## Part 1 GENERAL

### 1.1 SCOPE

.1 The Contractor shall furnish and install, where indicated on the drawings, a deadfront type, low voltage metal-enclosed switchgear assembly utilizing drawout power circuit breakers, as specified herein and shown on the contract drawings.

### 1.2 RELATED SECTIONS

.1 Section 26 24 05 – Service Entrance TVSS Protection

.2 Section 26 24 03 – Electric Metering System

### 1.3 REFERENCES

.1 The low voltage metal-enclosed switchgear assembly and all components shall be designed, manufactured and tested in accordance with the following latest applicable standards:

- .1 ANSI-C37.20 – Switchgear assemblies
- .2 ANSI-C37.13 – Low voltage power circuit breakers
- .3 ANSI-C37.17 – Trip devices
- .4 NEMA SG-5 – Switchgear assemblies
- .5 NEMA SG-3 – Low voltage power circuit breakers
- .6 UL 1558
- .7 CSA C22.2 N0. 31-14-Switchgear Assemblies

### 1.4 SUBMITTALS – FOR REVIEW/APPROVAL

.1 The following information shall be submitted:

- .1 Master drawing index
- .2 Front view and plan view of the assembly
- .3 Three-line diagram
- .4 Schematic diagram
- .5 Nameplate schedule
- .6 Component list
- .7 Conduit space locations within the assembly
- .8 Assembly ratings including:
  - .1 Short-circuit rating
  - .2 Voltage
  - .3 Continuous current rating
- .9 Major component ratings including:
  - .1 Voltage
  - .2 Continuous current rating
  - .3 Interrupting ratings

.10 Cable terminal sizes

.11 Product data sheets

.12 Where applicable, the following additional information shall be submitted:

.1 Busway connection

.2 Composite front view and plan view of close-coupled assemblies

.3 Key interlock scheme drawing and sequence of operations

.4 Mimic bus size and color

**1.5 SUBMITTALS – FOR CONSTRUCTION**

.1 The following information shall be submitted for record purposes:

.1 Final as-built drawings and information for items listed in Clause 1.4, and shall incorporate all changes made during the manufacturing process

.2 Wiring diagrams

.3 Certified production test reports

.4 Installation information

**1.6 QUALIFICATIONS**

.1 The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

.2 For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

.3 The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Departmental Representative, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

**1.7 REGULATORY REQUIREMENTS**

.1 The switchgear shall bear a UL 1558 label.

**1.8 DELIVERY, STORAGE AND HANDLING**

.1 Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

**1.9 OPERATION AND MAINTENANCE MANUALS**

.1 Equipment operation and maintenance manuals shall be provided with each assembly shipped, and shall include instruction leaflets and instruction bulletins for the complete assembly and each major component.

## Part 2 PRODUCTS

**2.1 MANUFACTURERS**

.1 Eaton

.2 Schneider Electric

.3 Siemens

.4 The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Departmental Representative ten (10) days prior to bid date.

**2.2 RATINGS**

.1 Voltage rating shall be as indicated on the drawings. The entire assembly shall be suitable for 600 volts maximum ac service.

.2 The assembly shall be rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current of 65,000 amperes symmetrical at rated voltage.

.3 The bus system shall have a minimum ANSI short-circuit withstand rating of 100,000 amperes symmetrical tested in accordance with ANSI C37.20.1 and UL1558.

.4 All circuit breakers shall have a minimum symmetrical interrupting capacity of 65,000 amperes. To ensure a fully selective system, all circuit breakers shall have 30 cycle short-time withstand ratings equal to their symmetrical interrupting ratings through 85,000 amperes, regardless of whether equipped with instantaneous trip protection or not.

.5 All ratings shall be tested to the requirements of ANSI C37.20.1, C37.50 and C37.51 and UL witnessed and approved.

**2.3 CONSTRUCTION**

.1 The switchgear shall consist of the required number of vertical sections bolted together to form a rigid assembly. The sides shall be covered with removable bolt-on covers. All edges of front covers or hinged front panels shall be formed. Provide ventilators located on the top of the switchgear over the breaker and bus compartments to ensure adequate ventilation within the enclosure.

