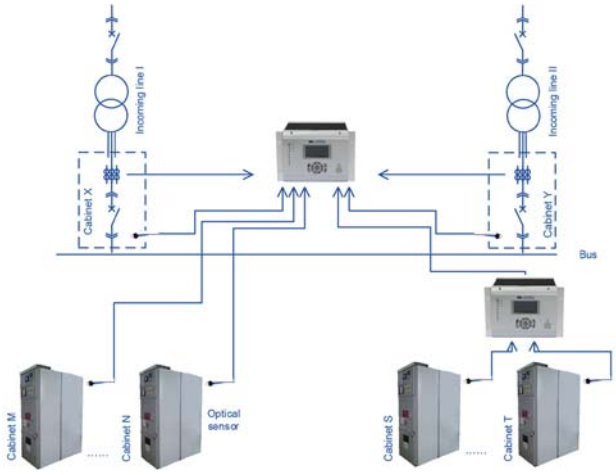



**Figure 1. PCS-9656 in single busbar application**

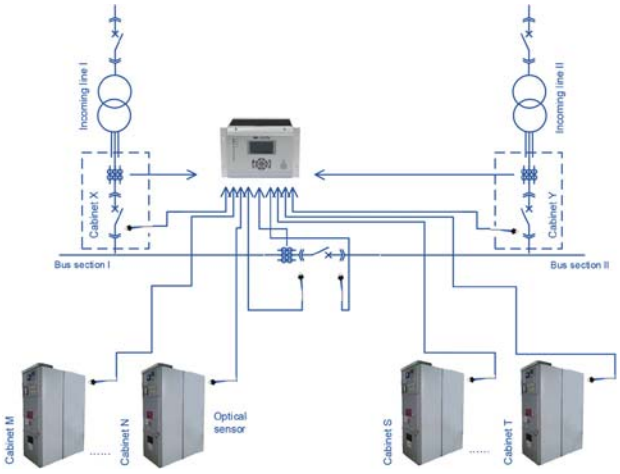



**Figure 2. PCS-9656 in single busbar with serction, up to 24 sensors**

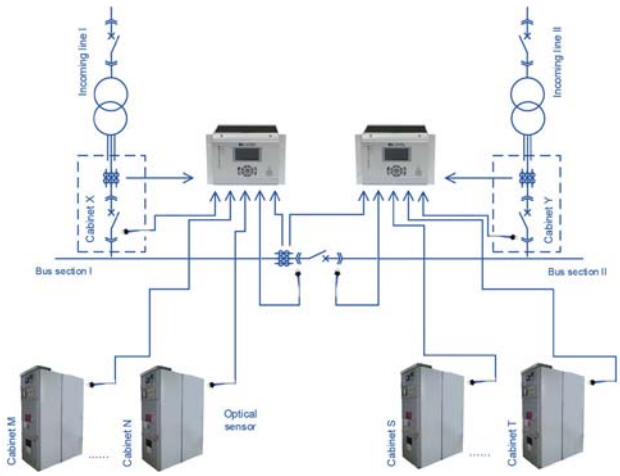



**Figure 3. PCS-9656 in single busbar with serction, over 24 sensors**

# Typical Applications

PCS-9656 relay employs the modular structure and supports up to 64 arc sensors in one main unit. The modular structure makes the on-site replacement much easier. Up to 12 current inputs are provided in one unit for incoming lines. Flexible hardware configuration based on modular structure can be tailored according to specific site requirements.

Single-unit or multi-unit arc protections are supported by PCS-9656 relays. Single-unit protection can provide up to 24 arc sensors, as well multi-unit protection can provide over 24 sensors. Series connection of several units can be performed to realize the protection with 24+ arc sensors, implementing multi-unit arc protection. Up to 3 point-to-point optical ports are provided in one unit for series connections among the units.

Typical applications are as follows:

- Single Busbar
- The single-unit or multi-unit of PCS-9656 can be chosen according to the number of bay units.
- Single Busbar with Section, no more than 24 Sensors
- Single Busbar with Section, Over 24 Sensors

# Functions

## Protections

- Arc Protection
- Breaker Failure Protection for up to 6 breakers (50BF)

## Monitoring

- Arc intensity supervision
- CT failure supervision
- Transfer/Receive module supervision
- Self-Diagnostic

## Measurement

- Phase current: Ia, Ib, Ic
- Sequence current: positive/negative/zero sequence current (I1, I2, I0)
- Phase angle: Ia^Ib, Ib^Ic, Ic^Ia

## Recording

- 64 trip reports
- 1024 self-diagnostic reports
- 1024 logging reports
- 1024 SOE
- 64 fault records with oscillograms compatible with COMTRADE

### Communication

- Up to four (4) Ethernet ports for automation (Optional)
- Two (2) RS-485 serial ports for automation
- One (1) faceplate RJ-45 port for commissioning
- Complying with IEC 61850-8-1 MMS, IEC 60870-5-103 and DNP 3.0

## Features

- The innovative technology of Deviation of Power Frequency Component (DPFC) is adopted in this relay. The current criteria based on DPFC technology utilize the change-of-current to realize the fast detection of faults.
- The relay provides both single-criteria (arc) and dual-criteria (current and arc) to guarantee fast and reliable operation. When dual-criteria is enabled, the typical operation time (including output relay time) is less than 10ms.
- The passive optic sensor, based on photometry cosine principle, realizes the analog optic signal transmission and has a strong immunity against interference.
- Arc sensor continuously monitors ambient light intensity during normal service state. This device will continuously track ambient light, and automatically change operating threshold.
- Fault locator function is provided in this relay. Fault position and fault information can be displayed on the LCD screen.
- Tripping outputs adopt high-speed contacts using combined IGBT and output relay, the delay time of output contacts is less than 1ms. As well, the conventional output contacts can be supplied according to customer specifications.
- The tripping outputs can be configured via tripping matrix to set different tripping zones. The relay can trip different zones sequentially in order to minimize the outage area.
- Up to six breaker failure protections (50BF) are integrated in this relay. Two criteria can be selected for breaker failure protection: one is circuit breaker position; the other is both circuit breaker position and feeder currents.
- Clock synchronization supports pulse per second, SNTP and IRIG-B.
- Continuous self-diagnostics is integrated in this relay, including hardware/software self-diagnostic, communication monitoring and arc sensor connection monitoring.
- Up to four 100Mbps Ethernet ports or two RS-485 serial ports are provided for SCADA communication, complying with IEC 61850-8-1 MMS, IEC 60870-5-103 and DNP 3.0
- Simulation outputs without current/voltage injection are provided to make on-site maintenance easier.
- Up to 64 trip reports, 1024 self-diagnostic reports,1024 logging reports and 1024 SOE are provided.
- Up to 64 fault oscillograms compatible with COMTRADE format are provided, each oscillogram includes AC quantities, Binary Inputs/Outputs and arc intensity.