

## SECTION 16400

### SERVICE AND DISTRIBUTION

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Division 0, including General and Supplementary Conditions, Division 1 Sections, and the Drawings, apply to this Section.
- B. Section 16010, Basic Electrical Requirements.
- C. Section 16050, Basic Electrical Materials and Methods.

##### 1.02 SECTION INCLUDES

- 1. Service entrance and metering
- 2. Switchboards
- 3. Panelboards
- 4. Transient Voltage Surge Suppression (TVSS)
- 5. Enclosed switches
- 6. Fuses
- 7. Enclosed circuit breakers
- 8. Motor starters
- 9. Contactors
- 10. Dry transformers

##### 1.03 SYSTEM DESCRIPTION

- A. Electric Service System: 480/277 volts, three phase, four wire, 60 Hz.

##### 1.04 SUBMITTALS

- A. Provide submittals in accordance with Section 16010 for the following:
  - 1. Service switchboard
  - 2. Panelboards
  - 3. Transient Voltage Surge Suppression
  - 4. Overcurrent devices
  - 5. Disconnects
  - 6. Dry transformers
  - 7. Motor starters
  - 8. Contactors
  - 9. Meter cabinets
- B. Shop Drawings: Indicate relevant information on switchboards, panelboards, and busways. Indicate circuit breaker arrangement in panelboard, type, size, number of poles, interrupting rating, size of enclosures, and quantities.
- C. Product Data: Provide data on enclosed switches and circuit breakers, fuses, panelboards, motor starters, and contactors.
- D. Upon request, submit samples for inspection.
- E. Test Reports: Submit for field inspection and testing. Include description of procedures, duration, instruments used, and test values obtained. Present information in table comparing acceptable values to actual values.

- F. Operating and Maintenance Instructions:
  - 1. Switchboard: Submit NEMA PB 1.1.
  - 2. Panelboard: Submit NEMA PB 2.1
  - 3. Busway: Submit NEMA BU 1.1.

#### 1.05 REGULATORY REQUIREMENTS

- A. Conform to requirements of Utility Company.

### PART 2 - PRODUCTS

#### 2.01 METER DEVICES

- 1. Manufacturers: As approved by utility company.
- 2. Provide to meet utility company specification.

#### 2.02 SWITCHBOARD

- A. Manufacturers:
  - 1. General Electric
  - 2. ITE/Siemens
  - 3. Square D
  - 4. Cutler-Hammer/Westinghouse
- B. Switchboard: NEMA PB2.
  - 1. Line and Load Terminations: Accessible from front only of switchboard, suitable for conductor materials used.
  - 2. Main Section Devices: Individually mounted.
  - 3. Distribution Section Devices: Panel mounted.
  - 4. Nameplates: Identify main and each feeder circuit breaker with lamicoid label, white letters on black background.
  - 5. Provide Arc Flash and Shock Hazard labels in accordance with NFPA 70.
- C. Ratings: As shown on drawings.
- D. Bussing:
  - 1. Bus Material: Copper or Aluminum with tin plating, sized in accordance with NEMA PB 2.
  - 2. Bus Connections: Accessible from rear for maintenance.
  - 3. Provide 1 x 1/4 inch copper ground bus through length of switchboard.
- E. Enclosure: Type 1 - General Purpose.
  - 1. Align sections at front and rear.
  - 2. Height: 90 inches, excluding floor sills, lifting members and pull boxes.
  - 3. Finish: Manufacturer's standard light gray enamel over external surfaces.
- F. Future Provisions:
  - 1. Fully equip spaces for future devices with bussing and bus connection provisions; continuous current rating as indicated on drawings.
  - 2. Do not taper main bus rating.
- G. Switching and Overcurrent Protective Devices:
  - 1. Molded Case Circuit Breakers: Use for circuits up to 400 amperes, NEMA AB 1.
  - 2. Solid State Molded Case Circuit Breakers: NEMA AB 1; with electronic sensing, timing and tripping circuits for adjustable current settings; instantaneous trip; and adjustable short time trip, use for circuits larger than 400 amperes.
  - 3. Provide fully rated circuit breakers; series ratings are not permitted unless specifically noted on the drawings

