PROJECT MANUAL

FOR

SENECA GAMING CORPORATION

SENECA NIAGARA CASINO
310 FOURTH STREET
NIAGARA FALLS, NEW YORK 14303

SNC UPS-1 REPLACEMENT

January 26, 2024

375 Essjay
Suite 200
Williamsville, New York 14221

WD Project No. 425570

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TECHNICAL SPECIFICATIONS

BID FORM

Seneca Niagara Casino
UPS-1 Replacement
Wendel Project No. 425570

BID FORM

To: Seneca Gaming Corporation
Seneca Niagara Falls Casino
310 Fourth Street
Niagara Falls, NY 14303

In compliance with the Invitation to Bid, the undersigned:

_____
(Name of firm, partnership, or Corporation)

hereby proposes to furnish all supervision, labor, materials, plant, tools, equipment, transportation, overhead and profit, and other facilities related to, proper for, or incidental to the Bid Package noted below for the Seneca Niagara Falls Casino UPS-1 Replacement project, in strict accordance with the Project Manual dated January 26, 2024 and the Drawings mentioned therein, and including any subsequently issued addenda for consideration of the following:

BID ITEMS:

TOTAL LUMP SUM BASE BID

_____Dollars ($_____)

BID BREAKDOWN: ALL bidders shall attach additional pages as necessary, to provide a complete breakdown of their total lump sum base bid.

ATTACH ADDITIONAL SHEET TO THIS BID FORM LISTING PROPOSED SUBCONTRACTORS/SUBCONSULTANTS AS NECESSARY.

The Bidder agrees that this Proposal shall be good and may not be withdrawn for a period of sixty (60) calendar days from the date of Bid opening. Furthermore, the undersigned will execute a contract in the form specified and submit specified insurance certificates.

The Bidder understands that the Owner specifically reserves the right to reject any and all Bids and to waive any informality therein.

The undersigned agrees to complete the work in accordance with the time period specified in the form of agreement as applicable to the Bid Package being submitted:

Addendum Receipt: The receipt of the following addenda to the Specifications is acknowledged:

Addendum No. _____ Date _____ Addendum No. _____ Date _____

Addendum No. _____ Date _____ Addendum No. _____ Date _____

Submittals as required by the Instructions to Bidders, shall be completed and delivered to the owner/engineer.

Dated _____, 20___

_____
Legal name of person, partnership, or corporation

(Sign Bid Here) By:

_____
Name and Title

Legal Business Address:

_____
Street

_____
City and State

_____
Phone Number

IF BIDDER IS A FIRM OR PARTNERSHIP, COMPLETE THE FOLLOWING:

Name of Members or Partners	Legal Residence
_____	_____
_____	_____
_____	_____
_____	_____

IF BIDDER IS A CORPORATION, COMPLETE THE FOLLOWING:

State of Incorporation: _____

Name and Title	Legal Residence
_____	_____
President	
_____	_____
Vice President	
_____	_____
Secretary	

BID PROPOSAL CERTIFICATIONS

Firm Name _____

Business Address _____

Telephone Number _____ Date of Bid _____

I. General Bid Certification

The bidder certifies that he will furnish, at the prices herein quoted, the materials, equipment, and/or services as proposed on this bid.

II. Non-Collusive Bidding Certifications

By submission of this bid proposal, the bidder also certifies compliance with the following:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation, or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor,

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition. (b) A bid shall not be considered for award nor shall any award be made where (a) (1) and (2) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where (a) (1) and (2) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting completions.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

2. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work of services performed or to be performed or goods sold or not to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

Signature (Authorized) _____

Title _____

DIVISION 01

SECTION 011000 SUMMARY OF WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. A brief description of the major work components covered under this Contract. A more complete description of the work is provided in individual sections of this document and on the contract drawings. The Contractor shall furnish and install all equipment, labor, materials, tools, and appurtenances necessary to complete the work for final acceptance.

1.2 LOCATION OF PROJECT

A. Project Location: 310 Fourth Street, Niagara Falls, New York 14303.

1.3 CONTRACT

A. This Project shall be constructed under one contract.

1.4 WORK TO BE PERFORMED

A. Summary: The work to be performed includes, but is not limited to the following:

1. Removal of existing 160KW UPS unit (UPS-1) while maintaining the existing distribution section (PDM). Provide temporary power to UPS-1 loads (PDM, DS-IT-PP1) from UPS-2 while the UPS-1 is out of service. Other UPS-1 loads served from PDM2 and SV-1 shall be transferred to UPS-2 at the point of use by the owner. Installation of new 100KW UPS (Provided by owner) refeeding PDM, DS IT-PP-1 and DS SV-1. Contractor responsible for transporting new UPS from owner's warehouse located at 6000 Packard Rd, Suite 100 Niagara Falls 14304 to the site. Contractor responsible for all rigging required to transport the UPS to the electrical room.

B. The Work includes but is not limited to: obtaining permits; complying with permits; site utilities, equipment, testing, training, flagging, inspection and other appurtenances, together with other related work specified and required to complete the Project.

C. The Contractor's use of site is limited to Work areas. Perform all Work to prevent damage or injury to buildings, existing equipment, occupants thereof, and adjacent features that might result from equipment or other causes, and so as not to interfere with the use, and free and safe passage throughout the Site.

D. Damage to the Site shall be repaired and/or replaced by the Contractor with the same or matching materials as the existing adjacent surface or as may be otherwise approved by the Owner.

E. Upon completion of the Work, restore premises to pre-construction conditions. Where documentation of pre-construction conditions does not exist or is insufficient, restoration shall be performed to Owner's satisfaction.

1.5 SEQUENCE AND PROGRESS OF WORK

A. All work shall be completed in accordance with the schedule set forth in the Agreement, and as indicated below.

B. The Contractor is advised that time is of the essence and that work under this contract shall proceed as expeditiously as possible.

C. The Contractor shall submit for review and approval by the Engineer a sequence and schedule of the work to be performed under this contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall furnish all labor, equipment and materials and shall do all work as shown on the Plans, as specified, and as directed by the Engineer, tested in place and ready for use, in accordance with the obvious and expressed intent of the Contract to secure a complete installation. In general, the work to be performed under is described in the following sections.

B. The quality of workmanship and materials entering into the work shall conform to the requirements of the pertinent sections, clauses, paragraphs and sentences, both directly and indirectly applicable thereto, in these Specifications, whether or not direct reference to such occurs in the Bid Items.

C. All items hereinafter listed in the Descriptions of Bid Items are described in detail in other Sections of these Specifications.

END OF SECTION 011000

SECTION 011201- PROJECT ADMINISTRATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DISCREPANCIES

A. Any discrepancy or lack of clarity in the Contract Documents must be brought to the Engineer's attention before the award of the Contract. Otherwise, the Engineers interpretation of the Documents shall be final, and no additional compensation shall be permitted due to the resolution of such discrepancy or lack of clarity.

B. For any modifications from the basis of design, the contractor is responsible for including all costs associated with any modification to the execution, inspection or testing from the basis of design. The contractor shall SUBMIT a detailed description of any modification to the execution, inspection or testing prior to proceeding with this scope of work.

1.3 REFERENCE AND DEFINITIONS

A. "Engineer": An architectural and engineering firm under contract to the Owner to perform architectural and engineering services for this project. Where the term is used in these Contract Documents, it shall refer to Wendel WD Architecture, Engineering, Surveying & Landscape Architecture, P.C.

B. "Authority having jurisdiction": An agency or entity having statutory, regulatory, or code enforcement jurisdiction on the project.

C. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.

D. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Owner or the Engineer, requested by the Owner or the Engineer, and similar phrases.

E. "Approved": The term "approved," when used in conjunction with the Engineer's action on the contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.

F. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

G. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

H. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

I. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

J. “Contractor”: The term contractor refers to the entity under separate agreement with the Owner, engaged to perform construction and/or Design-Build activities for the project.

K. “Subcontractor”: The term subcontractor refers to the entity engaged by the contractor to perform construction activities under separate agreement with the contractor.

L. "Project site" is the space available to the contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

M. “Owner” or “Customer”: Seneca Gaming Corporation., Inc.

1.4 PERMITS AND CODES

A. The contractor shall be responsible for obtaining and paying for all permits, licenses and inspections for proper execution of the work, in addition to being responsible for performing the work in compliance with all applicable codes, standards and authorities, and being present as required by code officials or other authorities as they inspect the work.

1.5 REQUEST FOR INFORMATION

A. All RFIs shall be submitted through Procore and are to be numbered and titled as required by the Engineer. Requests should be uploaded to Procore and shall include sufficient detail and documentation. Answers will be returned via Procore, copying Owner Representative, the Engineer, and any other necessary party.

1.6 CHANGE ORDERS

A. Field conditions may be encountered that are outside the responsibility of the contractor. It is the responsibility of the contractor to notify the Engineer and Owner of these field conditions prior to any work being started. Under no circumstances shall the contractor go ahead and do additional work until s/he receives a written change order from the Owner or Engineer to do so. If the contractor, without a written change order, does additional work it is at his/her own risk and if a change order cannot be obtained from the Owner, the extra work and materials used will be the contractor's own expense.

B. Contractor change orders are to have a maximum overhead and profit markup of 10% for material and labor, and 5% for subcontractor work.

1.7 COORDINATION, EMERGENCY RESPONSE & REPERFORMANCE OF WORK

A. The work will be performed while the facility is in operation or, if approved, during off hours. The contractor shall arrange his work schedule with the Engineer and Owner and shall take all reasonable precautions to ensure security protocols and the safety of people passing through the work area.

B. All necessary shutdowns of equipment shall be coordinated at least one (1) week in advance with the Engineer and Owner. Request for service interruptions shall be made in writing and shall be valid only after approval by the Owner.

C. The contractor shall handle emergency calls 24 hours a day and respond within a four hour period on work that they have done.

D. If inspections reveal improper work, a request to redo the work will be given to the contractor. Such re-performance of work shall be completed at the contractor's own expense and within 48 hours of the request.

1.8 CONSTRUCTION KICK-OFF MEETING

A. Contractor shall provide a preliminary schedule in sufficient detail to accurately reflect the scope of work. Include in the schedule all activities and durations necessary for completion of the entire scope of work.

B. Engineer shall schedule and take minutes at a Construction Kick-Off Meeting with contractor and Owner to discuss: administration of the contract, construction and material storage site(s) and disposal procedures; scheduling of work; dress codes; security protocol; morning check-in procedures; access procedures, safety concerns; and other pertinent information and procedures.

C. All meeting minutes shall: detail all decisions made during the meeting; detail who's responsibility it is to carry out each item discussed; be typed and; be e-mailed to all parties prior to next meeting.

1. Meeting minutes will be distributed by the Engineer.

D. During the Kick-Off meeting, the contractor, Engineer, and Owner shall agree to and schedule one (1) Job Progress Meeting.

1.9 IDENTIFICATION AND SCHEDULING OF TASKS

A. Prior to commencement of Construction activities, contractor shall divide the work into identifiable Tasks and schedule the Tasks according to the specific project work requirements discussed at the initial Kick-off Meeting. Task Identification and associated Schedules must be reviewed and approved by both Engineer and the Owner prior to material delivery and Construction start.