.2 The assembly shall be provided with adequate lifting means and shall be capable of being moved into installation position and bolted directly to the concrete housekeeping pads. Provisions shall be made for jacking of shipping groups, for removal of skids or insertion of equipment rollers. Base of assembly shall be suitable for rolling directly on pipes without skids. The base shall be equipped with slots in the base frame members to accommodate the use of pry bars for moving the equipment to its final position.

.3 Each vertical steel unit forming part of the switchgear line-up shall be a self-contained housing having one or more individual breaker or instrument compartments, a centralized bus compartment and a rear cable compartment. Each individual circuit breaker compartment, or cell, shall be segregated from adjacent compartments and sections by means of steel barriers to the maximum extent possible. It shall be equipped with drawout rails and primary and secondary disconnecting contacts. Removable hinge pins shall be provided on the breaker compartment door hinges. Current transformers for feeder instrumentation, where shown on the plans, shall be located within the appropriate breaker cells and be front accessible and removable.

.4 The stationary part of the primary disconnecting devices for each power circuit breaker shall be breaker mounted and consist of a set of contacts extending to the rear through a glass polyester insulating support barrier; corresponding moving finger contacts, suitably

spaced, shall be furnished on the power circuit breaker studs which engage in only the connected position. The assembly shall provide multiple silver-to-silver full floating high pressure point contacts with uniform pressure on each finger maintained by springs. Each circuit shall include the necessary three-phase bus connections between the section bus and the breaker line side studs. Load studs shall be equipped with insulated copper load extension buses terminating in solderless type terminals in the rear cable compartment of each structure. Bus extensions shall be silver-plated where outgoing terminals are attached.

.5 The circuit breaker door design shall be such that the following functions may be performed without the need to open the circuit breaker door: lever circuit breaker between positions, operate manual charging system, close and open circuit breaker, examine and adjust trip unit, and read circuit breaker rating nameplate.

.6 The secondary disconnecting devices shall consist of floating terminals mounted on the stationary unit and engaging mating contacts at the front of the breaker. The secondary disconnecting devices shall be gold-plated and engagement shall be maintained in the "connected" and "test" positions.

.7 The removable power circuit breaker element shall be equipped with disconnecting contacts and interlocks for drawout application. It shall have four positions, "connected," "test," "disconnected" and "removed." The breaker drawout element shall contain a worm gear levering "in" and "out" mechanism with removable lever crank. Levering shall be accomplished via the use of conventional tools. Mechanical interlocking shall be provided so that the breaker is in the tripped position before levering "in" or "out" of the cell. Interlocking that trips the breaker will not be accepted. The breaker shall include an optional provision for key locking open to prevent manual or electric closing. Padlocking shall provide for securing the breaker in the connected, test, or disconnected position by preventing levering.

.8 An insulating flash shield shall be mounted above each circuit breaker to prevent flashover from the arc chutes to ground.

.9 Standard of Acceptance: Cutler-Hammer Magnum DS low voltage metal-enclosed switchgear, utilizing Magnum DS power circuit breakers.

.10 The main electrical room switchgear shall be suitable for use as service entrance equipment and be labeled in accordance with CSA requirements.

.11 Provide a rear compartment barrier between the cable compartment and the main bus to protect against inadvertent contact with main or vertical bus bars.

.12 Provide in the cell when the circuit breaker is withdrawn, a safety shutter which automatically covers the line and load stabs and protects against incidental contact.

.13 Provide a metal barrier full height and depth between adjacent vertical structures in the cable compartment.

.14 Provide a glass polyester full height and depth barrier between adjacent vertical structures in the bus compartment with appropriate slots for main bus.

**2.4 BUS**

.1 All bus bars shall be silver-plated copper. Main horizontal bus bars shall be mounted with all three phases arranged in the same vertical plane. Bus sizing shall be based on ANSI standard temperature rise criteria of 65 degrees C over a 40 degrees C ambient (outside the enclosure).

.2 Provide a full capacity neutral bus where a neutral bus is indicated on the drawings.

.3 A copper ground bus shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchgear. The ground bus short-time withstand rating shall meet that of the largest circuit breaker within the assembly.

.4 All hardware used on conductors shall be high-tensile strength and zinc-plated. All bus joints shall be provided with Belleville-type washers.

