PCS-9641

Motor Relay

The PCS-9641 relay is a protection, control and monitoring unit for various kinds of motors on solidly grounded, impedance grounded, Peterson coil grounded and ungrounded system. The PCS-9641 features high performance functional library, programmable logic, configurable I/O and integrated frequencytracking.

This relay is designed based on advanced multiprocessor platform, fully complying with IEC 61850 station bus & process bus, supporting IEC 61850-8-1 MMS and GOOSE.

Functions

Protection and Control

- Current differential protection. (87M)
  The current differential protection is for fast clearing of statorphase faults. Advanced CT saturation detection algorithms are incorporated for increased security during heavy faults.

- Overcurrent protection. (67P, 50P/51P)
  Phase overcurrent protection can be controlled by voltage

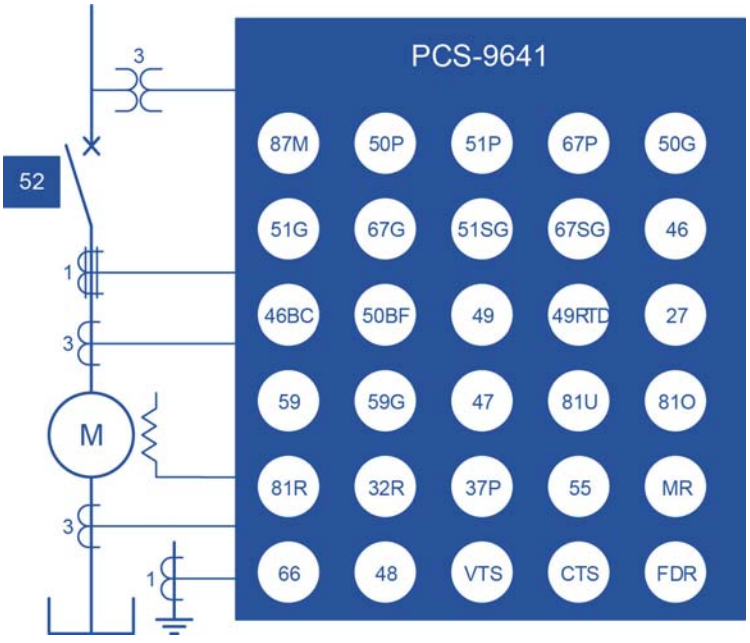

Figure 1 PCS-9641 Functional Block Diagram

control element, directional element and harmonic blocking element. IDMT curves complying with IEC and ANSI standard are provided.

- Neutral/ground overcurrent protection. (67G, 50/51G)
  Up to two groups of neutral (ground) overcurrent protections are provided. It can be controlled by directional element. IDMT curves complying with IEC and ANSI standard are provided.
- Sensitive earth fault protection. (67SG/51SG)
  The sensitive earth fault protection can be controlled by directional element. IDMT curves complying with IEC and ANSI is provided.
- Negative sequence overcurrent protection. (46)
  The negative sequence overcurrent protection reflects the unbalance current when asymmetrical fault occurs.
- Broken conductor detection. (46BC)
  The ratio of negative-sequence current to positive-sequence current (I2/I1) is used to detect the broken conductor.
- Breaker failure protection. (50BF)
  The relay will initiate re-tripping and adjacent breaker tripping during breaker failure. Four logics based on the phase current and the circuit breaker state is selectable.
- Undercurrent protection. (37)
  The undercurrent protection is for monitoring a motor.
- Undervoltage protection and Over voltage protection. (27/59)
  The voltage input can select either phase voltage or phaseto-phase voltage. VT failure blocking is integrated in this protection.
- Zero sequence overvoltage protection. (59G)
  Zero sequence voltage could be set as external voltage injection or internal calculated voltage.
- Negative sequence overvoltage protection. (47)
  Negative sequence overvoltage protection could be used to detect the unbalanced situation.
- Thermal overload element. (49)
  This relay provides a thermal overload model using the RMS value of current.
- RTD temperature protection. (RTD)
  The relay RTD option provides 6 programmable RTD inputs that are used for monitoring the stator, bearing and the ambient temperatures, every RTD input can be used for tripping output or alarm output.
- Under-frequency protection, overfrequency protection and rate-of-change of frequency (81U/O/R)
  The rate-of-change of frequency could be set as increasing or decreasing via the setting, as well as the duration used for rate-of-change calculation is settable.
- Reverse power protection. (32R)
  The reverse power protection is useful to detect conditions where the motor can become a generator.
- Under power protection. (37P)
  The under power protection feature provides for sensitive detection of a loss of load condition.
- Power factor protection (Out-of-step protection). (55)
  The power factor protection is used in synchronous motors applications to detect out-of-synchronism conditions.
- Restart inhibit for starts per time interval. (66)
  The restart inhibit function prevents restarting of a motor when the motor is too hot and does not have a sufficient amount of thermal capacity available. Not allowing a restart without being tripped offline.
- Starting-time supervision. (48)
  The motor startup-time supervision function protects against excessive starting time and locked rotor conditions of motors during startup.
- Remote and local tripping/closing of breaker.
  The breaker tripping/closing can be implemented remotely or locally.
- Voltage and current drift auto adjustment.
  The relay will continually and automatically trace the voltage and current drift and adjust the zero point to a normal value.
- Frequency tracking.
  Frequency tracking is integrated to accommodate the frequency shift in the power system.