B. The overall project schedule shall be listed on the submittal log and submitted as the first submittal item.

C. The project schedule shall include all project related tasks including but not limited to submittals, permitting, equipment lead times, work to be completed, training, O&Ms and final completion.

D. The project schedule shall start with the Notice of Award date and shall terminate with the Final Completion date.

1.10 PROJECT MANAGEMENT AND WORK CREW REQUIREMENTS

A. The contractor shall assign a Project Superintendent that has authorization and control over the execution of the work. The Project Superintendent shall be the single point of contact between the contractor and Engineer/Owner.

B. Project Superintendent requirements

1. A competent Project Superintendent with experience in managing and coordinating the project
2. Project Superintendent shall not change during the course of the project. Should such a change occur that is outside the contractor's control it is the contractor's responsibility to create a seamless transition.
3. Project Superintendent shall be available at all times by cell phone and e-mail.
4. The Project Superintendent shall possess sufficient technical knowledge and experience to lead the installation team, coordinate construction activities, mange project schedules and manage subcontractors.

C. The Project Superintendent's responsibilities shall include but not be limited to the following:

1. Develop and Maintain overall project schedule.
2. Develop and coordinate sequence of construction.
3. Update schedule on a weekly basis.
4. Coordinate organization and delivery of all correspondence between the contractor and their Engineer/Owner. Including but not limited to all Submittals, RFIs, RFPs, and COs.
5. Coordinating with Engineer and/or Owner for room access and equipment shutdowns.
6. Detailing and coordinating any Facility interruptions in a timely manner as outlined within this document.
7. Compiling of Record Document.
8. Ordering all necessary materials in a timely manner.
9. Coordinating the delivery of all materials.
10. Receiving and signing for all materials.
11. Periodic review of all labor to make sure installations are being done as per specification requirements.
12. Making sure waste is being handled properly.
13. Attending the "kick-off" meeting and all subsequent job meetings.

D. The Project Superintendent shall have a contractor supplied mobile phone so s/he may be located without delay.

E. The work crew shall wear company labeled shirts and be clean and neat in appearance.

F. Key Personnel Names: Within Five (5) days prior to starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; provide driver's licenses and list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, driver's licenses and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to the Project.

1.11 STORAGE SPACE

A. The contractor will be responsible for the storage of wastes, materials inventory, ladders, and work boxes for tools, etc. The contractor may ask the Owner and Engineer for storage space within the building or may provide their own storage space via on-site trailer. If a trailer is used for storage, contractor must get approval of Owner and Engineer for on-site location of the trailer and will be responsible for providing any utilities required for the trailer at the contractor's own expense.

B. In either case, contractor is responsible for the safety and security of all equipment and materials and holds the Owner and Engineer harmless of all losses.

1.12 FIELD RECORDS

A. RECORD DRAWINGS

1. Markup Procedure: During construction, the contractor shall maintain a set of blue-line or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

a. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:

1) Dimensional changes to the Drawings.
2) Revisions to details shown on the Drawings.
3) Locations and depths of underground utilities.
4) Revisions to routing of piping and conduits.
5) Revisions to electrical circuitry.
6) Actual equipment locations.
7) Duct size and routing.
8) Locations of concealed internal utilities.
9) Changes made by change order.
10) Details not on original Contract Drawings.

b. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.

c. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

d. Mark important additional information that was either shown schematically or omitted from original Drawings.
e. Note alternate numbers, change-order numbers, and similar identification.
f. Responsibility for Markup: The individual or entity who obtained record data, whether the individual or entity is the Installer, Contractor, Subcontractor, or similar entity, shall prepare the markup on record drawings.

2. Final submission of record drawings

a. One (1) Electronic and three (3) hard copies required. Electronic copies may be in Revit, PDF or TIF format at the discretion of the Engineer/Owner.

1) Accurately record information in an understandable drawing technique.
2) Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.

B. RECORD PRODUCT DATA

1. Obtain product data for each piece of equipment installed. It is the responsibility of the contractor to obtain and maintain product data for equipment supplied by others.

C. OPERATION AND MAINTENANCE MANUAL SUBMITTAL

1. Three (3) Operation and Maintenance Manuals and one (1) electronic manual on USB drive or in PDF format are required.
2. When each construction activity that requires submittal of maintenance manuals is nominally complete, but before Substantial Completion, submit maintenance manuals specified.

a. Organize operation and maintenance manuals into suitable sets of manageable size.
b. Bind data into individual binders for each manual, properly identified on front and spine. For large manuals, provide an index sheet and thumb tabs for separate information categories.

c. In each Operation and Maintenance Manual, include information specified in individual Specification Sections and the following:

1) Emergency instructions.
2) Spare parts list.
3) Copies of specific warranties.
4) Wiring diagrams.
5) Recommended maintenance procedures and turn-around times.
6) Inspection and system-test procedures.
7) Shop Drawings and Product Data.
8) Listing of required maintenance materials and services.
9) Names and addresses of sources of maintenance materials.
10) Maintenance drawings and diagrams.
11) Precautions against improper maintenance and exposure.

d. The contractor is responsible for Operation and Maintenance Manuals for all Work included in their respective scope of work. Where a manual includes information on installations by more than one entity, the contractor shall receive information from their Subcontractors, coordinate and collate information for a unified manual, and provide binders and submittal as specified.

1.13 DAILY AND FINAL CLEANING

A. At the end of each working day, the contractor shall remove all his/her equipment to the designated storage area and leave no trace of his/her presence throughout the Facility: i.e. all areas must be vacuum-cleaned at the end of each working day, even to the extent of removal of wire clippings and other such minor debris from the work area. In the materials storage area, the contractor is to stack all materials neatly and out of the way, remove all rubbish, and leave the area broom clean.

B. Final Cleaning – The contractor is to provide final cleaning of all areas affected by construction operations to a condition acceptable by the Owner and Engineer.

1.14 DISPOSAL OF OLD MATERIALS

A. Each contractor shall be responsible for the proper and legal disposal of all removed material, boxes, and other packaging. Rubbish shall be removed from the building daily. The contractor shall make all necessary arrangements for offsite disposal of all non-hazardous materials at any private or public dump that the contractor chooses. The contractor shall obtain any necessary approvals to use such facilities and bear all associated costs. All such costs are to be included in the bid prices.

1.15 WARRANTY

A. Refer to General Conditions for additional requirements.

B. Warranty to cover all materials, supplies, articles, equipment, parts and assemblies thereof furnished and incorporated in the permanent. Work shall be of the highest grade, free from defects and imperfections, of recent manufacture and unused. Workmanship shall be of the highest grade and in accordance with best modern standard practice.

C. Except where longer periods of warranty are elsewhere provided for, all Work done under the Contract by the contractor shall be guaranteed by the contractor to be free from faulty materials and Workmanship throughout the period ending one year from the date of formal written substantial completion of the entire completed Work under the Contract. Upon receiving notification from the Engineer and Owner, the contractor shall immediately correct, repair, replace, or otherwise remedy, without cost to the Engineer or Owner and to the entire satisfaction of the Engineer and Owner, all defects, damages or imperfections due to faulty materials or Workmanship appearing in said Work within such period. No payment to the contractor shall relieve it of any obligation hereunder. In the event the guarantee Work also proves defective within a year following the performance of such Work, the defective Work shall also be repaired, corrected, or replaced at the contractor’s cost.

D. All materials, articles, supplies, equipment, parts and assemblies thereof, of standard manufacture, or for which detail design or other requirements are not prescribed in the Contract Documents, incorporated in the Work shall be guaranteed by the contractor (1) as suitable and fit for the particular purpose intended and (2) throughout the period ending one year (or throughout such longer periods of time guaranteed by the respective manufacturers) from the date of formal written substantial completion of the entire completed Work under this Contract, against any failure in proper use or operation caused by defective material, Workmanship, design or other failure to meet the requirements of the specifications. Any defects in materials, Workmanship, design or other failure to meet the requirements of the specifications which are disclosed within such periods of time shall be corrected, repaired, replaced or otherwise remedied by the Contractor without additional cost to the Engineer or the Owner immediately after notice in writing of the defect or failure shall have been given by the Engineer.

E. In addition to the foregoing obligations in this section the contractor shall pay the total actual cost (including but not limited to direct, indirect and overhead costs) to the Owner of any additional Work by Others arising from the correction, repair, or replacement of any such defective material or Workmanship or other remedial action necessitated thereby. If the contractor fails promptly to remove such articles when requested by the Owner or Engineer and/or to proceed promptly with such repair, replacement or correction thereof, or other remedial action, the Owner (1) by contract or otherwise may replace, repair or correct such articles or effect other appropriate remedies and charge to the contractor the total actual cost as described immediately above occasioned thereby, and/or (2) may terminate the Contract for default. If because of any such defective material, workmanship, design or other failure to meet the requirement of the specifications immediate remedial action with respect to the articles is required to permit Work hereunder, to continue or to progress the Work by Others or to advance or continue the operation or re-operation of the plant, the Owner at its option and after notice to the contractor may proceed with such necessary correction, repair, replacement or other remedial action and such total actual cost thereof shall be charged to the contractor and deducted from any money due or to become due to it.

F. The guarantees under this section are in addition to any manufacturer’s guarantee or warranty. Manufacturer’s guarantee or warranties that extend over a period of time greater than the guarantee periods specified herein shall not be modified or voided by any requirement of this section. The contractor shall promptly provide the Engineer with copies of all manufacturers’ guarantees or warranty documents as part of the O&M manuals.

1.16 INSURANCE

A. The contractor shall provide a certificate of insurance showing the coverage required under these Contract Documents, and included within the subagreement, prior to the commencement of any work. The policy(ies) shall contain a provision that the afforded coverage cannot be canceled before at least thirty (30) days prior written notice has been given to the Owner and shall name the Engineer and the Owner as additional insurers on the Contractor's Comprehensive or Commercial General Liability, Contractual Liability, and products/Completed Operations Liability Insurance policies. Subcontracted labor insurance must list the Engineer and the Owner as additional insured.

1.17 AWARD OF CONTRACT / SIGNING OF AGREEMENT

A. The Owner will award the contract to the successful bidder by way of a written Agreement. The contractor shall then sign two (2) copies and provide an electronic copy of the enclosed contractor Agreement and return them to Owner and Engineer. The Owner will then sign these documents and return one original to the contractor. No payments will be made until these documents have been received by the Engineer and Owner.

1.18 INVOICING / PAYMENTS

A. Prior to the contractor submitting an application for payment, the contractor shall submit for approval a Schedule of Values to the Engineer/Owner. The schedule of values shall be broken out by Labor and Materials per specification section, and shall include line items for general requirements including but not limited to the following:

1. Mobilization
2. Insurance
3. Bonds
4. Submittals
5. Coordination Drawings
6. Daily and Final Cleaning
7. Temporary Facilities and Controls (as applicable to contract)
8. Alternates
9. Demobilization
10. Closeout Documents

B. Before the work starts, the Subagreement must have been properly completed by the contractor and submitted to Owner for their signature and Owner must have received all required certificates of insurance.