**2.5 WIRING/TERMINATIONS**

.1 Small wiring, necessary fuse blocks and terminal blocks within the switchgear shall be furnished as required. Control components mounted within the assembly shall be suitably marked for identification corresponding to the appropriate designations on manufacturer's wiring diagrams.

.2 Provide a front accessible, isolated vertical wireway for routing of factory and field wiring. Factory provisions shall be made for securing field wiring without the need for adhesive wire anchors.

.3 Front access to all circuit breaker secondary connection points shall be provided for ease of troubleshooting and connection to external field connections without the need of removing the circuit breaker for access.

.4 All control wire shall be type SIS. Control wiring shall be 14 ga for control circuits and 12 ga for current transformer circuits. Wire bundles shall be secured with nylon ties and anchored to the assembly with the use of pre-punched wire lances or nylon non-adhesive anchors. All current transformer secondary leads shall first be connected to conveniently accessible shorting terminal blocks before connecting to any other device. Shorting screws with provisions for storage shall be provided. All groups of control wires leaving the switchgear shall be provided with terminal blocks with suitable numbering strips and provisions for #10 AWG field connections. Each control wire shall be marked to the origin zone/wire name/destination zone over the entire length of the wire using a cured ink process. Provide wire markers at each end of all control wiring. Plug-in terminal blocks shall be provided for all shipping split wires. Terminal connections to remote devices or sources shall be front accessible via doors above each circuit breaker.

.5 NEMA 2-hole mechanical type lugs shall be provided for all line and load terminations suitable for copper or aluminum cable rated for 75 degrees C of the size indicated on the drawings.

.6 Lugs shall be provided in the incoming line section for connection of the main grounding conductor. Additional lugs for connection of other grounding conductors shall be provided as indicated on the drawings.

.7 Reusable insulating boots shall be provided to cover all power cable terminations.

**2.6 CIRCUIT BREAKERS**

.1 All protective devices shall be low voltage power circuit breakers. All breakers shall be UL listed for application in their intended enclosures for 100% of their continuous ampere rating.

.2 All power circuit breakers shall be constructed and tested in accordance with ANSI C37.13, C37.16, C37.17, C37.50, UL 1066 and NEMA SG-3 standard. The breaker shall carry a UL label.

.3 Breakers shall be provided in drawout configuration. The 800, 1600, 2000 and 3200 ampere frame power circuit breakers shall be provided in the same physical frame size, while 4000, 5000 and 6000 ampere frame power circuit breakers shall be provided in a second physical frame size. Both physical frame sizes shall have a common height and depth.

.4 Power circuit breakers shall utilize a two-step stored-energy mechanism to charge the closing springs. The closing of the breaker contacts shall automatically charge the opening springs to ensure quick-break operation.

.5 Breakers shall be manually operated (MO).

.6 To facilitate lifting, the power circuit breaker shall have integral handles on the side of the breaker.

.7 The power circuit breaker shall have a closing time of not more than 3 cycles.

.8 The primary contacts shall have an easily accessible wear indicator to indicate contact erosion.

.9 The power circuit breaker shall have three windows in the front cover to clearly indicate any electrical accessories that are mounted in the breaker. The accessory shall have a label that will indicate its function and voltage. The accessories shall be plug and lock type and UL listed for easy field installation. They shall be modular in design and shall be common to all frame sizes and ratings.

.10 The breaker control interface shall have color-coded visual indicators to indicate contact open or closed positions, as well as mechanism charged and discharged positions. Manual control pushbuttons on the breaker face shall be provided for opening and closing the breaker. The power circuit breaker shall have a "Positive On" feature. The breaker flag will read "Closed" if the contacts are welded and the breaker is tripped or opened.

.11 The current sensors shall have a back cover window that will permit viewing the sensor rating on the back of the breaker. A rating plug will offer indication of the rating on the front of the trip unit.

.12 A position indicator shall be located on the faceplate of the breaker. This indicator shall provide color indication of the breaker position in the cell. These positions shall be Connect (Red), Test (Yellow), and Disconnect (Green). The levering door shall be interlocked so that when the breaker is in the closed position, the breaker levering-in door shall not open.

.13 Each power circuit breaker shall offer sixty (60) front-mounted dedicated secondary wiring points. Each wiring point shall have finger safe contacts, which will accommodate #10 AWG maximum field connections with ring tongue or spade terminals or bare wire.