Monitoring and Metering

- Metering of current, voltage, active power, reactive power,
- power factor, energy, frequency,.
- Circuit breaker monitoring.
- CT failure supervision.
- VT failure supervision.
- Tripping circuit supervision.
- Self diagnostic.
- Fault Recorder: 64 fault and disturbance records, and 8
- motor startup wave records.
- Total 1024 SOE, including tripping, alarm, binary input
- change and human operation reports.
- 8 motor startup reports, 64 protection operation reports, 1024
- supervision alarm records, 1024 control operation records, 1024 user operation records.

Communications

- Up to four 10Base-T/100Base-TX (RJ45) ports or two
- 100Base-FX ports with IEC 61850-8-1 MMS and GOOSE for non-time-critical message, IEC 60870-5-103 over TCP/IP or DNP 3.0
- Two RS-485 rear ports with IEC 60870-5-103, MODBUS
- Up to Six 100Base-FX ports with IEC 61850-9-2 Sampling Value and GOOSE for time-critical message
- One RS-485 rear port for clock synchronization
- One RS-232 rear port for printer
- 1 faceplate RJ45 port for testing and setting
- Clock synchronization via pulse per second(PPS), IRIG-B and SNTP

Features

- Modularized hardware design enables an easy upgrade and repair. Various optional function modules can satisfy various situations according to the different requirements of users.
- This device can sample the analog values from the conventional CT/VT, or receive the sampled values from electronic CT/VT via the merging unit.
- Overcurrent protection can be controlled by directional protection, and voltage control element.
- The relay provides optional RTD input module and DC mA input module for temperature detection.
- This device has powerful GOOSE functions, and the connection and cooperation between some devices can be realized without using electrical cables, to facilitate such functions as simple bus differential protection, overload interlock shedding function and backup automatic transfer function etc.
- This device has fully realized the technology to integrate six functions into one device: protection, measurement, control, remote signaling, merging unit function and remote module functions, to improve the reliability.
- This device can communicate with a SAS or RTU via different communication intermediates: Ethernet network, RS-485 serial ports. The communication protocol of this device is optional: IEC61850, IEC60870-5-103, DNP3.0 or MODBUS.
- This relay can detect the tripping circuit of the circuit breaker and monitor the operation (close or trip) time of a circuit breaker by checking the auxiliary contacts of the circuit breaker.
- Powerful fault and disturbance recording function is supported: 8 latest motor startup wave records, 64 latest fault or disturbance waves, the duration of a wave recording is configurable.
- Various methods of GPS time synchronization are supported in this relay, including SNTP, pulse per second (PPS) and IRIG-B synchronization.