

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide an isolated power system for all Operating Rooms.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Raceways and Boxes For Electrical Systems, Section 26 05 33.
- B. Equipotential Grounding System, Section 26 05 27.

1.3 QUALITY ASSURANCE

- A. Refer to Section 26 05 00, Common Work Results for Electrical, for applicable codes. System shall meet all requirements of NFPA 99 and NFPA 70 (NEC) Section 517, for a non-flammable anesthetizing location.

1.4 SUBMITTALS

- A. Assemble in submittal brochure as specified in Section 26 05 00. Include shop drawings showing front view, side view, dimensions, electrical specifications, and nameplate information for isolated power panels and accessories.

1.5 ELECTRICAL EQUIPMENT MAINTENANCE MANUAL

- A. Manual shall include the test report required under this section and the information required in Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The manufacturer shall be a firm which is regularly engaged in manufacturing such products and shall have existing proven installations of like products. This manufacturer need not be same as that of other distribution equipment contained elsewhere in these specifications. All isolated power equipment shall be UL listed under Standard 1047. Approved Manufacturer: Isotrol (Bender).

2.2 ENCLOSURES

- A. Flush mounted enclosure with galvanized steel finish.
- B. Cabinet fronts on all equipment shall be stainless steel with satin finish and lockable door over the circuit breakers. All components shall withstand the application of normal hospital cleaning agents without degradation.

2.3 ISOLATED POWER PANEL

- A. The isolated power panel shall contain line isolation monitor, isolation transformer, circuit breaker panelboard, leakage ammeter, reference ground bus, alarm, and other accessories

as herein specified. All components shall be contained in a flush mounted enclosure no more than 14" deep for dual 120V & 208V output panels and 8" deep for 120V output panels.

- B. Line isolation monitor shall be a 25 microampere dynamic type and shall monitor the total leakage for the system. A meter shall display system leakage with the 5 milliampere zone at center of scale. All combinations of capacitance and/or resistive faults shall be detected. Provide test pushbutton to produce system test including meter readout. Fixed alarm at 5 milliamps. The line isolation monitor shall be U.L. listed under standard 1022.
- C. Isolation Transformer: 7.5 kVA, 10 kVA, or 25 kVA (as noted on the panel schedule or power one-line diagrams), 60 Hertz, 480 volt primary with 120 volt secondary (or 208 volt secondary) as noted. Transformer shall have a 27 db maximum sound level and meet all NEMA requirements for two winding electrostatic shielding isolation transformers. The leakage from the secondary to ground shall not exceed the values shown in table 29.2 of U.L. Standard 1047. Provide input (transformer primary) circuit breaker.
- D. Secondary Circuit Panelboard: Provide with secondary main circuit breaker and a minimum of eight (8) 20 amp, isolated branch circuit breakers for 120 volt secondary panels. Additional circuit breakers shall be provided per the panel schedules.
- E. Reference Ground Bus: Provide a ground bus with provision for bolted termination of at least ten (10) No. 10 AWG ground wires.
- F. Alarm: An alarm buzzer which sounds an alarm when total system leakage exceeds 5 milliamps shall be provided. Provide an indicator unit including green light, "normal;" red light, "abnormal;" and amber light, "acknowledgment," alarm and silence switch. Indicator unit shall be accessible without opening door.
- G. Nameplate: Provide an engraved phenolic nameplate per Section 26 05 53. Information to include panel name in 3/8" high letters and the panel & circuit the panel is fed from along with the primary & secondary voltages, and kVA rating in 3/16" high letters.

2.4 REMOTE LINE ISOLATION MONITOR

- A. Flush mounted in a common enclosure with stainless steel faceplate housing: Audible alarm, green "SAFE" LED, red "HAZARD" LED, "MUTE" button with integral amber LED, "TEST" button, and two digital displays. The "MUTE" button silences the local audible alarm. The "TEST" button performs a function test of the LIM. Digital display mimics the LIM hazard current display and consists of two seven segment red LEDs. The second digital display shall monitor the percentage load used on the secondary of the isolation transformer. When the isolation transformer approaches 80% of the rated power, a flashing amber LED shall illuminate. When 100% of power is achieved, a flashing amber LED shall illuminate and an audible alarm shall sound. Isotrol #MK2000CBM-G2 series. No substitute.

2.5 ISOLATED POWER BRANCH CIRCUITS

- A. Electrical Metallic Tubing: Refer to Section 26 05 33.
- B. Wire: Copper stranded conductors, colors and distinctive colored stripe per NEC 517.160, with cross linked polyethylene insulation (type XHHW) having a dielectric constant of 3.5 or less.

PART 3 - EXECUTION

3.1 RACEWAYS

- A. Refer to Section 26 05 33. All raceways shall be concealed.

3.2 CONDUCTORS

- A. Do not use pulling compound. Do not share neutral. Wires shall be unspliced from the isolated power panel to the outlets. Color code wire per NEC 517-160(a)(5) using colored insulation of the proper color and striping.
- B. A maximum of five (5) circuits shall be run in any isolated power system conduit.

3.3 GROUNDING

- A. Install #10 type XHHW, THW or THHN green ground wires (one per each circuit) continuous and unspliced from the ground bus in the isolated power panel to the ground connection at each receptacle, device, or switch.

3.4 REMOTE LINE ISOLATION MONITOR

- A. Mount the remote line isolation monitor (LIM) for each isolated power panelboard in the a remote enclosure. Enclosure shall house the normal and emergency power LIMs serving each OR. For dual voltage output panels, provide a remote LIM for each voltage. Provide wiring from each remote LIM to the respective isolated power panel per manufacturer requirements. Provide engraved labeling of each LIM with the panel name and the output voltage.

3.5 TESTING

- A. After the installation of the isolated power system and Equipotential Grounding System has been completed, the equipment manufacturer with assistance from the Contractor, shall perform the following tests in accordance with NFPA 99.
 1. The impedance (capacitive and resistive) to ground of all conductors with the connection between the line isolation monitor and reference grounding point open. Replace wiring that measures less than 200,000 ohms.
 2. Potential difference and resistances between the isolated power panel ground bus and the grounding pole of each receptacle and the patient grounding point. Also measure the potential between the grounding pole of each one of the receptacles and each of the other receptacles. The potential difference shall not exceed 10 millivolts with the system both energized and not energized
 3. System voltage.
 4. Readings of ungrounded system components including isolation transformer and line isolation monitor.
 5. System leakage with line isolation monitor connected in circuit.
 6. System leakage with surgery track light and film viewers energized.
 7. Tests described in Equipotential Grounding System, Section 26 05 27.
- B. Record all test values and include them in the maintenance manual information.

- C. Submit a copy of test results to the Engineer no longer than one week after tests are completed along with a letter stating that the installed system meets the requirements of the plans and specifications.
- D. In conjunction with these tests, the system shall be demonstrated and the operation and maintenance aspects explained to the Owner's personnel.

END OF SECTION