END OF SECTION 011201

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Engineer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Engineer are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 7 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Engineer.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs,

with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

3. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

4. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: For Change Order Proposals, use CSI Change Order Request (proposal format). A sample copy is included at the end of this section.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor.

1.5 WORK CHANGE DIRECTIVE

A. Work Change Directive: Engineer may issue a Work Change Directive. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 012600

CHANGE ORDER

NO. _____

PROJECT: _____

DATE OF ISSUANCE: _____ EFFECTIVE DATE: _____

OWNER: _____

OWNER'S Contract No. _____

CONTRACTOR _____ ENGINEER _____

You are directed to make the following changes in the Contract Documents.

Description: _____

Reason for Change Order: _____

Attachments: _____

CHANGE ORDER IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: $	Original Contract Times Substantial Completion: _____ Ready for final payment: _____ (days or dates)
Net changes from previous Change Orders No. to . $	Net changes from previous Change Orders No. to . days
Contract price prior to this Change Order: $	Contract Times prior to this Change Order Substantial Completion: _____ Ready for final payment: _____
Net increase (decrease) of this Change Orders $	Net increase (decrease) of this Change Orders days
Contract price with all approved Change Orders: $	Contract Times with all approved Change Orders Substantial Completion: _____ Ready for final payment: _____

This change order represents full and complete compensation for all costs relative to the change itself and all other impacts on the project. Contractor hereby acknowledges that it has considered and priced into this change order impacts beyond the scope of the individual change order and waives all claims otherwise.

RECOMMENDED:	**APPROVED:**	**ACCEPTED:**
BY: _____	BY: _____	BY: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

CHANGE ORDER REQUEST (PROPOSAL)

Project: _____ Change Order Request Number: _____

_____ From (Contractor): _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

This change Order Request (C.O.R.) contains an itemized quotation for changes in the Contract Sum or Contract Time in response to proposed modifications to the Contract Documents based on Proposal Request No._____.

Description of Proposed Change:

Attached supporting information from: ☐ Subcontractor ☐ Supplier ☐ _____ ☐ _____

Reason For Change:

Does Proposed Change involve a change in Contract Sum? ☐ No ☐ Yes [Increase] [Decrease] $ Does

Proposed Change involve a change in Contract Time? ☐ No ☐ Yes [Increase] [Decrease] _____days

Attached pages: ☐ Proposal Worksheet Summary: _____
☐ Proposal Worksheet Detail(s): _____

Signed by:

Copies: ☐ Owner Consultants ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ File

WORK CHANGE DIRECTIVE

No. _____

DATE OF ISSUANCE_____ EFFECTIVE DATE _____

OWNER_____
CONTRACTOR _____
Contract:_____
Project:_____
OWNER's Contract No._____ ENGINEER's Project No. _____

You are directed to proceed promptly with the following change(s):
Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If OWNER or CONTRACTOR believe that the above change has affected Contract Price any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Contract Documents.

Method of determining change in
Contract Price:

☐ Unit Prices
☐ Lump Sum
☐ Cost of the Work_____

Estimated increase (decrease) in Contract Price:
$_____.
If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Estimated increase (decrease) in Contract Times:
Substantial Completion:_____days;
Ready for final payment:_____days.

RECOMMENDED:

_____
ENGINEER
By: _____

AUTHORIZED:

_____
OWNER
By: _____

WORK CHANGE DIRECTIVE

INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent ChangeOrder.

For supplemental instructions and minor changes not involving a change in the Contract Price or the Contract Times a Field Order should be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

Engineer initiates the form, including a description of the items involved and attachments.

Based on conversations between Engineer and Contractor, Engineer completes the following:

> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE: Mark the method to be used in determining the final cost of Work involved and the estimated net effect on the Contract Price. If the change involves an increase in the Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or Contractor may stop the changed Work when the estimated time is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked "Not Applicable".

Once Engineer has completed and signed the form, all copies should be sent to Owner for authorization because Engineer alone does not have authority to authorize changes in Price or Times. Once authorized by Owner, a copy should be sent by Engineer to Contractor. Price and Times may only be changed by Change Order signed by Owner and Contractor with Engineer's recommendation.

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR CONTRACT TIMES. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.

SECTION 013000 - PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination.
2. Submittals.
3. Administrative and supervisory personnel.
4. Project meetings.
5. General installation provisions.
6. Cleaning and protection.

B. Where applicable, the Contractor shall participate in these coordination requirements.

1.2 COORDINATION

A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, cooperate with scheduled construction activities in the sequence required to obtain the best results.
2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out

with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.3 SUBMITTALS

A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals Procedures."

B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.4 PROJECT MEETINGS

A. General: The Engineer will schedule and conduct meetings and conferences at Project site or other location.

B. Preconstruction Conference: The Engineer will schedule a preconstruction conference and organizational meeting at the Project site prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of the Owner, the Engineer, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers and other concerned parties shall each be represented at the conference as necessary. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing.
    d. Designation of responsible personnel.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for processing Applications for Payment.
    g. Distribution of the Contract Documents.
    h. Submittal procedures.
    i. Preparation of Record Documents.
    j. Use of the premises.
    k. Responsibility for temporary facilities and controls.
    l. Parking availability.

m. Office, work, and storage areas.
n. Equipment deliveries and priorities.
o. Safety procedures.
p. First aid.
q. Security.
r. Progress cleaning.
s. Working hours.
t. Housekeeping.
u. Subcontractors.
v. Preliminary Schedule of Shop Drawings and Samples.
w. MBE, WBE, and EEO Goals.
x. Coordination with other contractors.
y. Insurance in Force.
z. Contractor's Schedule of Values.

C. Progress Meetings: The Engineer will conduct one (1) progress meeting at the Project.

1. Attendees: In addition to representatives of the Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Time.
3) Sequence of operations.
4) Status of submittals.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site utilization.
9) Temporary facilities and controls.
10) Work hours.
11) Hazards and risks.
12) Progress cleaning.
13) Quality and work standards.
14) Change Orders.
15) Documentation of information for payment requests.
16) MBE, WBE, and EEO goals
17) Neighborhood issues.

3. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Recheck measurements and dimensions before starting each installation.

F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.2 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or

otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 013000

REQUEST FOR INFORMATION

Contractor Name

Address:
City, State, Zip:

Phone:
Fax:

Project No.

Contractor RFI No.: _____ **DATE:** _____

TITLE: _____ **JOB:** _____

PROJECT: **REQUIRED:** _____

TO: Wendel
375 Essjay Road, Suite 200
Williamsville, New York, 14221

ATTN: PAA (PAA @wendelccompanies.com)

QUESTION:

ANSWER:

Note: the response to this RFI is for clarification of the contract documents. The response is **NOT** authorization to proceed with additional work.

Answered By:_____ Date:_____

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including but not limited to, the following:

1. Preliminary construction schedule.
2. Contractor's construction schedule.
3. Submittal schedule.
4. Material location reports.
5. Site condition reports.
6. Special reports.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

C. Event: The starting or ending point of an activity.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time belongs to Owner.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.
3. Three 3 paper copies.

B. Preliminary construction schedule.

1. Approval of startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Submittals Schedule: Submit submittals schedule, conforming to dates on the Contractor's Construction Schedule. Include any required submittals not included on the schedule. Arrange the following information in a tabular format:

1. Scheduled dates for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational)
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's and Owner's final release or approval.

D. Contractor's Construction Schedule: Submit on 11"x17" paper for review as required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. Site Condition Reports: Submit at time of discovery of differing conditions.

F. Special Reports: Submit at time of unusual event.

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTAL SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required per construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2. Initial Submittal: Submit within 10 business days of Notice to Proceed. Include submittals required during the first 60 calendar days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule. Update monthly as required.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

1. Contract completion date(s) shall not be changed by submission of a schedule that shows a late completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Include the following:

1. Activity Duration
2. Procurement Activities
3. Submittal Review Time
4. Startup and Testing Time
5. Commissioning
6. Substantial Completion
7. Punch List and Final Completion

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date as provided or as indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date as provided or as indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.

b. Submittals.
c. Purchases.
d. Mockups.
e. Fabrication.
f. Sample testing.
g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Building flush-out.
m. Startup and placement into final use and operation.
n. Commissioning

7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Structural completion.
b. Temporary enclosure and space conditioning.
c. Permanent space enclosure.
d. Completion of mechanical installation.
e. Completion of electrical installation.
f. Substantial Completion.
g. Final Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion**.**

E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 10 calendar days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 calendar days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately.

2.5 REPORTS

A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Owner with a need-to-know schedule responsibility.

1. Post copies in temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION - 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information, and physical samples that require Engineers responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information, and physical samples that do not require Engineers responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard for electronic documents, licensed by Adobe Systems, used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

E. Cloud-Based Construction Management Software Application (CMSA): Any of a number of proprietary file management collaborative systems intended for internet-connected device use. The intent of these applications is to enable dispersed users access to shared documents for storage, organization, retrieval, editing, tracking, reporting or other functions, with such access usually controlled by invitation and security protocols. More than one such application type or specific programs may be used, depending on Owner preferences.

1. Procore

1.4 SUBMITTAL PROCEDURES

A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.

1. Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project Record Drawings.

a. Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD format.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Engineer reserve(s) the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence upon Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 business days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 10 additional business days for initial review of each submittal.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
4. Transmittal Form for Electronic Submittals: Use Procore form acceptable to Owner and Engineer, containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name of Contractor.
    e. Name of firm or entity that prepared submittal.
    f. Names of subcontractor, manufacturer, and supplier.
    g. Category and type of submittal.
    h. Submittal purpose and description.
    i. Specification Section number and title.
    j. Specification paragraph number or drawing designation and generic name for each of multiple items.
    k. Drawing number and detail references, as appropriate.
    l. Location(s) where product is to be installed, as appropriate.
    m. Related physical samples submitted directly.
    n. Indication of full or partial submittal.
    o. Transmittal number, numbered consecutively.
    p. Submittal and transmittal distribution record.
    q. Other necessary identification.
    r. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

    a. Project name.
    b. Number and title of appropriate Specification Section.
    c. Manufacturer name.
    d. Product name.

E. Options: Identify options requiring selection by Engineer.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineers action stamps.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer catalog cuts.
    d. Wiring diagrams showing factory-installed wiring.
    e. Printed performance curves.
    f. Operational range diagrams.
    g. Mill reports.
    h. Standard product operating and maintenance manuals.
    i. Compliance with recognized trade association standards.
    j. Compliance with recognized testing agency standards.
    k. Application of testing agency labels and seals.
    l. Notation of coordination requirements.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shop work manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.

i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than sheet size used for Contract Document Drawings.
4. Number of Copies: Submit two black-line prints and one electronic file copy of each submittal. Engineer will return the one print marked with action taken to the Contractor for distribution. Contractor shall make necessary copies from the returned print.

