

SECTION 26 09 13
POWER MEASUREMENT AND CONTROL

PART 1 GENERAL

1.01 REFERENCES

- A. This section covers power quality meters for Government use. For utility metering requirements, refer to local utility service manual.
- B. The following is a list of standards which may be referenced in this section:
 - 1. American National Standards Institute (ANSI).
 - 2. Institute for Electrical and Electronics Engineers, Inc. (IEEE):
 - a. C37.90, Standard for Relays and Relay Systems Associated with Electric Power Apparatus.
 - b. C37.90.1, Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.
 - c. C57.13, Standard Requirements for Instrument Transformers.
 - 3. International Electrotechnical Commission (IEC):
 - a. 60255-26, Measuring Relays and Protection Equipment—Part 26: Electromagnetic Compatibility Requirements.
 - b. 60870-5-104, Telecontrol Equipment and Systems—Part 5-104: Transmission Protocols—Network Access for IEC 60870-5-101 Using Standard Transport Profiles.
 - c. 61850, Communication Networks and Systems for Power Utility Automation.
 - 4. National Electrical Manufacturers Association (NEMA):
 - a. C12.1, Electric Meters Code for Electricity Metering.
 - b. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
 - 5. Telecommunications Industry Association (TIA):
 - a. 232-F, Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange.
 - b. 485-A, Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems.

1.02 DEFINITIONS

- A. CT: Current Transformer.
- B. DNP: Distributed Network Protocol.
- C. LCD: Liquid Crystal Display.

- D. LED: Light Emitting Diode.
- E. MPR: Motor Protection Relay.
- F. PLC: Programmable Logic Controller.
- G. PT: Potential Transformer.

1.03 SUBMITTALS

A. Action Submittals:

1. Instruction manuals for each type of device.
2. Special features, licensed programming software.
3. Potential and current schematic diagrams.
4. Control and metering schematic diagrams.
5. Interconnection wiring diagrams.
6. Installation and mounting requirements.
7. Complete descriptive literature and renewal parts data.
8. Complete list of Input/Output points to be communicated over Ethernet IP to the Plant PLC. The list shall include the point tags, descriptors, and the software addresses.

B. Informational Submittals:

1. Programming software used to configure devices, along with settings files necessary to reload or revise settings as left by Contractor.
2. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.

PART 2 PRODUCTS

2.01 DIGITAL POWER MONITOR (DPM)

A. Physical Characteristics:

1. Solid state device with LED or LCD displays
2. Panel-mounted.

B. Functional Characteristics:

1. Programmable current and potential transformer ratios.
2. Programmable limits to activate up to four alarms.
3. Selectable Voltage Measurements: Line-to-line or line-to-neutral and wye or delta.
4. Ethernet communications.

5. Display:
 - a. Volts, three-phase.
 - b. Amperes, three-phase.
 - c. Kilowatts.
 - d. Kilowatt hours.
 - e. Frequency.
 - f. Harmonics.
 - g. Power factor.
 - h. kW Demand with programmable period intervals.
 - i. kVA.
 - j. kVAR.
 - k. kVARh.
6. Communications: Ethernet/IP communications network capable, to transmit all of the values listed the section above to the Plant PLC.

C. Performance Characteristics:

1. Direct voltage input up to 600V ac.
2. Current input via current transformer with 5-ampere secondary.
3. Power Supply Voltage Rating: 95V ac to 135V ac.
4. Measurement Accuracy: Within 0.5 percent.

2.02 CURRENT TRANSFORMER (CT), 600 VOLTS AND BELOW

A. Physical Characteristics:

1. Type: Molded bar or donut.
2. Shorting type terminal boards for current transformer leads.

B. Functional Characteristics: None.

C. Performance Characteristics:

1. Accuracy: 0.6 percent for metering.

2.03 VOLTAGE TRANSFORMER (VT), 600 VOLTS AND BELOW:

A. Physical Characteristics:

1. Type: Molded.
2. Primary Fuses: Two, current-limiting.
3. Secondary Fuses: One, current-limiting.

B. Functional Characteristics: None.

C. Performance Characteristics:

1. Accuracy Classification: 0.3 at burden imposed by meters and instruments.

2.04 TEST SWITCH MODULE

A. Physical Characteristics:

1. Mounted through enclosure door.
2. Switch cover for protection against dust intrusion.
3. Finger-safe.

B. Functional Characteristics:

1. Multipole switch bank for instrument transformer testing.
 - a. Allows current injection for each phase.
 - b. CT inputs short when current switches are open.
 - c. Ability to visually isolate (open) trip relay output circuits.
2. Ratings:
 - a. 600V.
 - b. 30A.
3. Conforms to requirements of IEEE C37.90.

C. Performance Characteristics: None.

PART 3 EXECUTION

3.01 INSTALLATION

- A. In accordance with manufacturer's written instructions.
- B. As defined in Section 26 08 00, Commissioning of Electrical Systems.

3.02 MANUFACTURER'S SERVICES

A. Manufacturer's Representative:

1. Present at distribution equipment factory, Site, and classroom designated by Contracting Officer, for the minimum person-days listed below, travel time excluded:
 - a. 1/2 person-day to enter, confirm, and assist in testing protective relay settings and communications configuration at the distribution equipment. Device settings to be based on values generated in the device coordination study.
 - b. 1/2 person-day for initial energization and start-up of distribution system equipment.

- c. 1 person-day for post-startup training of Government's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by the Contracting Officer.
- B. See Section 01 79 00, Demonstration and Training, and Section 01 91 14, Equipment Testing and Facility Startup.

END OF SECTION

