

SECTION 26 26 00
POWER DISTRIBUTION UNITS FOR STATIC UNINTERRUPTIBLE POWER SYSTEMS

SPEC WRITER NOTE: Delete between //----//
 if not applicable to project. Also,
 delete any other item or paragraph not
 applicable to the section and renumber
 the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, connection, and testing of power distribution units for transforming and distributing electrical power from a static uninterruptible power supply (UPS).

1.2 RELATED WORK

- //A. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Requirements for seismic restraint for nonstructural components.//
- B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.
- C. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Low-voltage conductors.
- D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible fault currents.
- E. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits.
- F. Section 26 33 53, STATIC UNINTERRUPTIBLE POWER SUPPLY: Power source for power distribution units.

1.3 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 FACTORY TESTS

- A. Factory Tests shall be required.
- B. Factory Tests shall be in accordance with Paragraph, MANUFACTURED PRODUCTS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and in accordance with UL and ANSI.

1.5 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:

1. Shop Drawings:

- a. Submit sufficient information to demonstrate compliance with drawings and specifications.
- b. Include electrical ratings, dimensions, mounting details, materials, required clearances, terminations, weight, temperature rise, wiring and connection diagrams, plan, front, side, and rear elevations, accessories, and device nameplate data.

SPEC WRITER NOTE: Include the following paragraph for projects in seismic areas of moderate-high, high and very high seismicities as listed in Table 4 of VA Handbook H-18-8, Seismic Design Requirements. Coordinate with the structural engineer.

//c. Certification from the manufacturer that representative power distribution units have been seismically tested to International Building Code requirements. Certification shall be based upon simulated seismic forces on a shake table or by analytical methods, but not by experience data or other methods.//

2. Manuals:

- a. Submit, simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering replacement parts.
 - 1) Schematic signal and control diagrams, with all terminals identified, matching terminal identification in the power distribution units.
 - 2) Include information for testing, repair, troubleshooting, assembly, disassembly, and factory recommended/required periodic maintenance procedures and frequency.
- b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

3. Certifications: Two weeks prior to final inspection, submit the following.

- a. Certification by the manufacturer that the power distribution units conform to the requirements of the drawings and specifications.

- b. Certification by the Contractor that the power distribution units have been properly installed, adjusted, and tested.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. International Code Council (ICC):
IBC-15.....International Building Code
- C. National Fire Protection Association (NFPA):
70-17.....National Electrical Code (NEC)
- D. National Electrical Manufacturers Association (NEMA):
PB 1-11.....Panelboards
250-14.....Enclosures for Electrical Equipment (1,000V
Maximum)
- E. Underwriters Laboratories, Inc. (UL):
50-15.....Enclosures for Electrical Equipment
67-09.....Panelboards
489-16.....Molded Case Circuit Breakers and Circuit
Breaker Enclosures
1561-11.....Dry-Type General Purpose and Power Transformers

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide the following components:
1. Input circuit breaker.
 2. Isolation transformer.
 3. Surge Protective Devices (SPD).
 4. Output panelboard(s).
 5. Alarm, monitoring, and control system.
- B. Power distribution unit ratings, including transformer kVA, primary and secondary voltage, and primary and secondary circuit breaker amperage shall be as shown on the drawings.

2.2 INPUT CIRCUIT BREAKER

- A. 3-pole, shunt-tripped, //thermal-magnetic// //electronic-trip //circuit breaker, rated for indicated interrupting capacity and 125 percent of input current.
- //1. Dual-input power distribution units:

- a. Two input circuit breakers arranged to provide transfer between two input sources.
- b. Controls and interfaces to allow both open- and closed-transition transfer between two input sources.//

2.3 ISOLATION TRANSFORMER

- A. Dry-type, electrostatically shielded, three-phase, common-core, convection-air-cooled isolation transformer.
 - 1. Comply with UL 1561.
 - 2. Cores: Grain-oriented, non-aging silicon steel, one leg per phase.
 - 3. Coil Material and Insulation: Copper windings with a 220 deg C insulation class.
 - 4. Temperature Rise: Designed for 80 deg C rise above 40 deg C ambient.
 - 5. Output Impedance: 3.5 plus or minus 0.5 percent.
 - 6. K-factor: //K1// //K13// //K20//.
 - 7. Taps: 6 full-capacity compensation taps at 2.5 percent increments; 2 above and 4 below nominal voltage.
 - 8. Full-Load Efficiency: Minimum 96 percent at rated load.
 - 9. Electrostatic Shielding: Independently shield each winding with a double-copper, electrostatic shield arranged to minimize interwinding capacitance.
 - 10. Neutral Rating: 200% rated neutral.