D. Submittals requiring compliance with other sections in the Project Manual.

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Application for Payment.
4. Schedule of Values.
5. Subcontract List.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by individual Specification Sections and elsewhere in the Contract Documents.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Engineer will not return copies, unless they are rejected for noncompliance with the Contract Documents.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.

C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

F. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

G. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

H. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.

I. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

J. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

M. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

N. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

O. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

P. Material Safety Data Sheets: Keep on site and submit information directly to Owner. If submitted to Engineer, Engineer will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer**.**

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEERS ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Engineer Action:

   a. Final Unrestricted Release: When the Engineer marks a submittal “No Exceptions Taken” the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
   b. Final-But-Restricted Release: When the Engineer marks a submittal “Provide as Corrected,” the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
   c. Returned for Resubmittal: When the Engineer marks a submittal “Revise and Resubmit,” do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay.

      1) Do not use, or allow others to use, submittals marked “Revise and Resubmit” at the Project Site or elsewhere where Work is in progress.

   d. Returned for Resubmittal: When the Engineer marks a submittal “Rejected”, the Engineer has not completed a full review, because it is clear that the submittal does not reflect the requirements of the Contract Documents. Do not proceed with work

covered by the submittal, including purchasing, fabrication, delivery or other activity. Revise or prepare a new submittal that complies with the Contract Documents.

e. Other Action: If the submittal is primarily for information purposes, record purposes, special processing, or other contractor activity, the submittal will be returned marked "Reviewed for General Conformance Only". These submittals have been received and processed for information only and not approved or disapproved by the Engineer.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will reject and return it if it does not comply with Contract Document requirements.

D. Submittals not required by the Contract Documents will not be reviewed and will be discarded or returned without action.

END OF SECTION 013300

Submittal No._____

Submittal Transmittal

PROJECT: Seneca Niagara Falls Casino – UPS-1 Replacement PROJECT #: 425570

OWNER: SGC A/E: WENDEL

CONTRACT # & NAME_____

CONTRACT: _____
(NAME, ADDRESS, TELEPHONE & FAX NUMBERS)

☐ NEW SUBMITTAL ☐ RESUBMITTAL Date: _____

This submittal is: ☐ AS SPECIFIED REMARKS:_____

NUMBER OF COPIES SUBMITTED: (8 maximum) _____

TYPE OF SUBMITTAL: ***(CHECK ALL THAT APPLY)***

( ) SHOP DRAWINGS
( ) SAMPLE
( ) COLOR SELECTION
( ) SCHEDULE
( ) WARRANTY
( ) TEST REPORT
( ) PRODUCT DATA/CATALOG CUT
( ) RECORD DOCUMENT
( ) PERFORMANCE DATA
( ) OPERATIONS & MAINTENANCE DATA
( ) OTHER _____

SPEC. SECTION: _____

PARAGRAPH(S): _____

DWG. REF. NO.:_____

CONTRACTOR CERTIFICATION

CONTRACTOR CERTIFIES THAT THE INFORMATION SUBMITTED COMPLIES WITH THE CONTRACT DOCUMENT REQUIREMENTS.

By: _____

Date: _____

NOTE: Contractor shall apply an approval stamp to each copy of each submittal.

DESCRIPTION OF SUBMITTAL:_____

PRODUCT NAME:_____

MANUFACTURER:_____

ADDRESS:_____ TEL. NO.:_____

CONTRACTOR or SUBCONTRACTOR:_____ TEL. NO.:_____

SUPPLIER:_____ TEL. NO.:_____

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Contractor's quality-control personnel.
2. Manufacturer.
3. Fabricator.
4. Installer.
5. Professional engineer.
6. Specialists.
7. Testing agency.
8. Manufacturer's technical representative.
9. Factory-authorized service representative.

B. Preconstruction testing.

C. Mockups: For each form of construction and finish required, using materials indicated for the completed Work.

1. Demonstrate the proposed range of aesthetic effects and workmanship.
2. Maintain mockups as a standard for judging the completed Work.
3. Demolish and remove mockups when directed unless otherwise indicated.
4.

1.3 QUALITY CONTROL

D. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility.

E. Manufacturer's field services.

F. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's

responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

G. Associated Services: Access to the Work, taking and storing samples**,** and delivery of samples to testing agency.

H. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

I. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections.

J. Test and inspection log.

K. Repair and Protection: Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum, unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Architect, Owner, testing agencies, and authorities having jurisdiction.

B. Any Contractor's cost of, or for establishing their own temporary services or facilities will not be accepted as basis of claim for an adjustment in Contract Sum or Contract Time. Charges for establishing temporary utility service must be borne by the Contractor receiving the service.

C. The Contractor is responsible for power associated with temporary field office and storage units including installation, hook-ups and consumption and use charges.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Contractor shall show temporary facilities, utility hookups, traffic control, staging areas, and designated parking areas for construction personnel.

B. Fire-Safety Program: General Contractor shall show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

3.2 ASSIGNMENT OF GENERAL AND SPECIFIC TEMPORARY FACILITIES

A. Providing temporary facilities includes, but is not limited to, providing, furnishing, installing, supplying, maintaining, altering, repairing, relocating, dismantling and removing such facilities.

B. The Contractor is responsible for providing all necessary and incidental labor, equipment and materials to complete the following work:

1. Installation, operation, maintenance, and removal of its own temporary facilities.
2. Its own field office.
3. Storage and Fabrication Containers: Provide mobile storage and fabrication trailers, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Location to be coordinated with Owner.
4. Secure lockup of its own tools, materials and equipment.
5. Electric for power distribution from temporary electrical service to office and storage trailers. The Contractor shall be responsible for their own cost to connect trailers and storage units to temporary electrical and other utilities.
6. Make provisions for temporary electric service for its own work until the Contractor has established project temporary electrical services.
7. The Contractor requiring temporary water shall, at their own expense, provide hoses containers and other devices required to deliver water to the point of that Contractor’s work.
8. Any water damage to work of others shall be the sole responsibility of the Contractor utilizing the water and not the Owner. Repair of water damaged work will be the responsibility of the Contractor causing the damage.
9. Provide its own drinking water including potable water containers, dispensers, cups and waste receptacle as required for their employee’s use.
10. First Aid Supplies.

11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
12. Provide task lighting, and special lighting necessary exclusively for its own activities.
13. It is the Contractor's responsibility to provide all necessary lights and power sources to complete work unless otherwise noted.
14. The Contractor shall provide its own hoisting of materials and equipment. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
15. Material and equipment hoists shall meet any and all requirements of law, rule or regulation.
16. Contractor shall provide its own temporary stairs, ladders and scaffolding required for the performance of their work.
17. Contractor shall provide its own clean-up of debris to dumpsters on a daily basis or as directed by the Owner or Engineer. Upon failure to so maintain a clean work area, the Owner shall cause clean-up to be performed by others at the expense of the Contractor failing to so clean. Upon completion of work in an area, the Contractor shall leave the area in a broom-clean condition. Upon failure to broom clean within 24 hours of Owner's or Engineer's written directive, the Owner shall cause said clean-up to be performed by others at the expense of the Contractor failing to clean.
18. All labor, material, and equipment necessary to provide and maintain suitable access roads and pads for use of cranes and tractor trailers.
19. Temporary electrical services shall not be provided for the operation of, but not limited to, electric welders, heaters, masonry mixing equipment, hoisting equipment or similar equipment with high power demands. Any contractor requiring special power requirements shall coordinate and pay for this metered service directly or provide stand-alone generator. This provision shall occur at no cost to the Owner.
20. The use of gasoline or kerosene-burning space heaters or open flame/salamander type heating units is prohibited.
21. All rubbish shall be lowered by way of chutes, taken down by hoists, or lowered in receptacles. Under no circumstances shall any rubbish be dropped or thrown from one (1) level to another inside or outside any building
22. Contractor will comply with the safety provisions of the National Fire Protection Association's "National Fire Codes" pertaining to the work and, particularly, in connection with any cutting or welding performed as part of the work.
23. Contractor is responsible for securing their individual portable offices, storage units, materials, tools and equipment. Contractor is required to make every effort to close and otherwise secure work areas at the end of each work shift. Contractor is responsible for thefts, damage to their work and replacement of damaged work that cannot be restored to its original condition. The Owner retains the exclusive right to accept or reject repair work.
24. Contractor shall provide and maintain all safety-related work necessary to result in a safe workplace for its employees, in strict accordance with OSHA Regulations.
25. Contractor will provide their company Safety Program fourteen days (14) in advance of mobilization to the site for review by the Owner. Contractors will abide by their Company Safety Program and all Project safety requirements until final Project closeout.
26. Contractor shall provide its employees with all personal safety devices required to protect said employees in accordance with OSHA Regulations.
27. Contractor shall restore any said safety-related work, which is removed or modified by its employees prior to leaving the protected area. Failure to so restore will render the

Contractor liable for any costs incurred by others in the restoration of said safety-related work.

28. Contractor is responsible for providing and maintaining proper ventilation during construction activities.
29. Contractor is responsible to protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
30. Contractor is responsible to provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
31. Service of existing utilities serving the site and/or adjacent building shall not be interrupted without issuing notice to the Owner one (1) week in advance of anticipated interruption. Contractor causing the interruption shall be responsible to provide temporary service until new or existing service can be restored to proper working condition.

3.3 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.2 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.3 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names foreach product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

a. Specification Section number and title.
b. Generic name used in the Contract Documents.
c. Proprietary name, model number, and similar designations.
d. Manufacturer's name and address.
e. Supplier's name and address.
f. Installer's name and address.
g. Projected delivery date or time span of delivery period.
h. Identification of items that require early submittal approval for scheduled delivery date.

B. Substitution Requests: Requests for substitution will be considered if received prior to commencement of the Work. Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A or other applicable form.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided

within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.

b. Use product specified if Engineer cannot make a decision on use of a proposed substitution within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

D. Warranty and Bond Submittals: Submit written warranties to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer.

1. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

B. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

1. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Engineer for a determination of the most important product qualities before proceeding.

Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources that produce products that possess these qualities, to the fullest extent possible.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products to allow for inspection and measurement of quantity or counting of units.
6. Store materials in a manner that will not endanger Project structure.
7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
9. Protect stored products from damage.

B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 48 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Warranty Requirements: Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

1. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
2. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
3. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
    a. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
4. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

PART 2 – PRODUCTS

2.1 PRODUCT OPTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Engineer's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.

    a. Substitutions may be considered.

2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.

    a. Substitutions may be considered.

3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

    a. Substitutions may be considered.

4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

    a. Substitutions may be considered.

5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
7. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.

2.2 PRODUCT SUBSTITUTIONS

A. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
11. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
12. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
13. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

2.3 COMPARABLE PRODUCTS

A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
5. Samples, if requested.

PART 3 – EXECUTION (NOT USED)

END OF SECTION 016000

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Operation and maintenance manuals.
4. Warranties.
5. Instruction of Owner's personnel.
6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.

12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer or Owner will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer or Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
    d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders, Record Drawings where applicable.

D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings where applicable.

E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.5 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
d. Description of controls and sequence of operations.
e. Piping diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of Installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.

