Controlled Power, LLC

Power Control Center

Guide Specification

POWER CONTROL CENTERS

CONTENTS

1.0 QUALITY ASSURANCE (QA) PROGRAM

The electrical equipment enclosure or Power Control Center manufacturer shall be ISO 9001 certified, or have an equivalent quality program in place prior to bidding this project. If the manufacturer is not ISO 9001, a copy of that company's quality program must be approved prior to the bid date.

2.0 QA PROGRAM APPROVAL and INSPECTION

An Engineer may visit the manufacturer's facility to review the detailed program as outlined in manufacturer's Master Quality Control Manual. If your company is ISO certified please indicate in your proposal when you received your ISO registration and the date of your last surveillance audit.

3.0 SCOPE AND DEFINITION

The climatized substation equipment enclosure is a modular (portable) thermally insulated electrical grade equipment enclosure that shall be preassembled at the manufacturer's factory, and will be unmanned after installation except for limited activity by skilled technical personnel after the equipment is energized.

The climatized substation equipment enclosure is also referred as a Power Control Center, and hereafter shall be referred to as a "PCC".

The PCC manufacturer shall serve as the single point of responsibility for field service as well as warranty for all component systems installed within the PCC. The PCC manufacturer shall also be the manufacturer of the Swichgear. This manufacturer shall provide all interconnecting wiring between component systems mounted within the PCC and shall furnish functional testing of these systems such as Metal-Clad or Metal-Enclosed Switchgear, Motor Starters, etc. Provisions shall be made for the Customer's engineer or consultant to witness these tests. Any additional costs incurred for this service shall be included in the base proposal.

The scope of the work included in this specification shall include furnishing the following material and service complete.

Equipment to be furnished is shown on attached one-line drawings, data sheets and arrangement drawings which form part of this specification.

All work shall be done and completed in a thorough workmanlike manner and in accordance with the best modern practices in manufacturing and fabrication.

All materials used in the construction of the apparatus shall be selected as the best available for the purpose for which used, considering strength, ductility, insulation and best engineering practice. Liberal factors of safety shall be used throughout the design.

4.0 GENERAL

The PCC design and construction, including the exterior components shall meet the environmental requirements and area classifications as follows:

Environment

1. Temperature Range _____ to _____
2. Relative Humidity _____ low _____ high
3. Wind Velocity 125 mph
4. Roof Load Snow/Ice 80 pounds per sq. Ft.
5. Yearly Rainfall _____ inches
6. Excessive Dust or Blowing Sand (If required)
7. Type of Corrosive Atmosphere (If required)
8. Altitude _____ ft above sea level
9. Fungus Protection (If required)

The vendor shall check the dimensions of the proposed equipment for required electrical and safety clearances front and back of the equipment within the PCC, space for interconnection, and confirm that the overall shipping dimensions and weight meet all interstate shipping requirements to transport the PCC from the factory to the final destination.

PCC's with a shipping split shall be designed and packaged to withstand the rigors of transportation and installation without distortion. Provide temporary shipping members to support the roof and wall sections when required, to be discarded in the field after installation and field erection. **Shipping split information (weights & dimensions) must be detailed on a drawing included with the proposal.**

PCC's shall be fully covered with a protective wrapping to minimize shipping damage to the outside finish.

5.0 STANDARDS

All apparatus included in the PCC shall comply with currently applicable standards of the American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers (IEEE), the National Electric Manufacturers Association (NEMA) switchgear specifications, and the National Fire Protection Association (NFPA). The PCC shall conform to the standards detailed in the Uniform Building Code (UBC).

6.0 DRAWINGS

Seller shall furnish within 8 weeks after receipt of order _____ copies of each of the following drawings for Purchaser's examination and approval. Do no work without approved drawings and release for manufacture.

6.1 Complete dimensioned assembly drawings(s) showing plan, elevation, section views, and weights.

6.2 Plan showing exact location and details of the structural steel base, anchor points, and terminations of power bus and control cables.