## 2.03 SWITCHBOARD METERING

- A. Manufacturers
1. Cutler Hammer/Westinghouse
  2. General Electric
  3. Square D
- B. General
1. Provide metering for incoming main bus including current and potential transformers to permit monitoring of current in each phase and neutral, and phase to phase and phase to neutral voltage in each leg.
  2. Provide digital readout for volts, amps, watts, vars, power factor, frequency, wathours, and watt demand.
  3. Metering device: IQ Data Plus II by Cutler-Hammer/Westinghouse, or equal by General Electric or Square D.
  4. Provide current and potential transformers as required to match service characteristics to the meter device.
  5. House CT's and PT's in a cabinet adequate for the purpose. Provide separate cabinet for meter.
- C. Electronic solid state multi-metering like Cutler-Hammer/Westinghouse IQ DP11. Unit to indicate direct reading metered values for the following:
- |            |                      |                 |
|------------|----------------------|-----------------|
| AC Amperes | Phase A              | +/- 1% Accuracy |
|            | Phase B              | +/- 1% Accuracy |
|            | Phase C              | +/- 1% Accuracy |
| AC Voltage | Phase A-B, A-Neutral | +/- 1% Accuracy |
|            | Phase B-C, B-Neutral | +/- 1% Accuracy |
|            | Phase C-A, C-Neutral | +/- 1% Accuracy |
|            | Watts                | +/- 2% Accuracy |
|            | Vars                 | +/- 2% Accuracy |
|            | Power Factor         | +/- 4% Accuracy |
|            | Watt Demand          | +/- 2% Accuracy |
|            | Watt Hours           | +/- 2% Accuracy |
- D. Provide with 3 selectable form C relay outputs: trip, alarm and KWHR pulse initiator and one synch input for KW utility demand synch.

## 2.04 PANELBOARDS

- A. Manufacturers:
1. General Electric
  2. ITE/Siemens
  3. Square D
  4. Cutler-Hammer/Westinghouse
- B. Distribution Panelboards: NEMA PB 1; circuit breaker type.
1. Enclosure: Type 1.
  2. Provide flush or surface cabinet front, as indicated, with screw cover and hinged lockable door, keyed alike, two keys per panelboard.
  3. Bus: Copper or tin plated aluminum.
  4. Ground Bus: Copper.
  5. Voltage: 208/120 or 480/277 volts, three phase.
  6. Minimum Integrated Equipment Rating: 30,000 amperes rms symmetrical for 240 volt panelboards; 25,000 amperes rms symmetrical for 480 volt panelboards, or as shown on drawings.
  7. Nameplate: Lamicaid, white letters on black background.
  8. Provide Arc Flash and Shock Hazard labels in accordance with NFPA 70.

- C. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1; circuit breaker type and similar to type referenced on drawings.
  - 1. Enclosure: NEMA PB 1; Type 1.
  - 2. Provide flush or surface cabinet front, as indicated, with screw cover and hinged lockable door, keyed alike, two keys per panelboard.
  - 3. Bus: Copper or tin plated aluminum.
  - 4. Ground Bus: Copper.
  - 5. Voltage: 208/120 volts, three phase, 4 wire.
  - 6. Minimum Integrated Equipment Rating: As shown on drawings.
  - 7. Provide Arc Flash and Shock Hazard labels in accordance with NFPA 70.
- D. Panelboard design shall be such that individual circuit breakers can be removed without disturbing adjacent units or removing supplemental insulation installed to obtain clearances required by UL. Where space only is indicated, make provisions for future installation of breakers of size indicated.
- E. Circuit Breakers: Thermal and magnetic, bolt-on, trip free, trip elements in each pole and single common handle or factory applied handle tie. For GFCI breakers, provide push-to-test button, visible indication of tripped condition, and ability to detect and trip on current imbalance of approximately 6 milliamperes or greater per requirements of UL 943 for Class A GFCI devices.
  - 1. Provide fully rated circuit breakers; series ratings are not permitted unless specifically noted on the drawings
- F. Panelboard Tubs: Code gauge galvanized steel, prepunched knockouts not permitted.