2.4 SURGE PROTECTIVE DEVICE (SPD)

- A. Integrated SPD system shall be in accordance with Section 26 43 13, SURGE PROTECTIVE DEVICES.

2.5 OUTPUT PANELBOARD(S)

- A. Quantity of panelboards shall be as shown on drawings. Mount panelboards behind flush doors. Include the following features for each panelboard:
 - 1. Construction: 42 pole, 208/120 V, 3 phase, 4 wire; capable of accepting branch circuit breakers rated to 100 A.
 - 2. Bus Rating: 225 A, with main circuit breaker.
 - 3. Phase, Neutral and Ground Buses: Copper, with 200% neutral bus.
 - 4. Branch Circuit Breakers: Bolt on.
 - 5. Cable Racks: Removable and arranged for supporting and routing cables for panelboard entrance.
 - 6. Access Panels: Arranged so additional branch-circuit wiring can be installed and connected in the future.

2.6 POWER DISTRIBUTION UNIT CONTROLS

- A. Include the following control features:
1. Emergency power-off (EPO) switch integral with power distribution unit.
 2. Emergency power-off (EPO) input terminals for connection to remote EPO switches.
 3. Sensors, alarms, and automatic unit shutdown for the following conditions:
 - a. High temperature.
 - b. High and low input or output voltage.
 - c. Phase loss.
 - d. Ground fault.
 - e. Reverse phase rotation.
 4. Alarm Contacts: Electrically isolated, Form C (one normally open and one normally closed), summary alarm; contact set shall change state if any monitored function goes into alarm mode.
 5. Auxiliary Control Outputs: As shown on drawings.

2.7 MONITORING, STATUS, AND ALARM ANNUNCIATION

- A. Electronic monitoring, status, and alarm annunciation panel mounted flush in front of power distribution unit to provide status display and failure-indicating interface for the following:
1. Power Monitoring:
 - a. kWh.
 - b. kW, phase A, B, C, total.
 - c. kW demand.
 - d. kVAR, phase A, B, C, total.
 - e. kVA, phase A, B, C, total.
 - f. kVA demand.
 - g. Power factor.
 - h. Voltage, L-L, average of three phases, phases A-B, B-C, A-C.
 - i. Voltage, L-N, average of three phases, phases A-N, B-N, A-N.
 - j. Current, average of three phases, phases A, B, C.
 - k. Frequency.
 2. Status Indication: Unit on.
 3. Alarm Annunciation:
 - a. High temperature.
 - b. High and low input voltage.
 - c. High and low output voltage.

- d. Phase loss.
 - e. Ground fault.
 - f. Frequency.
 - g. Phase rotation.
 - h. TVSS module failure.
4. Audible Alarm and Silencing Switch: Alarm sounds when alarm indication occurs. Silencing switch shall silence audible alarm but leave visual indication active until failure or other alarm conditions are corrected.

2.8 FINISHES

- A. Manufacturer's standard finish over corrosion-resistant pretreatment and primer.

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PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate installation of power distribution units with access flooring for proper support //and seismic restraint //.
- B. Anchor or restrain floor-mounting power distribution units according to manufacturer's written instructions.
- //C. In seismic areas, equipment shall be adequately anchored and braced per details on structural contract drawings to withstand the seismic forces at the location where installed.//
- D. Arrange power distribution units to provide adequate access to equipment and circulation of cooling air.

3.2 ACCEPTANCE CHECKS AND TESTS

- A. An authorized representative of the power distribution unit manufacturer shall technically supervise and participate during all of the field adjustments and tests. Field tests shall be witnessed by the //Resident Engineer// //COTR//. The manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in accordance with the manufacturer's recommendations.
- B. Perform manufacturer's required field tests in accordance with the manufacturer's recommendations. In addition, include the following:
 - 1. Visual Inspection and Tests:

- a. Compare equipment nameplate data with specifications and approved shop drawings.
- b. Inspect physical, electrical, and mechanical condition.
- c. Verify appropriate anchorage, required area clearances, and correct alignment.
- d. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method, or performing thermographic survey after energization.
- e. Verify grounding connections.
- f. Vacuum-clean enclosure interior. Clean enclosure exterior.
- g. Exercise all active components.
- h. Verify the correct operation of all alarms and indicating devices.
- i. Attach a phase rotation meter to the power distribution unit input and output, and observe proper phase sequences.

3.3 FOLLOW-UP VERIFICATION

- A. After completion of acceptance checks and tests, the Contractor shall show by demonstration in service that the power distribution units are in good operating condition and properly performing the intended function.

3.4 INSTRUCTION

- A. Provide the services of a factory-trained technician for one 2-hour training period for instructing personnel in the maintenance and operation of the power distribution units, on the date requested by the //Resident Engineer// //COTR//.

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