6.3 Detailed control wiring diagrams.

6.4 Elementary or schematic diagrams.

6.5 Bill of Material shall be provided listing all the devices and accessories to be furnished. The Bill of Material shall include complete identification and description of all the devices. Items which are not manufactured by the Seller shall have the original manufacturer's name and catalog number with other descriptive data.

6.6 All revisions to drawings shall be identified.

6.7 Seller shall assure that drawings are correct at date of PCC shipment and that "as built" drawings are included.

6.8 Spare parts list.

6.9 Seller shall furnish drawings for record via Auto-Cad drafting system producing various forms: hard copy, 3½ floppy disk, or CD ROM.

7.0 OPERATION AND MAINTENANCE MANUAL

Installation, operating, and maintenance instructions shall cover the PCC and all equipment supplied within the PCC. (Purchaser to specify number of sets required). One set of "as built" drawings shall be shipped with the PCC and additional sets within 2 to 3 weeks after the equipment is shipped.

8.0 CONSTRUCTION DETAILS

The PCC shall be _____ feet wide, _____ feet high, and ____ feet long. These dimensions are considered as guideline dimensions. Actual dimensions will be determined by the physical size of the electrical components proposed. It will be the responsibility of the PCC manufacturer to determine the correct size of the PCC and include any additional costs required if the PCC is different than specified.

BASE

The PCC base shall be fabricated using structural steel channels and/or wide flange beams conforming to ASTM-A36, welded together to provide a rigid square and level foundation for the enclosure, and sized to meet or exceed the static and dynamic loading requirements. Removable lifting lugs are to be supplied, placed in a position to provide

uniform lifting load at each lifting lug location. The base must have adequate strength so that when the enclosure is lifted there will be a deflection no greater than 1/240th of the unsupported span between and on either side of each lifting point. [Option: The under side of the structural steel base shall be given a coat of bitumastic undercoating for corrosion resistance purposes.]

FLOOR

The floor shall be constructed with 3/16 inch [Optional: 1/4 inch] minimum steel plates welded onto the base with adequate stiffening members to support a 250 pound per square foot load with a deflection of no greater than 1/240 of the distance between the floor stiffener members, when the PCC is in the normal operating position. The top side of the floor plates will be painted with skid resistant paint. [Optional: The floor is to be insulated with the use of a spray-on foam with a thermal rating of R-13.]

WALLS

All walls on the perimeter of the PCC are to framed using 14 gauge 3 ½ inch Steel Stud Wall Framing. All wall panels are to be provided with stiffeners and adequate flanges to support roof loads, wind loads, and equipment hanging from the walls. Thermal insulation shall be installed on the interiors of the walls, with a thermal rating of R-13. The exterior wall panels will be 24 gauge Pre-Formed Metal Exterior Wall Panels. The interior wall panels will be 16 gauge Cold Rolled Steel Panels. The PCC shall be designed for 125 mile per hour winds. All exterior surfaces shall be manufactured from epoxy pre-painted non-corrosive materials such as stainless steel, aluminum, or galvalume.

ROOF

The roof framing shall consist of 8 inch deep cold-formed steel joists with purlins or truss systems to provide a minimum slope of 1/2 inch per foot. The roof panels shall be 24 gauge [Option: 22 gauge] large batten, vertical leg, concealed faster, standing seam, utilizing male and female rib confugurations, with factory applied hot metal mastic in female rib, continuously locked together by an electrically powered mechanical seaming device during installation. The roof panels shall be manufactured from epoxy pre-painted non-corrosive materials such as stainless steel, aluminum, or galvalume. The roof system shall be designed to support a minimum of 80 pounds per square foot load on the roof panels plus loads due to all other equipment that may hang from the roof (lights, cable trays, etc.) or that may be mounted on the roof (bus duct, exhaust fans, HVAC units, etc.). Adequate stiffening must be provided to support all loads indicated above. Thermal insulation (minimum R-13) shall be installed on the underside of roof panels. The ceiling shall be fabricated from 22 gauge pre-formed aluminum panels, and shall be installed as a finished ceiling, thus providing a smooth surface.