**2.7 TRIP UNITS**

.1 Each low voltage power circuit breaker shall be equipped with a solid-state tripping system consisting of three current sensors, microprocessor-based trip device and flux-transfer shunt trip. Current sensors shall provide operation and signal function. The trip unit shall use microprocessor-based technology to provide the basic adjustable time-current protection functions. True rms sensing circuit protection shall be achieved by analyzing the secondary current signals received from the circuit breaker current sensors and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time delay settings are reached. Interchangeable current sensors with their associated rating plug

shall establish the continuous trip rating of each circuit breaker. The trip unit shall be Cutler-Hammer type Digitrip RMS 1150+ or equal.

.2 The trip unit shall have an information system that utilizes battery backup LEDs to indicate mode of trip following an automatic trip operation. The indication of the mode of trip shall be retained after an automatic trip. A reset button shall be provided to turn off the LED indication after an automatic trip. A test pushbutton shall energize a LED to indicate the battery status.

.3 The trip unit shall be provided with a display panel, including a representation of the time/current curve that will indicate the protection functions. The unit shall be continuously self-checking and provide a visual indication that the internal circuitry is being monitored and is fully operational.

.4 The trip unit shall be provided with a making-current release circuit. The circuit shall be armed for approximately two cycles after breaker closing and shall operate for all peak fault levels above 25 times the ampere value of the rating plug.

.5 Trip unit shall have selectable powered and unpowered thermal memory for enhanced circuit protection.

.6 The trip unit shall have provisions for a single test kit to test each of the trip functions.

.7 The trip unit shall provide zone interlocking for the short-time delay and ground fault delay trip functions for improved system coordination. The zone interlocking system shall restrain the tripping of an upstream breaker and allow the breaker closest to the fault to trip with no intentional time delay. In the event that the downstream breaker does not trip, the upstream breaker shall trip after the present time delay. Factory shall wire for zone interlocking for the power circuit breakers within the switchgear.

.8 Main Tie and breakers shall have individually adjustable ground fault alarm only.

.9 The trip unit shall have a 4-character LCD display showing phase, neutral, and ground current. The accuracy of these readings shall be +/- 2% of full scale.

.10 The trip unit shall include a power/relay module which shall supply control to the readout display. Following an automatic trip operation of the circuit breaker, the trip unit shall maintain the cause of trip history and the mode of trip LED indication as long as its internal power supply is available. An internal relay shall be programmable to provide contacts for remote ground alarm indication.

.11 The trip unit shall include a voltage transformer module, suitable for operation up to 600V, 50/60 Hz. The primary of the voltage transformer module shall be connected internally to the line side of the circuit breaker through a dielectric test disconnect plug.

.12 The display for the trip units shall be a 24-character LED display.

.13 Metering display accuracy of the complete system, including current sensors, auxiliary CTs, and the trip unit, shall be +/- 1% of full scale for current values. Metering display accuracy of the complete system shall be +/- 2% of full scale for power and energy values.

.14 The unit shall be capable of monitoring the following data:

.1 Instantaneous value of phase, neutral and ground current

.2 Instantaneous value of line-to-line voltage

.3 Minimum and maximum current values

.4 Watts, vars, VA, watthours, varhours and VA hours

.15 The energy-monitoring parameter values (peak demand, present demand, and energy consumption) shall be indicated in the trip unit's alphanumeric display panel.

.16 The trip unit shall display the following power quality values: crest factor, power factor, percent total harmonic distortion, and harmonic values of all phases through the 31st harmonic.

.17 An adjustable high load alarm shall be provided, adjustable from 50 to 100% of the long delay pickup setting.

.18 The trip unit shall contain an integral test pushbutton. A keypad shall be provided to enable the user to select the values of test currents within a range of available settings. The protection functions shall not be affected during test operations. The breaker may be tested in the TRIP or NO TRIP test mode.

.19 Programming may be done via a keypad at the faceplate of the unit or via the communication network.

.20 System coordination shall be provided by the following microprocessor-based programmable time-current curve shaping adjustments. The short-time pickup adjustment shall be dependant on the long delay setting.

