PROJECT
668-309

Construct Endoscopy and Central Processing Addition

SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation and connection of panelboards.

1.2 RELATED WORK

A. Section 09 91 00, PAINTING: Identification and painting of panelboards.

B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one Section of Division 26.

C. Section 26 05 71, ELECTRICAL SYSTEM PROTECTIVE DEVICE STUDY: Requirements for the over current protective devices to be installed to ensure proper equipment and personnel protection.

D. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits and outlet boxes.

E. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.

F. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.

2. Include electrical ratings, dimensions, mounting details, materials, wiring diagrams accessories and weights of equipment. Complete nameplate data including manufacturer’s name and catalog number.

C. Certification: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the material is in accordance with the drawings and specifications has been properly installed, and that the loads are balanced.

D. For equipment being submitted for approval, other than what was specified by the engineer, provide selective coordination study showing equipment is selectively coordinated with existing overcurrent protection devices in the Essential Electrical System's Distribution Equipment to satisfy NEC 700.27 requirements. Equipment not shown to be selectively coordinated will not be accepted.

1.4 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 the basic designation only.

B. National Electrical Manufacturers Association (NEMA):

PB-1-2006 ..... Panelboards
AB-1-2002 ..... Molded Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures

C. National Fire Protection Association (NFPA):

70-2005 ..... National Electrical Code (NEC)
70E-2004..... Standard for Electrical Life Safety in the Workplace

D. Underwriters Laboratories, Inc. (UL):

50-2003 ..... Enclosures for Electrical Equipment
67-2003 ..... Panel boards
489-2006 ..... Molded Case Circuit Breakers and Circuit Breaker Enclosures

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Basis of design is Eaton to match the existing Essential Electrical System equipment.

1. If other manufacturers are submitted for this project, a selective coordination study shall be submitted within 14 days following the bid date. The study shall clearly show that the equipment being submitted will selectively coordinate with the existing overcurrent protection devices in the Essential Electrical System's Distribution Equipment to satisfy the requirements of NEC 700.27. Equipment not shown to be selectively coordinated will not be accepted.

B. Panelboards shall be in accordance with UL, NEMA, NEC, and as shown on the drawings.

C. Panelboards shall be standard manufactured products. All components of the panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.

D. All panelboards shall be hinged “door in door” type with:

1. Interior hinged door with hand operated latch or latches as required to provide access to circuit breaker operating handles only, not to energized ports.

2. Outer hinged door shall be securely mounted to the panelboard box with factory bolts, screws, clips or other fasteners requiring a tool for entry, hand operated latches are not acceptable.

3. Push inner and outer doors shall open left to right.

E. All panelboards shall be completely factory assembled with molded case circuit breakers. Include one-piece removable, inner dead front cover independent of the panelboard cover.

F. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings.

G. Panelboards shall conform to NEMA PB-1, NEMA AB-1 and UL 67 and have the following features:

1. Nonreduced size copper or aluminum bus bars, complete with current ratings as shown on the panel schedules connection straps bolted together and rigidly supported on molded insulators.

2. Bus bar connections to the branch circuit breakers shall be the “distributed phase” or “phase sequence” type. Single-phase, three-wire panelboard busing shall be such that when any two adjacent single-pole breakers are connected to opposite phases, two-pole breakers can be installed in any location. Three-phase, four-wire busing shall be such that when any three adjacent single-pole breakers are individually connected to each of the three different phases, two-or three-pole breakers can be installed at any location. Current-carrying parts of the bus assembly shall be plated. Mains ratings shall be as shown.

3. Mechanical lugs furnished with panelboards shall be cast, stamped or machined metal alloys of sizes suitable for the conductors indicated to be connected thereto.

4. Neutral bus shall be 100% rated, mounted on insulated supports.

5. Grounding bus bar equipped with screws or lugs for the connection of grounding wires.

6. Buses braced for the available short circuit current, but not less than 22,000 amperes symmetrical for 120/208 volt and 120/240 volt panelboards.

7. Branch circuit panels shall have buses fabricated for bolt-on type circuit breakers.

8. Protective devices shall be designed so that they can be easily replaced.

9. Where designated on panel schedule "spaces", include all necessary bussing, device support and connections. Provide blank cover for each space.

10. In two section panelboards, the main bus in each section shall be full size. The first section shall be furnished with subfeed lugs on the line side of main lugs only, or through-feed lugs for main breaker type panels, and with cable connections to the second section. Panelboard sections with tapped bus or crossover bus are not acceptable.

11. Series rated panelboards are not permitted.

2.2 CABINETS AND TRIMS

A. Cabinets:

1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL 50 and UL 67.

2. Cabinet enclosure shall not have ventilating openings.

3. Cabinets for panelboards may be of one-piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.

2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

A. Basis of design is Eaton. Breakers installed in existing panelboards shall match existing.

B. Breakers shall be UL 489 listed and labeled, in accordance with the NEC, as shown on the drawings, and as specified.

C. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar.

1. Molded case circuit breakers for lighting and appliance branch circuit panelboards shall have minimum interrupting rating as indicated but not less than:

a. 120/208 Volt Panelboard: 22,000 amperes symmetrical.

b. 120/240 Volt Panelboard: 22,000 amperes symmetrical.

2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100-ampere frame or less. Magnetic trip shall be adjustable from 3X to 10X for breakers with 600 ampere frames and higher. //Breaker trip setting shall be set in the field based on the approved protective device study as specified in Section 26 05 71, ELECTRICAL SYSTEM PROTECTIVE DEVICE STUDY.

D. Breaker features shall be as follows:

1. A rugged, integral housing of molded insulating material.

2. Silver alloy contacts.

3. Arc quenchers and phase barriers for each pole.

4. Quick-make, quick-break, operating mechanisms.

5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.

6. Electrically and mechanically trip free.

7. An operating handle which indicates ON, TRIPPED, and OFF positions.

a. Line connections shall be bolted.

b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as shown on the electrical system protective device study as required in Section 26 05 71, ELECTRICAL SYSTEM PROTECTIVE DEVICE STUDY.

8. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.

9. Shunt trips shall be provided where indicated

10. For circuit breakers being added to existing panelboards, coordinate the breaker type with existing panelboards. Modify the panel directory.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the Manufacturer’s instructions, the NEC, as shown on the drawings, and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes of cabinets with designated closet space.

C. In accordance with Section 09 91 00, PAINTING, paint the panelboard system voltage, and feeder sizes as shown on the riser diagram in 1 inch block lettering on the inside cover of the cabinet door. Paint the words "LIFE SAFETY BRANCH", "CRITICAL BRANCH", or "EQUIPMENT SYSTEM" as applicable and the panel designation in one inch block letters on the outside of the cabinet doors.

D. Install a typewritten schedule of circuits in each panelboard after being submitted to and approved by the Resident Engineer. Schedules, after approval, shall be typed on the panel directory cards and installed in the appropriate panelboards, incorporating all applicable contract changes pertaining to that schedule. Include the room numbers and items served on the cards.

E. Mount the panelboard fully aligned and such that the maximum height of the top circuit breaker above finished floor shall not exceed 1980 mm (78 inches). For panelboards that are too high, mount panelboard so that the bottom of the cabinets will not be less than 150 mm (6 inches) above the finished floor.

F. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.

G. Directory-card information shall be typewritten to indicate outlets, lights, devices, and equipment controlled and final room numbers served by each circuit and shall be mounted in holders behind protective covering.

H. Provide ARC flash identification per NFPA 70E, including identification of the appropriate PPE levels on the labeling panelboard.

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