3. Operation and Maintenance Data in PDF format.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280- mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone

number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 – EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times.
3. Schedule training with Owner with at least seven (7) days' advance notice.
4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

3.2 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
e. Remove labels that are not permanent.

f. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

   1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

g. Wipe surfaces of mechanical and electrical equipment, and similar equipment.
h. Replace parts subject to unusual operating conditions.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Record Samples.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Work Change Directive.
k. Changes made following Engineer's written orders.

l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross- reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Work Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
2. Refer instances of uncertainty to Engineer for resolution.
3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Engineer will make the Contract Drawings available to Contractor's print shop.

C. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:

1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer for resolution.
4. Engineer will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.

a. Engineer makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
b. CAD Software Program: The Contract Drawings are available in AUTOCAD.

D. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

2. Consult with Engineer for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

E. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
3. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Engineer.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of the manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Drawings, where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that

cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings, where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

2.5 RECORD SAMPLE SUBMITTAL

A. Immediately prior to date of Substantial Completion, the Contractor shall meet with the Engineer and, if desired, the Owner's personnel at the site to determine which of the Samples maintained during the construction period shall be transmitted to Owner for record purposes. Comply with the Engineer's instructions for packaging, identification marking, and delivery to Owner's Sample storage space. Dispose of other Samples in manner specified for disposal of surplus and waste materials.

PART 3 – EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

END OF SECTION 017839

DIVISION 26

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

A. PV: Photovoltaic.

B. RoHS: Restriction of Hazardous Substances.

C. VFC: Variable-frequency controller.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For **manufacturer's authorized service representative**.

B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Manufacturers:
1. Southwire
2. General Cable Corporation
3. Encore wire
4. Or approved equal.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Conductor Insulation:
1. **Type RHH and Type RHW-2**: Comply with UL 44.
2. **Type THHN and Type THWN-2**: Comply with UL 83.
3. **Type THW and Type THW-2**: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
4. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: One or Two hole with standard barrels.
3. Termination: Compression Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: **Type THHN/THWN-2, single conductors in raceway or Type XHHW-2, single conductors in raceway**

B. Exposed Branch Circuits, Including in Crawlspaces: **Type THHN/THWN-2, single conductors in raceway.**

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

F. Complete cable tray systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections with the assistance of a factory-authorized service representative.
   1. After installing conductors and cables and before electrical circuitry has been energized, test conductors feeding the following critical equipment and services for compliance with requirements:

      a. UPS

   2. Perform each of the following visual and electrical tests:

      a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
      b. Test bolted connections for high resistance using one of the following:

         1) A low-resistance ohmmeter.
         2) Calibrated torque wrench.
         3) Thermographic survey.

      c. Inspect compression-applied connectors for correct cable match and indentation.
      d. Inspect for correct identification.
      e. Inspect cable jacket and condition.
      f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
      g. Continuity test on each conductor and cable.
      h. Uniform resistance of parallel conductors.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

   1. Procedures used.
   2. Results that comply with requirements.

3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Aluminum slotted support systems.
3. Conduit and cable support devices.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

a. Slotted support systems, hardware, and accessories.
b. Clamps.
c. Hangers.
d. Sockets.
e. Eye nuts.
f. Fasteners.
g. Anchors.
h. Saddles.
i. Brackets.

2. Include rated capacities and furnished specialties and accessories.

3. Hangers. Include product data for components.
4. Slotted support systems.
5. Equipment supports.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-(10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.

1. Manufacturers:
   a. Kindorf
   b. Unistrut
   c. Or Approved Equal
2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
3. Material for Channel, Fittings, and Accessories: Galvanized steel.
4. Channel Width: Selected for applicable load criteria**.**
5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, **zinc-coated** steel, for use in hardened Portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).
5. Toggle Bolts: **All**-steel springhead type.
6. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA 101
3. NECA 102.

B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as **required by** NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least **25** percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit or single-bolt conduit clamps using spring friction action for retention in support channel.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate].

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Metal wireways and auxiliary gutters.
3. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

A. GRC: Galvanized rigid steel conduit.

B. IMC: Intermediate metal conduit.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:
1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. GRC: Comply with ANSI C80.1 and UL 6.
3. IMC: Comply with ANSI C80.6 and UL 1242.
4. EMT: Comply with ANSI C80.3 and UL 797.
5. FMC: Comply with UL 1; **zinc-coated steel or aluminum**.
6. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:
1. Comply with NEMA FB 1 and UL 514B.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
5. Fittings for EMT:

a. Material: **Steel**.
b. Type: **Setscrew or compression**.

6. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
7. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

C. Joint Compound for IMC or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Hinged type unless otherwise indicated.

D. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

C. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, **galvanized, cast iron** with gasketed cover.

D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

E. Device Box Dimensions: [**4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep)**] [**4 inches by 2-1/8 inches by 2-1/8 inches deep (100 mm by 60 mm by 60 mm deep)**].

F. Gangable boxes **are allowed**.

G. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, **Type 1** with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

H. Cabinets:

1. NEMA 250, **Type 1** galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: **EMT**.
2. Exposed, Not Subject to Severe Physical Damage: **EMT**.
3. Exposed and Subject to Severe Physical Damage: **GRC**. Raceway locations include the following:
    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Boxes and Enclosures: NEMA 250, Type 1.

B. Minimum Raceway Size: **3/4-inch (21-mm)** trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits.

Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

D. Do not fasten conduits onto the bottom side of a metal deck roof.

E. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

F. Complete raceway installation before starting conductor installation.

G. Arrange stub-ups so curved portions of bends are not visible above finished slab.

H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.

I. Support conduit within 12 inches (300 mm) of enclosures to which attached.

J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

M. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

O. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of **72 inches (1830 mm)** of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

P. Locate boxes so that cover or plate will not span different building finishes.

Q. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Tags.
4. Cable ties.
5. Paint for identification.
6. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 70.

B. Comply with ANSI Z535.4 for safety signs and labels.

C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: **120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces**.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. **Black letters on an orange field**.
2. Legend: Indicate voltage.

B. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded **feeder and branch-circuit** conductors.

1. Color shall be factory applied **or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit**.
2. Colors for 208/120-V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.

3. Colors for 240-V Circuits:

a. Phase A: Black.
b. Phase B: Red.

4. Colors for 480/277-V Circuits:

a. Phase A: Brown.
b. Phase B: Orange.
c. Phase C: Yellow.

5. Color for Neutral: **White or gray**.
6. Color for Equipment Grounds: **Green**.
7. Colors for Isolated Grounds: Green with two or more yellow stripes.

C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

E. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

B. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
1. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.

C. Self-Adhesive Labels: **Vinyl**, thermal, transfer-printed, 3-mil- (0.08-mm-) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
1. Minimum Nominal Size:

a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
c. As required by authorities having jurisdiction.

2.4 TAGS

A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.

B. Nonmetallic Preprinted Tags: Polyethylene tags, [**0.015 inch (0.38 mm)**] [**0.023 inch (0.58 mm)**] thick, color-coded for phase and voltage level, with factory [**screened**] [**printed**] permanent designations; punched for use with self-locking cable tie fastener.

C. Write-on Tags:
1. Polyester Tags: **0.010 inch (0.25 mm)** thick, with corrosion-resistant grommet and cable tie for attachment.
2. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.5 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 Deg F (23 Deg C) according to ASTM D638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black, except where used for color-coding.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of each item before installing identification products.

D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

I. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:

1. "EMERGENCY POWER."
2. "POWER."
3. "UPS."

J. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.

K. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.

L. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

M. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.

N. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

O. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.

P. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.

Q. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

R. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

S. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.

T. Metal Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using **general-purpose** cable ties.

U. Nonmetallic Preprinted Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using **general-purpose** cable ties.

V. Write-on Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using **general-purpose** cable ties.

W. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

C. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:

1. "EMERGENCY POWER."
2. "POWER."
3. "UPS."

D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use **self-adhesive labels** with the conductor or cable designation, origin, and destination.

E. Control-Circuit Conductor Termination Identification: For identification at terminations, provide **self-adhesive labels** with the conductor designation.

F. Auxiliary Electrical Systems Conductor Identification: **Self-adhesive vinyl tape** that is uniform and consistent with system used by manufacturer for factory-installed connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

G. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.

H. Equipment Identification Labels:

1. Indoor Equipment: **Laminated acrylic or melamine plastic sign**.
2. Equipment to Be Labeled:
   a. Enclosures and electrical cabinets.
   b. Emergency system boxes and enclosures.
   c. Enclosed switches.
   d. Enclosed circuit breakers.
   e. Enclosed controllers.

f. Power-transfer equipment.
g. Battery-inverter units.
h. Battery racks.
i. Power-generating units.
j. Monitoring and control equipment.
k. UPS equipment.

END OF SECTION 260553

SECTION 263353 - STATIC UNINTERRUPTIBLE POWER SUPPLY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Installation of Three-phase, on-line, double-conversion, static-type, UPS units.

2. Contractor responsible for transporting new UPS from owner's warehouse located at 6000 Packard Rd, Suite 100 Niagara Falls 14304 to the site. Contractor responsible for all rigging required to transport the UPS to the electrical room.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GTO: Gate turn-off thyristor.

C. IGBT: Isolated gate bipolar transistor.

D. LCD: Liquid-crystal display.

E. LED: Light-emitting diode.

F. NiCd: Nickel cadmium.

G. PC: Personal computer.

H. SPD: Surge protection device.

I. THD: Total harmonic distortion.

J. UPS: Uninterruptible power supply.

PART 2 - PRODUCTS – Furnished by Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the UPS.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Verify installation conditions are representative of the conditions used in the coordination studies for the electrical system. Provide fuse protection according to Section 262813 "Fuses" if required for coordination with UPS overcurrent protective device requirements.

3.2 INSTALLATION

A. Comply with NECA 1.

B. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters.
   1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

D. Equipment Mounting: Install UPS on existing rails, see drawings."

E. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NFPA 70.

F. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams unless otherwise indicated. Apply oxide inhibitor on battery terminals.

3.3 GROUNDING

A. Separately Derived Systems: If not part of a listed power supply for a data-processing room, comply with NFPA 70 requirements for connecting to grounding electrodes and for bonding to metallic piping near isolation transformer. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 BATTERY EQUALIZATION

A. Equalize charging of battery cells according to manufacturer's written instructions. Record individual-cell voltages.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage and coordinate with a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections with the assistance of a factory-authorized service representative.

C. Tests and Inspections:

1. Inspect interiors of enclosures, including the following:

    a. Inspect anchorage, alignment, grounding, and required clearances.
    b. Component type and labeling verification.
    c. Ratings of installed components.

2. Test electrical and mechanical interlock systems for correct operation and sequencing.
3. Inspect bolted electrical connections for high resistance using one or more of the following methods:

    a. Use of low-resistance ohmmeter according to Section 7.22.2.2 of NETA ATS.
    b. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data or Table 100.12 of NETA ATS.
    c. Perform thermographic survey according to Section 9 of NETA ATS.