## 2.05 TRANSIENT VOLTAGE SURGE SUPPRESSION SYSTEM

- A. Acceptable Manufacturers:
  - 1. Current Technology
  - 2. Cutler Hammer/Westinghouse
  - 3. General Electric
  - 4. Square D
- B. The transient voltage surge suppression (TVSS) system shall utilize multiple bi-directional modules to suppress and divert transient voltages and surge currents. Design the system to provide protection for sensitive electronic devices against the effects of surges, transients, and electrical line noise.
- C. Design and manufacture the TVSS system to the following standards:
  - 1. Underwriters Laboratory (UL): UL 1449 and UL 1283.
  - 2. American National Standards Institute (ANSI):
  - 3. ANSI/IEEE C62.41, Categories A, B and C.
  - 4. ANSI/IEEE C62.45.
  - 5. Institute of Electrical and Electronics Engineers (IEEE).
  - 6. National Electrical Manufacturers Association (NEMA).
  - 7. National Fire Protection Association (NFPA): NFPA 70, National Electrical Code.
  - 8. Occupational Safety and Health Act (OSHA).
- D. Design the TVSS system for operation in the following conditions:
  - 1. Operating temperature: -40EC to 60EC.
  - 2. Relative humidity: 0-95%.
  - 3. Operating altitude: 0-12,000 feet.
  - 4. Audible noise: <35 DBA at 3 feet.
- E. Design the TVSS system for the following:
  - 1. Unlimited nominal current handling when installed in a parallel configuration.
  - 2. System voltage: 208/120 VAC, 3-PH, 4-W, grounded wye, 60 Hz.
  - 3. Two stage device and protect against surges and transients up to 160 KA.
  - 4. Response time: Maximum one nanosecond; systems that do not contain silicon avalanche diodes (SADs) are unacceptable.
  - 5. Frequency range: 45-450 Hz.

6. Noise filtering: Capable of managing noise levels produced by electromagnetic interference and radio frequency interference and reject a minimum of 40 db as measured by the 50 ohm insertion loss method.
  7. Filtering mode shall provide sinewave tracking to  $\pm 20\%$ .
  8. UL 1449 clamping voltage ratings shall be no greater than 400 volts line to neutral, and 500 volts neutral to ground.
- F. Protection and Filtering Elements:
1. Shall consist of a number of electronic protection modules designed to divert and suppress transient voltages and surge current. Each electronic protection module shall be rated to suppress a minimum of 80,000 amperes of surge current. The electronic protection modules shall contain one or more individually fused metal oxide varistors (MOVs), each capable of withstanding over 1,000 surges of Category C (IEEE/ANSI C62.41).
  2. Systems that contain more than two MOVs per module shall have their MOV performance derated to compensate for reduced performance resulting from the multiple paths in which the transient must flow. The amount of derating shall be equal to the total per MOV greater than two.
  3. Provide easily viewed red and green indicating lights in each electronic protection module. Indicate normal operation of the module with the green light, and failure by the red light. Indicate summary failure on the front cover of the enclosure using red and green lights.
  4. The protection modules shall be equipped with an octal pin connection assembly and be suitable for field replacement by easy insertion or removal from a matching female base.
  5. Mount the protection modules on a printed circuit board to minimize impedance.
  6. Include filtering elements in each protection module which provide 40 db of noise attenuation.
  7. The use of gas discharge devices or selenium rectifier systems are not acceptable.
- G. Standard Monitoring Features:
1. Provide complete visual system status indication and an audible alarm to indicate electronic protection module failure.
    - a. Provide a monitoring panel complete with mounting bezel and an integral status display. The status display shall contain separate LEDs indicating the following:
    - b. Input AC ON
    - c. System Ready
    - d. System Fault
    - e. Alarm No. 1
    - f. Alarm No. 2
  2. Provide a transient voltage surge counter on the cover of the TVSS enclosure. Include battery backup capable of storing the number of events in memory when input power is unavailable.
  3. Provide a summary contact so that remote monitoring of the TVSS system is possible. The form "C" dry contacts can be connected in either the normally open or normally closed position.
- H. Mounting and Installation: Mount unit integral to the equipment and maintain panelboard UL 67 rating when installed, except in lighting and appliance type panels not exceeding 20 inches in width, design TVSS enclosure for wall mounting as an extension to the panelboard enclosure not exceeding 20" W x 18" H. Attachment of the TVSS to the panelboard shall not increase the combined width of the panelboard and TVSS installation to more than 20 inches. Installation shall be aesthetically pleasing and provide the appearance of an integrated panelboard/TVSS unit. The TVSS enclosure shall be a single bay vertical cabinet using natural convection for cooling. Design the enclosure to allow routine maintenance via front panel access separate from the panelboard dead front.]

