

# Power Distribution Center (PDC) Technical Specification

## Classified Environment

### PART I - GENERAL

#### 1. SCOPE

1.1. The specification covers requirements applicable to the provision of power distribution centers (PDC) suitable for installation in classified (hazardous) environments. The PDC shall be environmentally controlled, and shall consist of a coordinated grouping of electrical power and control equipment as indicated on accompanying data sheets and/or drawings.

##### 1.1.1. Reference Documents

- **CLIENT TO INSERT DOCUMENT NUMBERS WITH APPLICABLE REVISIONS FOR ANY SPECIFYING DOCUMENTS RELATED TO THE PROJECT SCOPE OF SUPPLY (I.E. EQUIPMENT SPECIFICATIONS, ONE-LINES, DATA SHEETS, ETC).**

1.2. The supplier shall furnish, install, interconnect and test the equipment and materials specified herein, as well as any equipment specified in any related documents.

1.3. Site conditions shall be shown on the data sheet(s). These conditions shall be considered when sizing and designing equipment.

1.4. Any exceptions to the specification shall be noted in the supplier's quotation, under a separate heading. For any portions of the specification that have not been commented upon, the customer shall construe complete compliance by the supplier. All exceptions and clarifications shall cite specifying document and section being commented upon.

#### 2. STATUTES, CODES AND STANDARDS

2.1. All materials, equipment and labor supplied by the supplier shall be in strict compliance with the statutes, codes and standards listed herein. Where conflicts exist between statutes, codes and standards, the more stringent requirement shall prevail. Applicable statutes, codes and standards are as listed below:

2.1.1. American Institute of Steel Construction (AISC)

2.1.2. American National Standard Institute (ANSI)

2.1.3. American Society of Testing and Materials (ASTM)

2.1.4. American Welding Society (AWS), AWS D1.1, Structural Welding Code - Steel

2.1.5. National Fire Protection Association (NFPA)

2.1.6. National Electric Code (NEC), latest edition

2.1.7. National Electrical Manufacturers Association (NEMA)

2.1.8. **CLIENT TO INSERT APPLICABLE NATIONAL BUILDING CODE (I.E. INTERNATIONAL BUILDING CODE, UBC, BOCA, OR SBCCI) AND APPROPRIATE CODE CYCLE (YEAR).**

**TO DETERMINE THE APPROPRIATE CODE, CLIENT MUST FIRST DETERMINE IF THE JOBSITE IS WITHIN THE LIMITS OF A MUNICIPALITY OR IN THE OUTLYING COUNTY**



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OR PARISH. IF WITHIN CITY LIMITS, THE CITY HAS JURISDICTION. IF OUTSIDE CITY LIMITS, THE COUNTY OR PARISH HAS JURISDICTION. IN EITHER CASE THE CLIENT SHOULD CONSULT THE CITY OR COUNTY CODES TO DETERMINE THE NATIONAL MODEL CODE THAT HAS BEEN ADOPTED BY THE AUTHORITY HAVING JURISDICTION FOR THAT AREA.

NOTE THAT SOME STATES (E.G. CALIFORNIA, FLORIDA) HAVE GOVERNING STATE BUILDING CODES RATHER THAN ADOPTED NATIONAL MODEL CODES, WHICH ARE MANDATORY FOR THAT STATE.

THE CLIENT IS WELCOME TO CONSULT WITH POINT EIGHT POWER FOR FURTHER CLARIFICATION ON THIS REQUIREMENT DURING THE PRE-TENDER PHASE.

### 3. QUALITY REQUIREMENTS

- 3.1. The PDC shall be manufactured under an established quality assurance program. The supplier shall have a designated quality assurance (QA) manager. The supplier must be ISO 9001:2000 certified, or have a quality system in place which corresponds with the requirements of ISO 9001:2000.

