SECTION 26 10 00
MEDIUM-VOLTAGE PROTECTIVE RELAY
[MULTIFUNCTION OVERURRENT PROTECTION – 7SJ63/64]

PART 1 - GENERAL

1.1 SCOPE

A. This section defines medium voltage protective relays for use in multifunction overcurrent protection.

1.2 ***[RELATED DOCUMENTS***

A. ***Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.***
   1. ***[Related Sections include the following:***
      a. ***Section 26 13 13 – Medium Voltage Circuit Breaker Switchgear]***

1.3 SUBMITTALS

A. Provide product information prior to fabrication and installation. Product data shall include all dimensions, electrical ratings and maintenance data (if applicable).

B. Submit shop drawings and product data for approval and final documentation in the quantities listed according to the Conditions of the Contract. Customer name, customer location and customer order number shall identify all transmittals.

C. ***[Final Documents: Record documentation to include wiring diagrams, instruction and installation manuals [and certified test reports]].***

1.4 RELATED STANDARDS

A. Comply with requirements of latest revisions of applicable industry standards.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of this equipment shall have a minimum of 5 years experience producing similar electrical equipment.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from potential damage from weather and construction operations. If the relays are installed in equipment, store the equipment so condensation will not form on or in it. If necessary, apply temporary heat where required to obtain suitable service conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ***[The SIPROTEC protective relay shall be type 7SJ63/64 by Siemens or pre-approved equal. Approved manufacturers are as follows:***
   1. ***SIEMENS Energy***
   2. ***.]***

2.2 PROTECTIVE RELAYS

A. The relays shall include the following functions and features:
   1. The relay(s) shall include the following ANSI protection functions: 50/51, 50N/51N, 67/67N, 27, 59, 27R, 59R, 81O/U, 25, 51V, 46, 67, 67Ns. In addition, it shall offer undervoltage controlled reactive power protection (Q>/U<), and intermittent ground fault protection.

2. The relay shall provide trip circuit supervision of the main circuit breaker, and alarm on circuit failure.
3. The relay shall provide monitoring of the CT and VT circuits, and alarm on circuit failure.
4. The relay shall provide demand alarms, VAr alarms, and power factor alarms.
5. The relay shall provide complete metering including amps, volts, watts, VArs, kWhr, power factor, frequency, with demand and min/max information for all current and power quantities.
6. The relays shall provide a graphic mimic display visually indicating the position (open/closed) of the circuit breaker, protection function trip, and metering data. Display shall be curser selectable for ten pages.
7. The relay shall provide four programmable function keys to replace toggle switches. The relays shall provide 14 (fourteen) user-programmable target LED's and 2 (two) diagnostic alarm LED's.
8. The relay shall provide key locking to prevent unauthorized tripping either local or remote.
9. The relay shall have front access to circuit boards packaged in a flush mounted case with removable front cover
10. The relays shall be capable of internally performing main-tie-main auto-transfer and auto-restore functions.
11. The relays shall have programmable logic capabilities to permit use in protection and control systems. Programming software must be compliant with IEC 1131 standard for PLC programming.
12. The relays shall have a modular communications processor to permit field change between ModbusRTU, Profibus-DP, Profibus-FMS, DNP3.0, IEC60870-5-103 and ***[IEC 61850] [IEC61850 + Profinet] [IEC61850 + DNP3 TCP]*** protocols. The relay must be able to support either RS-485, RJ45 or fiber optic communications.
13. The relays shall provide IRIG-B time synchronization for sequence-of-events recording time stamping.
14. The relays shall provide complete sequence-of-events recording, time stamped in milliseconds. The relays shall provide oscillography (waveform) capture, with configurable pre- and post-fault data capture times.
15. The relays shall recognize and alarm CT open-circuit or short-circuit conditions.
16. The relay shall provide user Programmable Binary Inputs. Each binary input shall have two pick up voltage levels (19VDC and 88VDC) that can be independently adjusted through jumper position on the relay board.
17. The relay binary inputs shall be provided with chatter blocking and filter time. The chatter blocking effectively blocks a binary input indication and prevents the generation of indications when the signal cannot be interpreted. The filter time indicates how long a signal must be present before it is interpreted as an indication. This serves to suppress short, intermittent changes. These two features shall be available and settable separately for each binary input indication.
18. The relay shall provide user Programmable Binary Output and LED's. Each LED or Binary output indication shall be settable either latched or unlatched.
19. The relay shall be configured through Windows based software.
20. Logging of system & protective events, last 200 events (accessible via front RS-232 communications port, and rear service communications port)
21. Log of last 8 faults (max. 5 sec record time) - containing date & time stamps, pickup & tripping signals, interrupted amps, voltage, etc.
22. Logging of per-phase interrupted amperes for the last fault
23. The relay shall provide 4 setting groups. Setting group changes shall be available locally through frontal function key and binary input; remotely through operator or service communication interface using a personal computer and via system interface (Profibus, Modbus, etc)