## 2.06 ENCLOSED SWITCHES

- A. Manufacturers:
1. General Electric
  2. ITE/Siemens
  3. Square D
  4. Cutler-Hammer/Westinghouse
- B. Enclosed Switch Assemblies: NEMA KS 12; Type HD.
1. Fuse clips: Designed to accommodate Class R fuses.

- C. Enclosures: NEMA KS 12; Type 12 or as indicated on drawings.
- D. Motor Disconnect Switches: General duty for up to 240 volts and 1.5 HP, heavy duty for over 240 volts or 1.5 HP, quick make/break type, fused or nonfused (NF) as indicated. For 1/6 HP or less, motor rated toggle switches are permitted.

#### 2.07 FUSES

- A. Manufacturers:
  - 1. Bussman
  - 2. Gould
- B. Fuses 600 Amperes and Less: Current limiting, time delay, one-time fuse, 250 volts, UL Class RK 1.
- C. Fuses Larger Than 600 Amperes: Current limiting, time delay, one-time fuse, 600 volt, UL Class L.
- D. Fuse Interrupting Rating: 200,000 rms amperes.

#### 2.08 ENCLOSED CIRCUIT BREAKERS

- A. Manufacturers:
  - 1. General Electric
  - 2. ITE/Siemens
  - 3. Square D
  - 4. Cutler-Hammer/Westinghouse
- B. Circuit Breaker: NEMA AB 12.
  - 1. Ratings: As indicated on the drawings.
  - 2. Enclosure: NEMA AB 12; as indicated on the drawings, NEMA 4X stainless steel for kitchen applications.
  - 3. Accessories: As indicated on the drawings.

#### 2.09 MOTOR STARTERS

- A. Manufacturers:
  - 1. Allen-Bradley
  - 2. General Electric
  - 3. ITE/Siemens
  - 4. Square D
  - 5. Cutler-Hammer/Westinghouse
- B. Manual Motor Starter:
  - 1. NEMA ICS 2; AC general purpose Class A manually operated, full voltage controller with overload relay, red pilot light, NO and NC auxiliary contact, and push button or toggle operator.
  - 2. Fractional Horsepower Manual Starter: NEMA ICS 2; AC general purpose Class A manually operated, full voltage controller for fractional horsepower induction motors, with thermal overload unit, red pilot light, and toggle operator.
  - 3. Enclosure: NEMA ICS 6; Type 1.
- C. Magnetic Motor Starter: NEMA ICS 2.
  - 1. Full Voltage Motor Starters: AC general purpose Class A magnetic controller for induction motors rated in horsepower with integral thermal overload elements.
  - 2. Two Speed Starters: Include integral time delay transition between FAST and SLOW speeds.
  - 3. Coil Operating Voltage: 120 volts, 60 Hz.
  - 4. Extra Auxiliary Contacts: 2 normally open or closed, field convertible.
  - 5. Control Power Transformers: 120 volt secondary, or as required by ATC subcontractor, 100 VA or larger as needed.
  - 6. Enclosure: Type 12 lockable for indoor and NEMA 3R for outdoor applications.

- D. Provide as specified or indicated with unit packaged equipment provided under other sections.
- E. Combination Motor Starters: Provide motor starters with integral thermal overload and motor circuit protector (MCP) or non-fusible or fusible switch in single enclosure, as indicated. Size starter in accordance with manufacturer's ratings, or as indicated. Include control transformer, manual-off-automatic (MOA) switch, and red motor run pilot light.
- F. For all starters, provide thermal overload protection in each phase wire of motor circuit to automatically interrupt all phases upon activation of overload sensor in any phase, and manual reset mechanism.
- G. Overload protection for motors 1/4 HP and smaller may be integral with the motor.