## **PART II - PRODUCTS**

### 4. Power Distribution Center (PDC)

- 4.1. The PDC shall be designed and constructed for outdoor use under loading conditions per the data sheet.
- 4.2. The PDC and all mounted components shall be designed for and anchored sufficiently for transportation to the jobsite.
- 4.3. PDC construction:
  - 4.3.1. Base skid construction
    - 4.3.1.1. The skid shall be of all welded, seamless construction utilizing ASTM-A36 structural steel members, sized and arranged for proper strength, and able to withstand the stress and loads which will result when lifting the complete factory fabricated and equipped assemblies. Crossmembers shall be located so as not to obstruct conduit entry into the bottom of equipment.
    - 4.3.1.2. Deflection shall be L/240. The PDC shall be suitable for installation on a concrete pad, piers, vault, or structural framework. Mounting method shall be indicated on the data sheet.
    - 4.3.1.3. The skid shall be equipped with two (2) stainless steel ground pads located at opposite corners of the skid.
    - 4.3.1.4. The floor shall be a minimum of 1/4" H.R. ASTM-A36 smooth steel plate welded to the perimeter and longitudinal and/or transverse structural members of the skid.
  - 4.3.2. PDC walls, roof and ceiling shall be fabricated from G90 galvanized steel utilizing self-framing, interlocking panels. Panel width shall not exceed 16". Framed construction is not acceptable. Interior walls to be fabricated as liners.



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- 4.3.3. PDC wall thickness shall be 3”.
- 4.3.4. Panel thickness shall be minimum 18-gauge. Bidder is responsible to determine if thicker gauge material is required to meet loading criteria.
- 4.3.5. The roof shall be sloped at 1/4" per linear foot, and shall be sloped away from the personnel doors. Roof shall be designed for single pitch slope, unless the PDC is fabricated in multiple sections.
- 4.4. Where possible PDC’s shall be shipped in single sections.
  - 4.4.1. For PDC’s that must be shipped in multiple shipping sections, junction boxes will be provided at the shipping splits for easy breakdown of the PDC wiring for shipment and reconnecting at the jobsite.
  - 4.4.2. For PDC’s in multiple shipping sections, the vendor shall provide detailed reassembly instructions.
  - 4.4.3. Prior to shipment the open end/sides of each shipping section will be crated (weatherproofed) for transit to the jobsite.
- 4.5. Penetrations
  - 4.5.1. If specified on the data sheet, the floor shall be provided with penetrations where required for power and control cable entry/exit from the equipment. The cutouts shall be provided with 12 gauge galvanized gasketed coverplates.
  - 4.5.2. If specified on the data sheet, wall bulkhead penetrations shall be provided, completely framed with 1/4" aluminum gasketed coverplates with neoprene gasket.
    - 4.5.2.1. If specified on the data sheet, cable transiting systems shall be furnished in the wall penetrations. Frames only are to be furnished. Purchaser will provide interior blocks.
  - 4.5.3. If specified on the data sheet, busduct penetrations shall be provided.
- 4.6. All fastening hardware shall be zinc plated. Welding of panels and rivets shall not be an acceptable method of exterior fastening.
- 4.7. The PDC shall be provided with a minimum of two (2) entrance doors. The doors shall be double wall construction, insulated, with brushed aluminum panic, cylinder lock and thumbblatch, brushed aluminum automatic closure with built-in hold open device, prime coat hinges, stainless steel threshold integral to door frame, neoprene gasket, drip shields/water flashing, "**DANGER, HIGH VOLTAGE, KEEP OUT**" sign, and removable transom above the equipment door only. Door sizes shall be as shown on the drawings.
  - 4.7.1. If specified on the data sheet, supplier shall provide landings and stairs for the PDC. The stairs shall be built in compliance with OSHA and building code requirements, and shall be hot-dipped galvanized after fabrication.
    - 4.7.1.1. Landing handrails at personnel doors shall be non-removable.