.1 Programmable long-time setting

.2 Programmable long-time delay with selectable I2t or I4t curve shaping

.3 Programmable short-time setting

.4 Programmable short-time delay with selectable flat or I2t curve shaping, and zone selective interlocking

.5 Programmable instantaneous setting

.6 Programmable ground fault setting trip or ground fault setting alarm

.7 Programmable ground fault delay with selectable flat or I2t curve shaping and zone selective interlocking

.21 The trip unit shall offer a three-event trip log that will store the trip data, and shall time and date stamp the event.

.22 The trip unit shall have the following advanced features integral to the trip unit:

.1 Adjustable undervoltage release

.2 Adjustable overvoltage release

.3 Reverse load and fault current

.4 Reverse sequence voltage alarm

.5 Underfrequency

.6 Overfrequency

.7 Voltage phase unbalance and phase loss during current detection

.23 The trip unit shall offer information on the circuit breaker's health. The data available shall include total number of all Instantaneous and Short Delay trips seen by the circuit breaker, an additional count of all the overloads and ground fault trips seen by the circuit breaker, an operation counter, a time stamp of the last breaker operation, and the maximum temperature seen by the trip unit. All these data points will be stored in non volatile memory and available for remote communications.

.24 The trip unit shall utilize ARMs Technology (Arc Flash Reduction Maintenance System). The ARMs Technology shall be provided in a system that shall reduce the trip unit Instantaneous pickup value when activated. The ARMs device shall not compromise breaker phase protection even when enabled. Once the ARMs unit is disabled, the recalibration of trip unit phase protection shall not be required. Activation and deactivation of the ARMs Technology trip setting shall be accomplished without opening the circuit breaker door and exposing operators to energized parts. The ARMs Technology shall provide a clearing time of 0.04 seconds, adjustable with a minimum of five settings ranging from 2.5X to 10X of the sensor value.

.25 The ARMs Technology shall be enabled via a switch on the trip unit. It shall also provide confirmation of protection via a Blue LED.

.26 The ARMs Technology shall be provided with remote "enable/disable" control and confirmation of protection via an IR communication link.

.27 The ARMs Technology shall be provided with a switchgear panel mounted enable padlockable selector switch and indication via Blue LED pilot light.

.28 The ARMs Technology shall be wired locally with interposing relays and wired to terminal blocks to enable a remote selector switch and confirmation light to be mounted a the downstream protected distribution equipment.

.29 A remote selector switch is to be provided and installed in the electrical room for all exterior service switches.

## 2.8 MISCELLANEOUS DEVICES

.1 Key interlocks shall be provided as indicated on the drawings. These interlocks shall keep the circuit breakers trip-free when actuated.

.2 Each section of exterior switchgear shall be provided with a space heater thermostatically controlled. Power for the space heaters shall be obtained from a control power transformer within the switchgear. Supply voltage shall be 120 volts ac.

.3 Fused control power transformers shall be provided as indicated on the drawings or as required for proper operation of the equipment. A manual disconnect shall be provided ahead of the primary fuses.

## 2.9 UTILITY METERING

.1 Where indicated on the drawings, furnish separate barriered-off utility metering compartments, complete with hinged sealable doors. Bus work shall include provisions for mounting utility company current transformers and potential transformers, or potential taps as required by the utility company. Provide service entrance label and necessary applicable service entrance features per CEC and local code requirements.

.2 Where indicated on the drawings, metering compartments are to be provided to accommodate dual service entrances with totalizing capability to permit a single utility meter.

## 2.10 OWNER METERING

.1 Where indicated on the drawings, provide a separate owner metering compartment with front hinged door.

.2 Provide current transformers for each meter and each breaker as indicated. Current transformers shall be wired to shorting-type terminal blocks.

.3 Provide potential transformers including primary and secondary fuses with disconnecting means for metering as shown on the drawings.

## 2.11 ENCLOSURES

.1 NEMA 1 Enclosure for interior applications.