## 2.10 VARIABLE FREQUENCY DRIVES

- A. Manufacturers:
  1. Allen Bradley
  2. Cutler-Hammer/Westinghouse
  3. Square D
  4. General Electric
  5. Magnetek
- B. Provide variable frequency drives (VFD) suitable to drive its associated motor at its rated capacity. Provide with features and accessories as listed below, and as needed to interface with temperature control system provided under Division 15.
- C. VFD's shall be pulse width modulated (PWM) with diode bridge rectifiers, transistorized inverters and microprocessor based digital control as follows:
  1. Provide rating in horsepower (HP) equal to or greater than the motor name plate horsepower and the motor full load amperes.
  2. House components in a single NEMA 1, metallic, self ventilated enclosure.
  3. Design for continuous duty operation in a 40 degree C ambient temperature.
  4. Power supply will be 480 volts (+10%), 3 phase, 60 hz, (+2 Hz) on a solidly grounded system.
  5. Output Frequency: 0 to 60 Hz..
  6. Frequency Accuracy: + 0.5%.
  7. Overload Rating: 150% for one minute.
  8. Efficiency: 95% minimum.
  9. Power Factor: 0.95 nominal.
  10. Local and remote control capability.
- D. Provide as a minimum the following control capability:
  1. Minimum and maximum speed adjustment pots.
  2. Acceleration control.
  3. Gain and span adjustment to match input control signal.
  4. Current limit adjustment to limit maximum motor current.
  5. Automatic deceleration control dependant upon load.
  6. Start/Stop selector switch.
  7. Speed potentiometer.
  8. Auto/Manual selector switch.
  9. Digital speed/load meter with selector switch.
  10. Automatic restart after loss of power.
- E. Provide the following diagnostic indicators:
 

-Overvoltage	-Undervoltage
-Overcurrent	-Overload Timer On
-Overload	-Run
-Fault Pilot	-Auto/Manual
-Chopper	-Inverters
-Input Bus Charged	-Input Surge Cycle Complete
-Output Bus Charged	-Power On Pilot
-Fault Pilot	

- F. Prior to ordering, coordinate with Temperature Control contractor to assure that all required features are included and the unit will operate as intended.
- G. Accessories: Provide the following:
1. Door mounted MANUAL/OFF/AUTO (MOA) selector switch to select between manual and remote (AUTO) run control.
  2. The RUN control circuit shall be 120 VAC obtained from a 100VA control power transformer installed in the drive cabinet.
  3. No external sources of control power shall be required.
  4. Door mounted manual speed adjust control by means of a function in the keypad or a separate door potentiometer.
  5. Remote speed adjustment shall be 4-20 mA DC or 0-10 VDC as required by TC.
  6. A door mounted, maintained contact, EMERGENCY STOP push button and emergency stop relay. The relay coil shall be 120 VAC with wiring brought to terminal points for connection of remote emergency stop contacts. The relay shall initiate an external drive fault condition and be wired directly to the output contactor.
  7. A door mounted operator keypad capable of programming, setting and adjusting all drive parameters.
  8. Alphanumeric display to indicate drive status, speed, and fault conditions.
  9. Current transformers and a door mounted ammeter or percent load meter.
  10. One set of Form C dry contacts rated 120 VAC for customer use for "Drive RUN", and "Drive FAULT".
  11. A 4-20 mA or 0-10 VDC output for "Output FREQUENCY" and "Output LOAD" functions.
  12. Pilot lights for "Power ON", "Drive RUN".
  13. Door mounted Run Time Meter.
- H. Include the following protective features.
1. External Signal Trip.
  2. Phase sequence.
  3. Phase loss.
  4. Undervoltage.
  5. Overvoltage
  6. Overcurrent
  7. Overtemperature.
- I. Provide current limiting input line fuses to protect the drive from overloads and short circuits.
- J. Provide adjustable electronic overload protection to provide motor running overload protection in accordance with NEC Article 430 Part C.
- K. Enclosure: Install the drive and all components in a single NEMA 1 metallic gasketed enclosure.
1. The enclosure shall be suitable for top or bottom conduit entry.
  2. Arrange cabinet ventilation such that two or more drive cabinets may be placed next to each other.
  3. Cabinet shall be front access only and suitable for mounting against a wall.
  4. Provide a copper equipment ground bus; include a bonding jumper between the enclosure and the door.
- L. Wiring:
1. Segregate power and control wiring from wiring sensitive to noise.
  2. Control wiring shall be No. 14 AWG stranded or larger.
  3. Signal leads shall be No. 16 AWG shielded, 600 volt insulation.
  4. Provide easily accessible and labeled terminal strips for signal leads and 120 volt control field connections.
  5. Identify each wire or cable termination with wire numbers at both ends.