2.3 SOFTWARE/DATA INFORMATION

A. Requirements

1. The relay shall be configured through Windows based software current up to Windows 10.
2. The relays shall provide complete sequence-of-events recording, time stamped in milliseconds under all conditions. The relays shall provide oscillography (waveform) capture, with configurable pre- and post-fault data capture times. All internally and externally generated binary values will be configurable to appear in the custom generated fault. Information containing time, date, interrupted amps per phase, time in pickup, trip open, close or user programmed status points, etc. shall be displayed
3. Logging of system & protective events, last 200 events (accessible via front RS-232 communications port, and rear service communications port used to connect to a personnel computer having an RS232 port or USB via conversion)
4. Log of last 8 faults (max. 5 second record time) - containing date & time stamps, pickup & tripping signals, interrupted amps, voltage, etc. The analog quantities displayed in the oscillography shall have the option for viewing in either primary or secondary quantities.
5. Fault records shall be in the industry standard Comtrade format and can be imported or exported.
6. The relay shall provide 4 setting groups. Setting group changes shall be available locally through frontal function key and binary input; remotely through operator or service communication interface using a personal computer and via system interface ***[IEC 61850] [IEC61850 + Profinet] [IEC61850 + DNP3 TCP].***
7. All logging settings, annunciations, fault records, Binary I/O and LED assignments must have easy to print options and easy file transfer capabilities.
8. Relay software will have feature for archiving or retrieving an entire project that includes all subfolders and relay files in one simple to use feature.
9. A measurement supervision feature shall be providing for monitoring external current and voltage transformers connected to the relay.
10. The software must have the capability of entering the settings in both primary and secondary quantities.
11. The current transformer polarities can be reversed using a setting in the software when it becomes necessary.
12. The software shall include a commissioning tool for all hardware (BI/BO/LEDs) and Scada mapped points.
13. The software must be compatible with earlier version relay firmware releases.
14. The software shall have a capability where an IP address can be assigned to the relay allowing for a web browser commissioning tool feature to view relay information online.
15. Software shall include a logic editor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The relay shall be installed at the factory by a manufacturer's trained employee.

B. Additional connections to relay, where applicable, shall be done in the field by ***[the manufacturer's start-up service group] [the installing contractor]***.

3.2 ADJUSTING AND CLEANING

A. The relay(s) shall be adjusted in the field by ***[the manufacturer's start-up service group] [the installing contractor]*** to the setting provided by the responsible project engineer.

B. Clean exposed surfaces using manufacturer recommended materials and methods.

3.3 TESTING

A. Test of protection functions shall be possible while relay is in service.

3.4 WARRANTY

A. Equipment manufacturer warrants that all goods supplied are free of non-conformities in workmanship and materials for six years from date of shipment.

3.5 ***[STARTUP SERVICES]***

A. ***Engage a factory authorized service representative to perform startup service.***

B. ***Train Owner's maintenance personnel on procedures and schedules for energizing and de-energizing, troubleshooting, servicing and maintaining equipment and schedules.***

C. ***Verify that switchgear is installed and connected according to the Contract Documents.***

D. ***Verify that electrical control wiring installation complies with manufacturer's submittal by means of point-to-point continuity testing. Verify that wiring installation complies with requirements in Division [26] [16] Sections.***

E. ***Complete installation and startup check list according to manufacturer's written instructions.]***

END OF SECTION