4. Test static transfer from inverter to bypass and back. Use normal load, if possible.
5. Test dc undervoltage trip level on inverter input breaker. Set according to manufacturer's published data.
6. Verify synchronizing indicators for static switch and bypass switches.
7. Test insulated-case and molded-case breakers.

    a. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed, and across each open pole. Apply voltage according to manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 of NETA ATS.
    b. Perform insulation-resistance tests on all control wiring for ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid-state components, follow manufacturer's recommendation.
    c. Use primary current injection to determine long time and short time, ground fault, and instantaneous pickup, Use secondary current injection to test trip functions.
    d. Perform minimum pickup voltage tests on shunt trip and close coils according to manufacturer's published data.
    e. Verify operation of charging mechanism.

f. Verify correct operation of auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, antipump function, and trip unit battery condition. Reset all trip logs and indicators.

8. Test automatic transfer switches.

   a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, according to Section 7.22.3.1 of NETA ATS.
   b. Perform insulation-resistance tests on all control wiring for ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid-state components or for control devices that cannot tolerate the applied voltage, follow manufacturer's recommendation.
   c. Perform a contact/pole-resistance test.
   d. Verify settings and operation of control devices.
   e. Calibrate and set all relays and timers according to Section 7.9 of NETA ATS.
   f. Verify phase rotation, phasing, and synchronized operation as required by the application.
   g. Perform automatic transfer tests.

      1) Simulate loss of normal power.
      2) Return to normal power.
      3) Simulate loss of emergency power.
      4) Simulate all forms of single-phase conditions.

   h. Verify correct operation and timing of the following functions:

      1) Normal source voltage-sensing and frequency-sensing relays.
      2) Time delay on transfer.
      3) Alternative source voltage-sensing and frequency-sensing relays.
      4) Automatic transfer operation.
      5) Interlocks and limit switch function.
      6) Time delay and retransfer on normal power restoration.

9. Test direct current system's batteries.

   a. Verify adequacy of battery support racks, mounting, anchorage, alignment, grounding, and clearances.
   b. Inspect spill containment installation. Measure charger float and equalizing voltage levels. Adjust to battery manufacturer's recommended settings.
   c. Verify all charger functions and alarms.
   d. Measure each cell voltage and total battery voltage with charger energized and in float mode of operation.
   e. Perform a load test according to manufacturer's published data or IEEE 450.
   f. Measure charger float and equalizing voltage levels. Adjust to battery manufacturer's recommended settings.
   g. Test values.

1) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
2) Charger float and equalize voltage levels shall be according to battery manufacturer's published data.
3) The results of charger functions and alarms shall be according to manufacturer's published data.
4) Cell voltages shall be within 0.05 V of each other or according to manufacturer's published data.
5) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
6) Cell internal ohmic values (resistance, impedance, or conductance) shall not vary by more than 25 percent between identical cells that are in a fully charged state.
7) Results of load tests shall be according to manufacturer's published data or IEEE 450.

10. Test communication of status and alarms to remote monitoring equipment.
11. Load the system using a variable-load bank to simulate kilovolt amperes, kilowatts, and power factor of loads for unit's rating. Use instruments calibrated within the previous six months according to NIST standards.

D. The UPS system will be considered defective if it does not pass tests and inspections.

E. Record of Tests and Inspections: Maintain and submit documentation of tests and inspections, including references to manufacturers' written instructions and other test and inspection criteria. Include results of tests, inspections, and retests.

F. Prepare test and inspection reports.

3.7 PERFORMANCE TESTING

A. Engage the services of a qualified power quality specialist to perform tests and activities indicated.

B. Monitoring and Testing Schedule: Perform monitoring and testing in a single 10-day period.

1. Schedule monitoring and testing activity with Owner, through Architect, with at least 14 days' advance notice.
2. Schedule monitoring and testing after Substantial Completion, when the UPS is supplying power to its intended load.

C. Monitoring and Testing Instruments: Three-phase, recording, power monitors. Instruments shall provide continuous simultaneous monitoring of electrical parameters at UPS input terminals and at input terminals of loads served by the UPS. Instruments shall monitor, measure, and graph voltage current and frequency simultaneously and provide full-graphic recordings of the values of those parameters before and during power-line disturbances that cause the values to deviate from normal beyond the adjustable threshold values. Instruments shall be capable of recording

either on paper or on magnetic media and have a minimum accuracy of plus or minus 2 percent for electrical parameters. Parameters to be monitored include the following:

1. Current: Each phase and neutral and grounding conductors.
2. Voltage: Phase to phase, phase to neutral, phase to ground, and neutral to ground.
3. Frequency transients.
4. Voltage swells and sags.
5. Voltage Impulses: Phase to phase, phase to neutral, phase to ground, and neutral to ground.
6. High-frequency noise.
7. Radio-frequency interference.
8. THD of the above currents and voltages.
9. Harmonic content of currents and voltages above.
10. Battery cell temperature during charging.
11. Ambient temperature.

D. Monitoring and Testing Procedures:

1. Exploratory Period: For the first two days[, make recordings at various circuit locations and with various parameter-threshold and sampling-interval settings. Make these measurements with the objective of identifying optimum UPS, power system, load, and instrumentation setup conditions for subsequent test and monitoring operations.
2. Remainder of Test Period: Perform continuous monitoring of at least two circuit locations selected on the basis of data obtained during exploratory period.

    a. Set thresholds and sampling intervals for recording data at values selected to optimize data on performance of the UPS for values indicated, and to highlight the need to adjust, repair, or modify the UPS, distribution system, or load component that may influence its performance or that may require better power quality.
    b. Perform load and UPS power source switching and operate the UPS on generator power during portions of test period according to directions of Owner's power quality specialist.
    c. Operate the UPS and its loads in each mode of operation permitted by UPS controls and by the power distribution system design.
    d. Using loads and devices available as part of the facility's installed systems and equipment[**and a temporarily connected portable generator set**], create and simulate unusual operating conditions, including outages, voltage swells and sags, and voltage, current, and frequency transients. Maintain normal operating loads in operation on system to maximum extent possible during tests.
    e. Make adjustments and repairs to UPS, distribution, and load equipment to correct deficiencies disclosed by monitoring and testing; repeat appropriate monitoring and testing to verify success of corrective action.

E. Monitoring and Testing Assistance by Contractor:

1. Open UPS and electrical distribution and load equipment and wiring enclosures to make monitoring and testing points accessible for temporary monitoring probe and sensor placement and removal as requested.
2. Observe monitoring and testing operations; ensure that UPS and distribution and load equipment warranties are not compromised.

3. Perform switching and control of various UPS units, electrical distribution systems, and load components as directed by power quality specialist. Specialist shall design this portion of monitoring and testing operations to expose the UPS to various operating environments, conditions, and events while response is observed, electrical parameters are monitored, and system and equipment deficiencies are identified.
4. Make repairs and adjustments to the UPS and to electrical distribution system and load components, and retest and repeat monitoring as needed to verify validity of results and correction of deficiencies.
5. Engage the services of the UPS manufacturer's factory-authorized service representative periodically during performance testing operations for repairs, adjustments, and consultations.

F. Documentation: Record test point and sensor locations, instrument settings, and circuit and load conditions for each monitoring summary and power disturbance recording. Coordinate simultaneous recordings made on UPS input and load circuits.

G. Analysis of Recorded Data and Report: Review and analyze test observations and recorded data and submit a detailed written report. Include the following in [**each**]report:

1. Descriptions of corrective actions performed during monitoring and survey work and their results.
2. Recommendations for further action to provide optimum performance by the UPS and appropriate power quality for non-UPS loads. Include a statement of priority ranking and a cost estimate for each recommendation that involves system or equipment revisions.
3. Copies of monitoring summary graphics and graphics illustrating harmonic content of significant voltages and currents.
4. Copies of graphics of power disturbance recordings that illustrate findings, conclusions, and recommendations.
5. Recommendations for operating, adjusting, or revising UPS controls.
6. Recommendations for alterations to the UPS installation.
7. Recommendations for adjusting or revising generator-set or automatic transfer switch installations or their controls.
8. Recommendations for power distribution system revisions.
9. Recommendations for adjusting or revising electrical loads, their connections, or controls.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the UPS.

END OF SECTION 263353

APPENDIX A

Equipment Data

Detail Bill of Material

Project Name:	Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM	**Negotiation No:**	BUQ50220X4K2
General Order No:		**Alternate No:**	0000

Item No.	Qty	Product	Description
	1	93PM UPS 20-200kW	480V in, 208/120V out (3 wire in, 4 wire out) System Voltage, 100kW Rated, 100kW Frame Capacity, Standard 97% Efficiency, Sidecar Bypass Cabinet, Includes Power Xpert Gateway Card, Industrial Relay Card, and EMP, Includes 7x24 Startup, and 1 year on-site parts and labor coverage, Power Quality Terms and Conditions apply, PredictPulse Wireless remote monitoring installed during startup, includes 24x7 alarm monitoring, dispatch, reporting, real-time access to health data, LTE cellular modem/router hardware, AT&T Wireless data plan and activation, Only available for purchases after January 1st 2022, SOW R-32 applies

Catalog No 9PG10N0009E20R2

Catalog No	Qty	List of Materials
9PG10N0009E20R2	1	Catalog # 9PG10N0009E20R2 93PM UPS 480V in, 208/120V out (3 wire in, 4 wire out) 100kW UPS Frame
9PZTBAE28020000	1	Catalog # 9PZTBAE28020000 93PM IBC-LW Battery Cabinet, 2/2 Cabinets/Strings
9PZE1S500000001	1	Catalog # 9PZE1S500000001 93PM IAC-D 100kW, K1, Non TP1, 480/208 Delta/Wye, 5 Subfeed Breakers, No Distribution, Top Air Exhaust
P-103004440	1	93PM 480V PREDICTPULSE WIRELESS KIT
P-103001998	1	93PM Remote Monitoring Device Kit (includes independent PXGMS card for RMD operation)
CTD93PM	1	Catalog # CTD93PM 93PM Certified Test Data
FREIGHT-PQD	1	Standard Ground Shipping to NY

Eaton Selling Policy 25-000 applies.

All orders must be released for manufacture within 90 days of date of order entry. If approval drawings are required, drawings must be returned approved for release within 60 days of mailing. If drawings are not returned accordingly, and/or if shipment is delayed for any reason, the price of the order will increase by 1.0% per month or fraction thereof for the time the shipment is delayed.

Seller shall not be responsible for any failure to perform, or delay in performance of, its obligations resulting from the COVID-19 pandemic or any future epidemic, and Buyer shall not be entitled to any damages resulting thereof.