## 2.11 CONTACTORS

- A. Manufacturers:
1. General Electric
  2. ITE/Siemens



3. Square D
  4. Cutler-Hammer/Westinghouse
  5. Allen Bradley
- B. General Purpose Contactors: NEMA ICS 2; electrically held.
1. Coil Operating Voltage: 120 volts, 60 Hz.
  2. Enclosure: NEMA ICS 6; Type 1.
- C. Lighting Contactors: NEMA ICS 2; electrically operated, mechanically held, or as indicated.
1. Coil Operating Voltage: 120 volts, 60 Hz.
  2. Enclosure: NEMA ICS 6; Type 1.
  3. Provide bus terminals suitable for mounting in panelboard.

## 2.12 DRY TRANSFORMERS

- A. Manufacturers:
1. General Electric
  2. ITE/Siemens
  3. Square D
  4. Cutler-Hammer/Westinghouse
  5. Jefferson
- B. Description: Enclosed air cooled dry type transformers.
- C. Ratings: As shown on drawings.
- D. Configuration: Two winding.
- E. Winding Taps: Four full capacity primary taps, each at 2.5 percent below rated voltage;
- F. Mounting: Floor.
- G. Enclosure: Indoor.

## PART 3 - EXECUTION

### 3.01 EXAMINATION AND PREPARATION

- A. Make arrangements with Utility Company to obtain permanent electric service to the Project.

### 3.02 INSTALLATION

- A. Install Utility services in accordance with Utility Company instructions and as indicated.
1. Install service entrance conduits and conductors to building service entrance equipment as indicated on the drawings.
  2. Utility company will provide primary conductors and make final connection of contractor furnished spades, left loose, on transformer secondary terminals.
- B. Install equipment in accordance with manufacturer's instructions.
- C. Install switchboard to NEMA PB 2.1.
- D. Install proper fuses in each fused switch.
- E. Install panelboards and load centers to NEMA PB 1.1.

- F. Mount panelboards, disconnects, starters, and enclosed circuit breakers 6'-6" AFF to top of cabinet on steel channel of sufficient length to bridge studs, except where indicated otherwise or approved by Engineer.
  - G. Set flush mounted panelboards such that tub flanges extend within 1/8" of wall surface at all points, covers rest firmly against wall, and completely close all openings to interior of cabinet.
  - H. Provide a minimum of three 3/4" spare capped conduits stubbed to accessible ceiling void for future use on all flush mounted panelboards.
  - I. Panelboard circuiting has been worked out with breakers numbered and increasing in size and number of poles from top to bottom. If this is not retained, the Contractor shall be responsible for revising contract drawings and paying to have it done. This is not to prohibit an occasional revision approved by Engineer and properly marked on as-built drawings for correction by others.
  - J. For each branch circuit panelboard, provide a typewritten tabulation indicating fixture outlets, devices, machines, or apparatus served by each breaker and their room location. This shall follow coding on the drawings with breakers numbered from top to bottom. Mount tabulation inside the door in a frame for the purpose with a transparent plastic cover.
  - K. Coordinate installation with other sections. It is the responsibility of this section to ensure that mechanical ducts and piping maintain code required clearances around electrical equipment and that walls have sufficient thickness to accept recessed panelboards.
- 3.03 Install VFD drives in accordance with manufacturers written instructions.
- A. Provide manufacturer's technician service assistance for drive set-up, start up, adjustment and field checking and testing.
- 3.04 GROUNDING
- A. Bond system neutral and all ground conductors together at the service. Bond all feeder conduits to ground at the service and at the main distribution switchboard. Bond service to water and sprinkler mains on street side of water meter and to heating main.
  - B. Bond separately derived systems such as dry transformers and generators to building steel and water main.
  - C. Provide grounding and bonding to NFPA 70, include a separate green grounding conductor in each circuit. Bond all panelboards, cabinets, and equipment to service ground.
  - D. On all but service equipment and separately derived systems, the neutral bus shall be isolated from ground except for the common bond at the main distribution.
- 3.05 FIELD QUALITY CONTROL
- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
  - B. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point by passing minimum current of 10 amperes DC and measuring voltage drop. Maximum resistance: 10 ohms.
- 3.06 CLEANING
- A. Clean equipment finishes to remove paint and concrete splatters.

END OF SECTION