DOORS

The PCC shall be equipped with a minimum of two doors. Doors are to be fabricated from 18 gauge steel (ASTM-A569) minimum and shall be equipped with panic hardware to allow exit during emergency conditions. Doors behind major equipment with cable termination compartments such as Switchgear shall be furnished unless otherwise specified. All doors shall be two wall construction with thermal insulation (except equipment doors), and gasketed with water tight seals. Pneumatic door closers shall be provided on the two main entrance doors. All doors shall be equipped with padlocking provisions.

INSULATION

The thermal insulation in the roof and walls shall be 3 inch fiberglass insulation with a minimum rating of R-13.

PAINT

Bases:

All welds, loose scale and rough spots are to be ground and/or sanded to present an acceptable appearance and to provide a surface to promote adhesion and application of primer coat.

The surface shall be free of any viscous or resilient soils (for example, grease, oil, tar, etc.) These soils shall be removed with a solvent such as Xylol or lacquer thinner. The surfaces are to also be steam cleaned with a phosphating compound containing an etching agent.

After the surface has been properly cleaned and prepared, the work shall be coated with a gray acrylic dry primer to a minimum thickness of 1 mils.

After the primer coat has been applied and properly dried, the surface shall be sprayed with a gray acrylic waterborne air dry topcoat for a total thickness of 2.0 -2.5 mils.

If the equipment is for outdoor usage, then a second top coat is to be applied for extra protection. All outdoor equipment will also have an undercoating applied to the base prior to shipment.

One quart of the exterior finishing paint per lineup shall be included for field touch up.

Walls & Roof Panels:

Walls and Roof panels shall be painted with Premium Thermoset Silicone Polyester process. [Option: Walls and Roof panels shall be painted with Premium Fluorocarbon Coating produced by Kynar 500 or Hylar 5000 resin process.] The PCC manufacturer shall supply a 20-year written paint warranty for the roof and wall panels.

HVAC

The heating, ventilating, and air conditioning (HVAC) system, shall be sized and provided by the PCC manufacturer. Consideration shall be given to the ambient site conditions, the dimensions and heat retention of the PCC enclosure, and the heat dissipated by the electrical equipment (including any future equipment) inside the PCC. Air conditioning equipment shall be capable of maintaining an inside temperature of not more than 27 degrees C (80 degrees F). Thermostatically controlled heating elements shall maintain a minimum inside temperature of 13 degrees C (55 degrees F). The HVAC system shall be capable of cooling the inside equipment even if the outside temperature falls below 60 degrees F.

GROUNDING

A continuous copper ground bus (bus bar and/or cable) will interconnect all components within the PCC to two exterior grond pads located on the structural steel base. The purchaser will then make connection from the ground pads to the substation grounding system.

[Optional: FIRE PROTECTION]

[Provide smoke detectors in the PCC with relay contacts to stop the pressurizing and/or air conditioning system, and to activate an alarm. Provide a hand held wall mounted U.L. rated fire extinguisher near each of the main doors.]

INTERCONNECTING WIRING

Provide a four inch minimum internal wire way around the perimeter of the PCC for interconnecting wiring between the various electrical equipment installed in the PCC. Interconnecting wiring between shipping halves shall be coiled, properly tagged, and supported for shipment. Type THHN, 14 gauge switchboard wiring shall be used for all interconnecting wiring. This wire shall have a permanent wire marking system identifying the “from-to” wire designation. [Option: Insulated ring tongue terminal connectors shall be used.]

ADDITIONAL REQUIREMENTS

Provide fluorescent lighting twin tube, four foot fixtures providing 50 foot candles of illumination vertically 2 1/2 feet above the floor level in front of any major equipment**.** Indoor lighting shall be controlled by three-way switches located at each main entrance. Interior emergency lights shall be provided above each main door by means of wall mounted self contained continuously charged battery powered units with two lamps that, on event of power failure, will stay illuminated for 90 minutes.

Provide high pressure sodium type exterior lighting above each main door. External lights shall be controlled by a common photo-electric cell. Provide a minimum of two 125 volt, 20 amp, 3 wire, grounded type, duplex receptacles with one located at each main entrance. [Optional: Provide a dry type station service transformer with 120/240 volt secondary and AC panel board sized by the PCC manufacturer to provide AC power for lighting, air conditioning, heating, etc.]