.2 Outdoor non-walk-in enclosure for exterior applications

.1 Switchgear shall be enclosed in an outdoor non-walk-in NEMA 3R enclosure conforming to all applicable requirements of UL and designed to withstand wind velocities of 125 mph. The enclosure shall have a roof sloping toward the rear. Outer sections shall be the same widths as indoor structures except the end sections of a non-walk-in enclosure shall be wider than the inner sections to permit opening the inner door. Each end of the outdoor structure shall have an end trim

.2 The enclosure shall be provided with front and rear hinged padlockable doors with wind stops for each section. Ventilating openings shall be provided complete with replaceable fiberglass air filters which are removable from the exterior of the enclosure. Provide necessary space heaters thermostatically controlled for breaker, bus and cable compartments of adequate wattage to prevent the accumulation of moisture within the compartments

.3 The construction of the enclosure shall be modular so future sections can be added without affecting NEMA 3R integrity. Provide interior fluorescent lights, switches and GFI protected receptacles

.4 The enclosure shall be provided with undercoating applied to all members in contact with the foundation surface to retard corrosion

.5 Power for the space heaters, lights and receptacles shall be obtained from a control power transformer within the switchgear. Supply voltage shall be 120 volts ac

.6 A portable overhead circuit breaker lifter shall be provided to assist in removal of the circuit breakers from the enclosure

.7 Each shipping section shall be shipped completely assembled

.8 Provide separate wireway as required for line and load conductor bottom entry.

## 2.12 NAMEPLATES

.1 Engraved nameplates, mounted on the face of the assembly, shall be furnished for all main and feeder circuits as indicated on the drawings. Nameplates shall be laminated plastic, black characters on white background, and secured with screws. Characters shall be 3/16-inch high, minimum.

.2 Furnish master nameplate giving switchgear designation, voltage ampere rating, short-circuit rating, and manufacturer's name.

.3 Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer's drawings.

**2.13 FINISH**

.1 All exterior and interior steel surfaces of the switchgear shall be properly cleaned and provided with a rust-inhibiting phosphatized coating. Color and finish of the switchgear shall be ANSI 61.

**2.14 ACCESSORIES**

.1 Provide a traveling type circuit breaker lifter, rail-mounted on top of exterior switchgear and a floor running portable circuit breaker transfer truck with manual lifting mechanism for interior switchgear.

**2.15 SURGE PROTECTIVE DEVICES**

.1 Provide surge protective devices as specified in Section 26 24 05.

**Part 3 EXECUTION**

**3.1 FACTORY TESTING**

.1 The switchgear shall be completely assembled, wired, adjusted and tested at the factory. After assembly, the complete switchgear shall be tested to ensure the accuracy of the wiring and the functioning of all equipment. The main bus system shall be given a dielectric test of 2200 volts for one minute between live parts and ground and between opposite polarities.

.2 The wiring and control circuits shall be given a dielectric test of 1500 volts for one minute, or 1800 volts for one second, between live parts and ground, in accordance with ANSI C37.20.1.

.3 A certified test report of all standard production tests shall be shipped with each assembly.

**3.2 FIELD QUALITY CONTROL**

.1 Provide the services of a qualified factory-trained manufacturer's representative to provide start-up of the equipment specified under this section for a period of 3working days.

.2 The Contractor shall provide three (3) copies of the manufacturer's field startup report.

.3 Manufacturers Representative to complete/oversee primary injection testing of all breakers. Submit test results to Engineer.

**3.3 TRAINING**

.1 The Contractor shall provide a training session for up to five (5) owner's representatives for 2 normal workdays at a job site location determined by the owner.

.2 The training session shall be conducted by a manufacturer's qualified representative. The training program shall consist of the instruction on the operation of the assembly, circuit breakers, and major components within the assembly.

**3.4 INSTALLATION**

.1 The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

.2 All necessary hardware to secure the assembly in place shall be provided by the Contractor.

.3 The equipment shall be installed and checked in accordance with the manufacturer's recommendations. This shall include but not limited to:

.1 Checking to ensure that the pad location is level to within 0.125 inches per three feet of distance in any direction

.2 Checking to ensure that all bus bars are torqued to the manufacturer's recommendations

.3 Assembling all shipping sections, removing all shipping braces and connecting all shipping split mechanical and electrical connections

.4 Securing assemblies to foundation or floor channels

.5 Measuring and recording Megger readings phase-to-phase, phase-to-ground, and neutral-to-ground (four wire systems only)

.6 Inspecting and installing all circuit breakers in their proper compartments

**END OF SECTION**