Package Price.....[redacted]

Leadtime 8-10 Weeks

Flex Warranty - extended for years 2 & 3. Included full parts, labor, and travel. 8 hour response, 7 x 24 service

Net Add.....[redacted]

Spare Parts (fuses and filters) by others. The Eaton service tech carries these on their truck and they are readily available

General Information: 93PM UPS 20-200kW

93PM System Specifications

System Voltage:	480V in, 208/120V out (3 wire in, 4 wire out)	UPS Frame Capacity:	100kW
Quantity of 50kW Power Modules:	2	UPS kW Rating:	100
Internal Redundant Configuration:	No	Internal Battery Configuration:	None
Input Feed:	Single Feed	ESS Included:	No
Communication:	Industrial Gateway Card, Industrial Relay Card, and EMP	Accessories:	Sidecar Bypass Cabinet
Side Car:	3 Breaker MBS, Left Mount	Side Car Breaker Rating:	35kAIC MBS w/ Aux contact
Exhaust Configuration:	Top Air Exhaust	Internal Estimated Runtime:	None
UPS Dimensions (H" x W" x D"):	74 x 30 x 42	UPS Weight (lbs):	1107

UPS System Dimensions

Combined Matching System Dimensions (H" x W" x D", excluding non-matching panels):	74 x 129.4 x 42

93PM Integrated Distribution Cabinet

9PZE1S500000001		IDC kW Rating:	100kW
Transformer:	K1, Non TP1, 480/208 Delta/Wye	Breaker Interrupt Rating (kAIC):	Standard kAIC
Top Distribution:	5 Subfeed Breakers	Bottom Distribution:	No Distribution
Subfeed Breaker Rating:	80% Rated Breaker	Exhaust Configuration:	Top Air Exhaust
Output Breaker:	No	OSHPD Rated:	No
IAC-D Dimensions (H" x W" x D"):	74 x 31.3 x 42	IAC-D Weight (lbs):	1384.5

UPS Accessories

Floor Stand:	None	Chimney:	None

93PM Battery Cabinet

9PZTBAE28020000		Battery Cabinet:	IBC-LW
DC Voltage:	432	Battery Cabinet Weight (lbs):	6108
Battery Cabinet Width (in):	68.4	74" H x 42" D	
kW for Runtime Calculation:	100	Estimated Runtime (min) at 77 degrees F:	20
# of Cabinets/Strings:	2/2	Battery Manufacturer:	Eaton
Battery Installation:	Line and Match	OSHPD Rated:	No

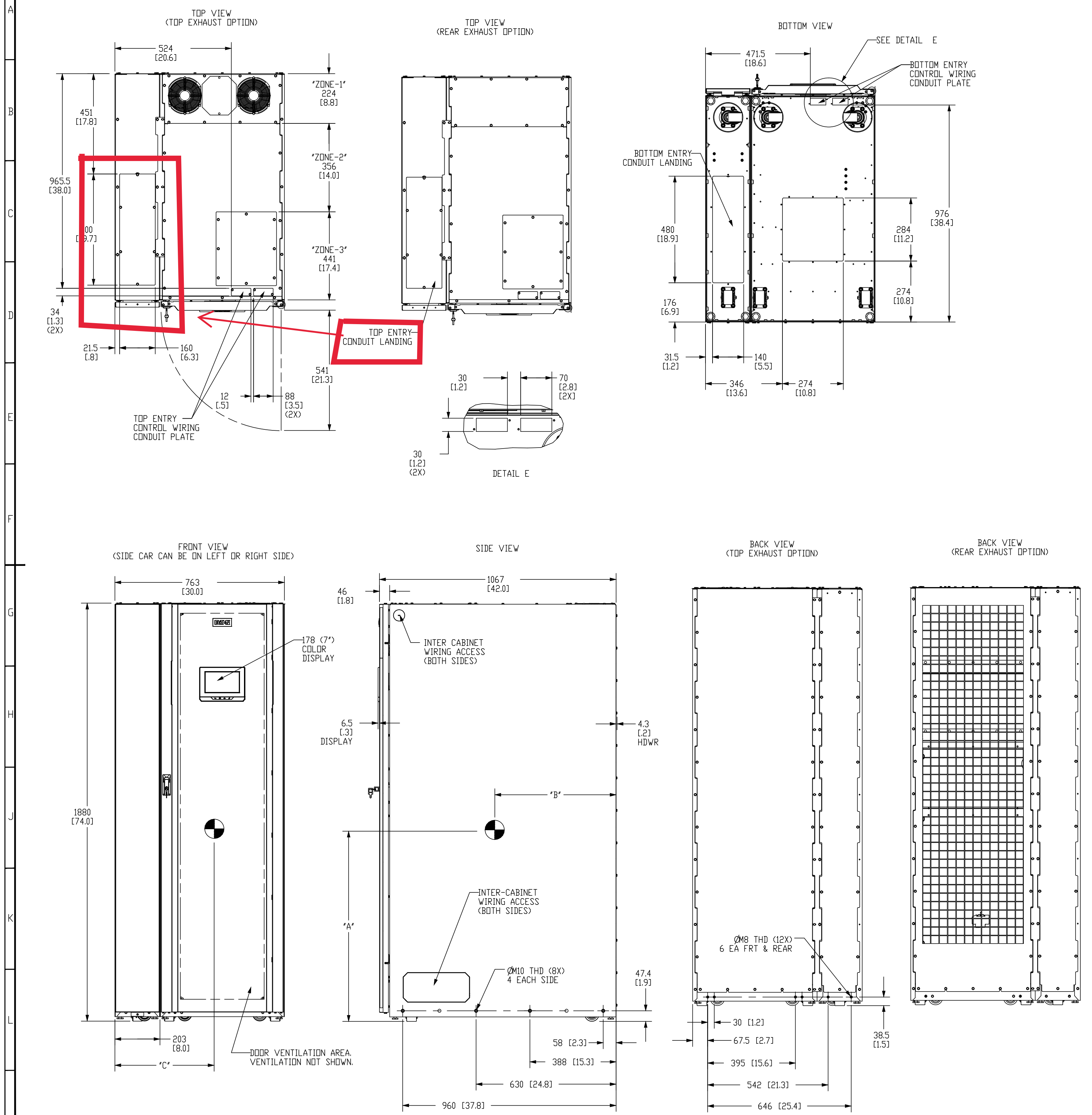
One Battery pack will provide 11.3 mins runtime, two battery packs will provide 20 mins runtime

UPS Static Switch is rated at 100 kW. It can't be field upgraded

PREPARED BY: JOSEPH FUCHS	DATE: 3/1/2024	Eaton			
APPROVED BY:	DATE:	JOB NAME: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B0221			
		DESIGNATION:			
	VERSION: 10.0.0.1	TYPE: 93PM UPS 20-200kW		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: BUQ50220X4K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 2

Structure	1	2	3							
Ship-Inches Ship-MM										
Width-Inches Width-MM	31.00 787	30.00 762	68.40 1737							
Depth-Inches Depth-MM	42.00 1066	42.00 1066	42.00 1066							
Height-Inches Height-MM	74.00 1879	74.00 1879	74.00 1879							
Weight-Lbs Weight-Kg	1384.50 627.89	1107.00 502.04	6108.00 2770.07							

PREPARED BY: JOSEPH FUCHS	DATE: 3/1/2024	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B0221			
		DESIGNATION:			
VERSION: 10.0.0.1		TYPE: 93PM UPS 20-200kW		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: BUQ50220X4K2-0000	REVISION: 0	DWG SIZE: A	G.O.:	ITEM:	SHEET: 2 of 2



WEIGHT AND CENTER OF GRAVITY		DIMENSIONS MM (IN) A	B	C	WEIGHT kg [lbs]
UPS W/ LEFT SIDECAR (4 BKR)	100KW CAPACITY FRAME- 1 50KW UPM INSTALLED W/ LEFT SIDECAR (4 BKR)	855 [33.7]	568 [22.4]	390 [15.4]	446 [984]
	100KW CAPACITY FRAME- 2 50KW UPM INSTALLED W/ LEFT SIDECAR (4 BKR)	917 [36.1]	564 [22.2]	402 [15.8]	510 [1124]
	100KW REDUNDANT FRAME- 1 50KW UPM INSTALLED W/ LEFT SIDECAR (4 BKR)	858 [33.8]	568 [22.4]	391 [15.4]	452 [997]
	100KW REDUNDANT FRAME- 2 50KW UPM INSTALLED W/ LEFT SIDECAR (4 BKR)	918 [36.1]	564 [22.2]	403 [15.9]	516 [1137]
	100KW REDUNDANT FRAME- 3 50KW UPM INSTALLED W/ LEFT SIDECAR (4 BKR)	1001 [39.4]	561 [22.1]	412 [16.2]	580 [1278]
UPS W/ RIGHT SIDECAR (4 BKR)	100KW CAPACITY FRAME- 1 50KW UPM INSTALLED W/ RIGHT SIDECAR (4 BKR)	855 [33.7]	568 [22.4]	367 [14.4]	446 [984]
	100KW CAPACITY FRAME- 2 50KW UPM INSTALLED W/ RIGHT SIDECAR (4 BKR)	917 [36.1]	564 [22.2]	356 [14.0]	510 [1124]
	100KW REDUNDANT FRAME- 1 50KW UPM INSTALLED W/ RIGHT SIDECAR (4 BKR)	858 [33.8]	568 [22.4]	366 [14.4]	452 [997]
	100KW REDUNDANT FRAME- 2 50KW UPM INSTALLED W/ RIGHT SIDECAR (4 BKR)	918 [36.1]	564 [22.2]	355 [14.0]	516 [1137]
	100KW REDUNDANT FRAME- 3 50KW UPM INSTALLED W/ RIGHT SIDECAR (4 BKR)	1001 [39.4]	561 [22.1]	346 [13.6]	580 [1278]
UPS W/ LEFT EMPTY SIDECAR (TOP ENTRY)	100KW CAPACITY FRAME- 1 50KW UPM INSTALLED W/ LEFT EMPTY SIDECAR FOR TOP ENTRY	844 [33.2]	542 [21.3]	409 [16.1]	419 [924]
	100KW CAPACITY FRAME- 2 50KW UPM INSTALLED W/ LEFT EMPTY SIDECAR FOR TOP ENTRY	911 [35.8]	541 [21.3]	419 [16.5]	483 [1064]
	100KW REDUNDANT FRAME- 1 50KW UPM INSTALLED W/ LEFT EMPTY SIDECAR FOR TOP ENTRY	847 [33.3]	542 [21.3]	410 [16.1]	425 [937]
	100KW REDUNDANT FRAME- 2 50KW UPM INSTALLED W/ LEFT EMPTY SIDECAR FOR TOP ENTRY	913 [35.9]	541 [21.3]	420 [16.5]	489 [1077]
	100KW REDUNDANT FRAME- 3 50KW UPM INSTALLED W/ LEFT EMPTY SIDECAR FOR TOP ENTRY	1001 [39.4]	541 [21.3]	427 [16.8]	552 [1218]
UPS W/ RIGHT EMPTY SIDECAR (TOP ENTRY)	100KW CAPACITY FRAME- 1 50KW UPM INSTALLED W/ RIGHT EMPTY SIDECAR FOR TOP ENTRY	844 [33.2]	542 [21.3]	347 [13.7]	419 [924]
	100KW CAPACITY FRAME- 2 50KW UPM INSTALLED W/ RIGHT EMPTY SIDECAR FOR TOP ENTRY	911 [35.8]	541 [21.3]	338 [13.3]	483 [1064]
	100KW REDUNDANT FRAME- 1 50KW UPM INSTALLED W/ RIGHT EMPTY SIDECAR FOR TOP ENTRY	847 [33.3]	542 [21.3]	346 [13.6]	425 [937]
	100KW REDUNDANT FRAME- 2 50KW UPM INSTALLED W/ RIGHT EMPTY SIDECAR FOR TOP ENTRY	913 [35.9]	541 [21.3]	337 [13.3]	489 [1077]
	100KW REDUNDANT FRAME- 3 50KW UPM INSTALLED W/ RIGHT EMPTY SIDECAR FOR TOP ENTRY	1001 [39.4]	541 [21.3]	330 [13.0]	552 [1218]