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- 4.7.1.2. Landing handrails at equipment doors shall be removable.
- 4.7.1.3. Stairs accessing personnel doors shall have 36"W treads.
- 4.7.1.4. Stairs accessing equipment doors shall have 48"W treads.
- 4.8. If specified on the data sheet, the supplier shall provide 14 gauge galvanized steel, insulated, gasketed and hinged equipment rear access panels, with 3-point latching system, galvanized padlockable handles, "**DANGER HIGH VOLTAGE**" sign, and drip shields/water flashing.
- 4.9. The walls, roof and floor shall be fully insulated, with a minimum of R-11 insulation. All insulation shall carry a flame spread rating of 25 or less.
  - 4.9.1. The walls and roof shall be provided with fiberglass batt type insulation.
  - 4.9.2. The floor shall be provided with polyurethane spray foam insulation.
- 4.10. The PDC shall be provided with the manufacturer's standard paint system, including:
  - 4.10.1. The skid shall be provided with a 2-3 mil application of epoxy primer shall be provided.
  - 4.10.2. The underside of the skid shall have a 20-25 mil application of bituminous mastic.
  - 4.10.3. The floor shall be provided with a 2-3 mil application of epoxy primer, followed by a 2-3 mil application of ANSI-61 gray epoxy, with a non-skid finish.
  - 4.10.4. The exterior and interior of the PDC shall be provided with a 0.3-0.6 mil application of a vinyl wash primer, followed by a 2-3 mil application of polyurethane paint. Exterior and interior finish color shall be white unless otherwise indicated on the data sheet.
- 4.11. HVAC System
  - 4.11.1. The HVAC system shall be sized and provided by the supplier, considering the ambient site conditions, dimensions of the PDC, solar heat generated, and heat generated by the equipment within the PDC.
  - 4.11.2. The system sizing shall account for the sensible heat gain from all sources in the PDC and the sensible cooling capacity of the air conditioning units provided,
  - 4.11.3. The system shall be sized to maintain design temperatures as indicated on the data sheet with all equipment operating at full rated capacity.
    - 4.11.3.1. Sizing shall incorporate any future equipment indicated on the drawings.
  - 4.11.4. The system shall be provided with an electronic thermostat.
  - 4.11.5. If 100% redundancy is specified on the data sheet, duty cycling and lead/lag controls shall be furnished.
  - 4.11.6. HVAC units shall be complete with low ambient controls, high/low pressure controls, and compressor anti-cycle relays.



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- 4.11.7. 3-phase HVAC units shall be complete with phase monitors.
- 4.11.8. The HVAC/Pressurization system shall be designed and fabricated in strict compliance with NFPA 496 requirements, providing 0.1" W.C. pressure and 60FPM through all operable openings simultaneously.
  - 4.11.8.1. HVAC and pressurization units shall be suitable for installation in a classified environment. Consult the data sheet for electrical area classification.
  - 4.11.8.2. The pressurization system shall be capable of providing a Type Z purge, declassifying the interior of the PDC.
  - 4.11.8.3. A self-supporting (no guy wires) air intake stack shall be furnished, with hood and screen, extending to 25' above grade.
  - 4.11.8.4. A combustible gas detector shall be furnished in the air intake stack.
  - 4.11.8.5. A control panel shall be furnished with high temperature, loss of pressure, and gas detection alarms (local visual and dry contacts). Gas detection shall initiate HVAC emergency shutdown.
- 4.12. Electrical Devices
  - 4.12.1. The supplier shall furnish all electrical distribution equipment necessary for the proper operation of building services associated with the PDC.
  - 4.12.2. **CLIENT TO INSERT ANY TRANSFORMER AND PANELBOARD REQUIREMENTS HERE.**
  - 4.12.3. The PDC shall be provided with twin tube, rapid start, T12 fluorescent lighting fixtures, controlled via three-way wall switches to be located at each entry door.
  - 4.12.4. The PDC shall be provided with combination emergency/exit lighting fixtures above each door, and emergency lighting fixtures as necessary throughout the building to create an illuminated egress path.
  - 4.12.5. The PDC shall be provided with 125V, 20A, interior surface mount duplex receptacles at each entry door.
  - 4.12.6. The PDC shall be provided with 125V, 20A, exterior surface mount GFCI duplex receptacles at each entry door, suitable for installation in a classified environment. Consult the data sheet for electrical area classification.
  - 4.12.7. The PDC shall be provided with 70 watt high pressure sodium exterior lights at each entry door, with photoelectric control, suitable for installation in a classified environment. Consult the data sheet for electrical area classification.
- 4.13. Wire, Cable Transiting, and Grounding
  - 4.13.1. All wiring shall be type THWN, #12 AWG minimum for power circuits, minimum #14 AWG for control circuits, and minimum #16 AWG for instrumentation circuits.