9.0 FACTORY PRODUCTION TESTS

All equipment, apparatus and material furnished with the PCC shall be subject to factory tests and inspection by the Purchaser's authorized representative. Such tests and inspection may be made during any stage of manufacture and any equipment, apparatus or material found unsatisfactory as to quality of workmanship will be rejected. Tests shall be in accord with applicable standards as noted above.

The manufacturer shall make factory tests at not less than standard NEMA, ANSI, or IEEE values and such additional factory tests required by the manufacturer's control organization to insure that this product will maintain its high quality standard of materials and reliability in operation. Tests on switchgear equipment shall include, but not be limited to:

9.1 Dielectric - (6.3.1)

9.2 Sequence Test (Control Circuit Continuity) - (6.3.4.1/6.3.4.4)

9.3 Control Wiring Insulation - (6.3.4.2)

9.4 Functional Check

9.5 Mechanical Operation Tests - (6.3.2)

9.6 Polarity Verification - (6.3.4.3

10.0 FIELD SERVICE

The PCC manufacturer shall supply a field service technician for installation and start up after equipment has been delivered. One man day per breaker unit shall be included in the base price. This shall include all travel and living expenses. A separate price shall be quoted on a per man day basis for any additional or lesser number of days needed by the buyer.

The field service technician shall be a qualified technician having a minimum of 5 years field experience in the installation, operation, and maintenance of switchgear and associated equipment.

The work of assembly in the field by the Purchaser shall consist of aligning, leveling, and bolting the stationary housing to the concrete floor or foundation, connecting bus work and cables at shipping splits, and attaching power and control cables to appropriate terminals.

11.0 HARDWARE

All bolting hardware to be high tensile strength zinc plated steel. If the PCC is subject to a corrosive atmosphere, stainless steel hardware shall be used.

12.0 SPARE PARTS LIST

Spare parts list shall include the following:

11.1 Complete spare parts list, including parts location diagrams or drawings.

11.2 List prices of parts that the Manufacturer recommends being available during start-up and the first two (2) years of operation.

Installation, operating, and maintenance instructions shall cover all the equipment furnished including all Switchgear components, panelboards, battery system, HVAC system, etc.

13.0 INSPECTION / WITNESS TEST

The purchaser reserves the right to inspect the equipment during manufacture and prior to shipment. Travel and living expenses for visits to the manufacturer's plant will be at the purchaser's expense. The purchaser will not accept any charges for visiting the plant. The manufacturer shall notify purchaser in writing of the intended date for shipment and test.

Full ANSI production testing shall be performed on Switchgear assemblies as well as other component systems in the PCC ,and after all ANSI Production Tests have been completed, and any deficiencies and/or wiring errors have been corrected, the tests shall be repeated and available for witness test by the purchaser or his authorized representative. The manufacturer shall supply a qualified service technician for the length of time required to perform these tests. The service technician shall assist in testing each switchgear metering, control, and protective relay circuit during checkout by the purchaser. Any additional costs for this service shall be included as part of the base bid.

14.0 PACKAGING FOR TRANSPORTATION

The PCC will be delivered fully wrapped with a protective covering. Shipping splits, if required, will be enclosed with a protective covering to prevent entrance of dust and water. Each PCC shipping section shall be completely wrapped with a protective

covering during transportation. Temporary bracing shall support the roof and wall structure to prevent damage during shipment. Equipment shall be shipped F.O.B. jobsite, freight prepaid and allowed. Unloading will be the responsibility of others.

15.0 WARRANTY

The manufacturer of the PCC shall act as a "single point" of responsibility for all components installed in the PCC, including major assemblies such as switchgear and motor starters, that are not furnished by the owner. This equipment shall be guaranteed for a period of 12 months from startup date, or 18 months from shipment, whichever time limit occurs first. All exterior wall and roof panel painted surfaces shall have a written twenty-year warranty from date of shipment.