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- 4.13.2. All wires shall be provided with polyolefin sleeve type wire markers.
- 4.13.3. A perimeter NEMA 1 wireway shall be provided at the ceiling of the PDC. RGS conduit drops from the wireway to electrical devices shall be utilized throughout the PDC. Conduits seals shall be installed and tagged as required for change in electrical area classification throughout the PDC. Personnel in the field shall be responsible for pouring seals.
- 4.13.4. Wiring for the HVAC/Pressurization system may NOT be run in wireway. This wiring shall be run in dedicated RGS conduit.
- 4.13.5. Cabletray
  - 4.13.5.1. If specified on the data sheet or shown on the drawings, cabletray shall be furnished.
  - 4.13.5.2. Cabletray shall be aluminum, NEMA 12C, 6" high with 9" rung spacing. All fittings shall have a minimum 12" radius.
  - 4.13.5.3. Cabletray splice plates shall be rated as equipment grounding conductors. Where fitting splice plates are not rated as equipment grounding conductors, or where cabletray is discontinuous, ground bonding jumpers shall be installed between cabletray sections.
  - 4.13.5.4. Structural steel channel supports shall be embedded in the ceiling for hanger support. The use of unistrut fastened directly to the ceiling for cabletray support shall not be permitted. The support from the channel supports shall be via allthread and unistrut hangers.
- 4.13.6. 1/4" x 2" copper ground bar running each length of the PDC shall be provided, mounted approximately 6" above floor and connected to each end of the equipment ground bar. A #4/0 green insulated copper ground cable shall be provided from the ground bar to the exterior ground pads. A green insulated copper ground wire/cable will be provided from the ground bar to all auxiliary electrical equipment per NEC Table 250-95.

### **PART III - TESTING AND INSPECTION**

- 5. The following testing and inspection shall be performed on the PDC.
  - 5.1. Continuity checks of all wiring installed by PDC manufacturer.
  - 5.2. Operational check of all PDC manufacturer furnished and installed electrical apparatuses.
  - 5.3. As necessary, all equipment shipping sections' bus shall be respliced, torqued and meggered.
  - 5.4. A certified test report shall be provided by the supplier's Quality Assurance Manager.
  - 5.5. If necessary, secondary control power shall be provided for customer use. Available control power voltages shall be 480/3/60, 120-208/3/60 and 120-240/1/60.

**IN ADDITION, SOME STATES HAVE MANDATORY PLAN EXAMINATION AND INSPECTION REQUIREMENTS THAT MUST BE MET. MEETING THESE REQUIREMENTS IS THE**



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RESPONSIBILITY OF THE ENGINEER-OF-RECORD. THE CODE DEFINES THE ENGINEER-OF-RECORD AS THE OWNER BY DEFAULT, UNLESS THE OWNER HAS CONTRACTED A THIRD PARTY (ENGINEERING FIRM) IN WHICH CASE THE THIRD PARTY IS DESIGNATED AS THE ENGINEER-OF-RECORD. THE SYSTEMS INTEGRATOR (SUCH AS POINT EIGHT POWER) IS NOT THE ENGINEER-OF-RECORD. IT IS THE RESPONSIBILITY OF THE CLIENT TO NOTIFY BIDDERS OF ANY PLAN EXAMINATION AND/OR INSPECTION REQUIREMENTS MANDATED BY THE AUTHORITY HAVING JURISDICTION THAT MUST BE INCLUDED IN THE QUOTATION.

THE CLIENT IS WELCOME TO CONSULT WITH POINT EIGHT POWER FOR FURTHER CLARIFICATION ON THIS POTENTIAL REQUIREMENT IN THE PRE-TENDER PHASE.