NOTES:
1. THE SYSTEM MUST BE INSTALLED ON A LEVEL FLOOR SURFACE SUITABLE FOR COMPUTER OR ELECTRONIC EQUIPMENT.
2. UPS WITH SIDECAR COMES WITH REMOVABLE TOP AND BOTTOM ENTRY CONDUIT LANDING PLATE.
3. CONTROL WIRE ENTRY IS THROUGH REMOVABLE CONTROL LANDING PLATE.
4. THE SYSTEM MUST BE INSTALLED IN A TEMPERATURE AND HUMIDITY CONTROLLED INDOOR AREA FREE OF CONDUCTIVE CONTAMINANTS.
5. AMBIENT TEMPERATURE RANGE 5-40degC [41-104degF] AT AN ELEVATION UP TO 1500M WITHOUT DERATING.
   STORAGE TEMPERATURE -25 to +55degC.
   RELATIVE HUMIDITY(OPERATING AND STORAGE) 5% TO 95% MAX NON CONDENSING.
6. UPS WITH SIDECAR CABINET CLEARANCES:
   FRONT OF THE CABINET: 914mm[36.0"]
   FROM TOP OF THE CABINET: 457mm[18.0"] ALWAYS IN ZONE-1 AND ZONE-3
   ZONE-2 CAN BE LESS THAN 457mm[18.0"] WITH REAR SERVICE ACCESS
   FROM BACK OF THE CABINET WITH REAR EXHAUST: 254mm[10.0"]
7. MINIMUM REQUIRED AIR FLOW FOR CABINET AT FULL LOAD IS 800 CFM.
8. THE UPS WITH SIDECAR CABINET CAN BE INSTALLED IN LINE-UP-AND-MATCH OR STANDALONE CONFIGURATIONS.
9. ALL WIRING IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRIC CODES.
10. WEIGHT OF THE CABINET DOES NOT INCLUDE CUSTOMER WIRING.
11. UPS WITH TOP ENTRY SIDECAR
    AC INPUT TO UPS RECTIFIER: 3 PHASES, GROUND,WYE.
    AC OUTPUT TO LOAD: 3 PHASES,GROUND.
    AC INPUT TO UPS BYPASS: 3 PHASES,GROUND,WYE.
    DC INPUT TO UPS(EXTERNAL BATTERY ONLY): POSITIVE,NEGATIVE,GROUND.
12. SOURCE INPUT TO BYPASS CABINET: 3 PHASES, GROUND,WYE.
    AC OUTPUT TO LOAD: 3 PHASES,GROUND.
13. SPECIFICATIONS ARE SUBJECT TO CHANGE.

METRIC | THIRD ∠ PROJECTION | EATON CORPORATION | EATON

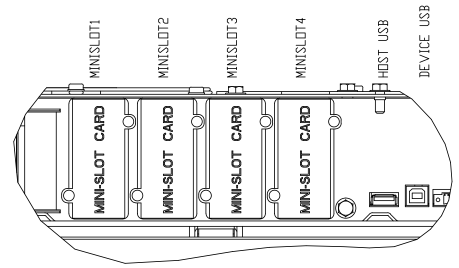
DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.

DESCRIPTION: 93PM-100 FRAME WITH SIDECAR UPS SITE PLAN

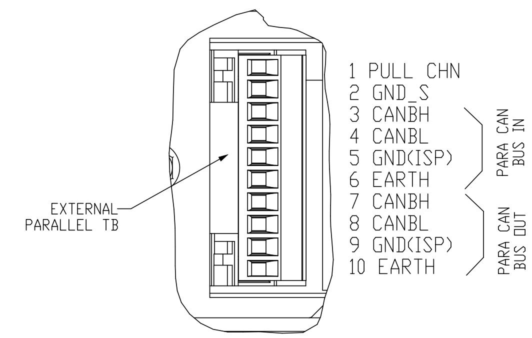
ORIGINATED: RANDEV_A	29OCT2012	ECO: ECO-135286	NAME: P-110000128	REVISION: 11	SIZE: A1
MODIFIED: MULE V	20-FEB-2018				SCALE: 7:100
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING		STATE: RELEASE	
SAFETY:					SHEET: 1 OF 3
APPROVED:					

GO/NEG-Alt-Date: BUQ50220X4K2-0000-3/1/2024		Job Name: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM	
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:	

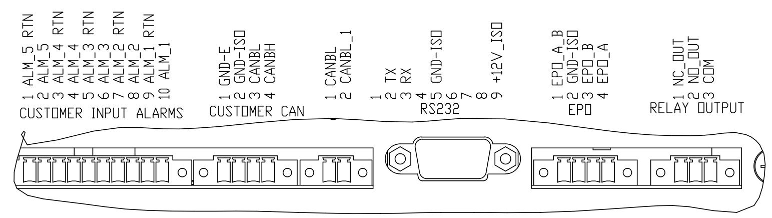
CUSTOMER CONTROL WIRE CONNECTIONS



DETAIL A

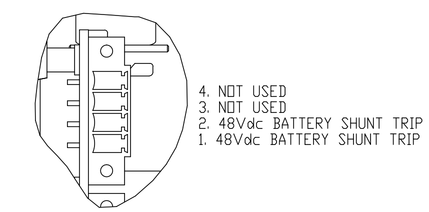


DETAIL C



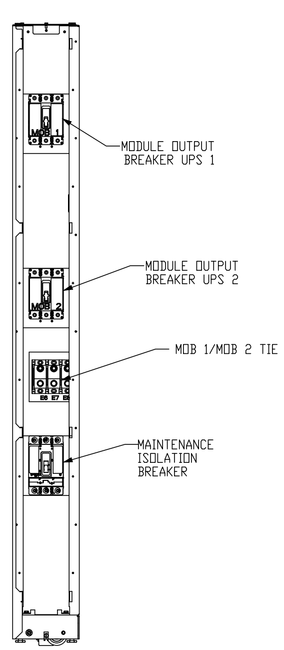
DETAIL B

UPS SHUNT TRIP TERMINAL

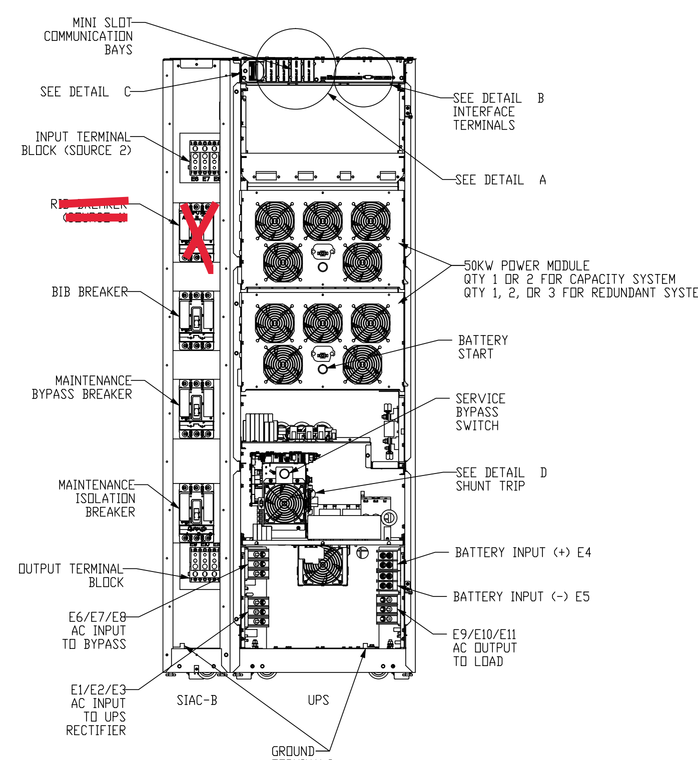


DETAIL D

FRONT VIEW
SIAC-T LEFT
W/O DOOR
(2 OR 3 BREAKER AVAILABLE)



FRONT VIEW
W/O DOOR
W/O UPS LOWER DEADFRONT
W/O SIAC-B DEADFRONT
(4 BREAKER VERSION SHOWN)



PRODUCT SPECIFICATIONS

UPS RATING		AC INPUT VOLTAGE	AC OUTPUT VOLTAGE	AC INPUT/ BYPASS CURRENT	AC OUTPUT CURRENT	MAX HEAT DISSIPATION AT 100% LOAD	DC INPUT VOLTAGE	DC INPUT CURRENT 432/480V
KVA	KW	V	V	AMP	AMP	KW [BTU/HR]	V	AMP
20	20	480	480	35	24	0.75 [2550]	432/480	50/45
30	30			48	36	1.05 [3580]		74/67
40	40			60	48	1.34 [4560]		99/89
50	50			73	60	1.67 [5700]		124/111
60	60			94	72	2.10 [7164]		149/134
70	70			108	84	2.45 [8358]		165/156
80	80			120	96	2.67 [9121]		198/178
90	90			133	108	3.01 [10261]		223/200
100	100			146	120	3.34 [11402]		247/223

CUSTOMER WIRING (UPS)

WIRES	ACCEPTED WIRE RANGE	TORQUE RATING N*M [LB.IN]		RECOMMENDED MINIMUM WIRE SIZE FOR 75 DEG C COPPER STRANDED WIRE (WIRE SIZES ARE FOR 100KW)
INPUT PHASE WIRES	(2) 6 AWG-250MCM	31 [275]		(1) 4/0 PER PHASE
BYPASS PHASE WIRES	(2) 6 AWG-250MCM			(1) 4/0 PER PHASE
OUTPUT PHASE WIRES	(2) 6 AWG-250MCM			(1) 2/0 PER PHASE
DC INPUT FROM BATTERY	(4) 6 AWG-250MCM			BATTERY CABINET DEPENDENT
GROUND WIRES (INPUT, BYPASS, AND OUTPUT)	(6) 14 AWG-1/0	8 AWG	4.5 [40]	(1) 6 AWG
		4 AWG-6 AWG	5.1 [45]	
		3 AWG-1/0	5.6 [50]	
GROUND WIRES(BATTERY)	(6) 14 AWG-1/0	8 AWG	4.5 [40]	(1) 4 AWG
		4 AWG-6 AWG	5.1 [45]	
		3 AWG-1/0	5.6 [50]	
CONTROL WIRE (DETAIL C)	12-22 AWG	0.56-0.79 [5-7]		TWISTED PAIR WIRES 18AWG
CONTROL WIRE (DETAIL B,D)	14-30 AWG	0.22-0.25 [2]		

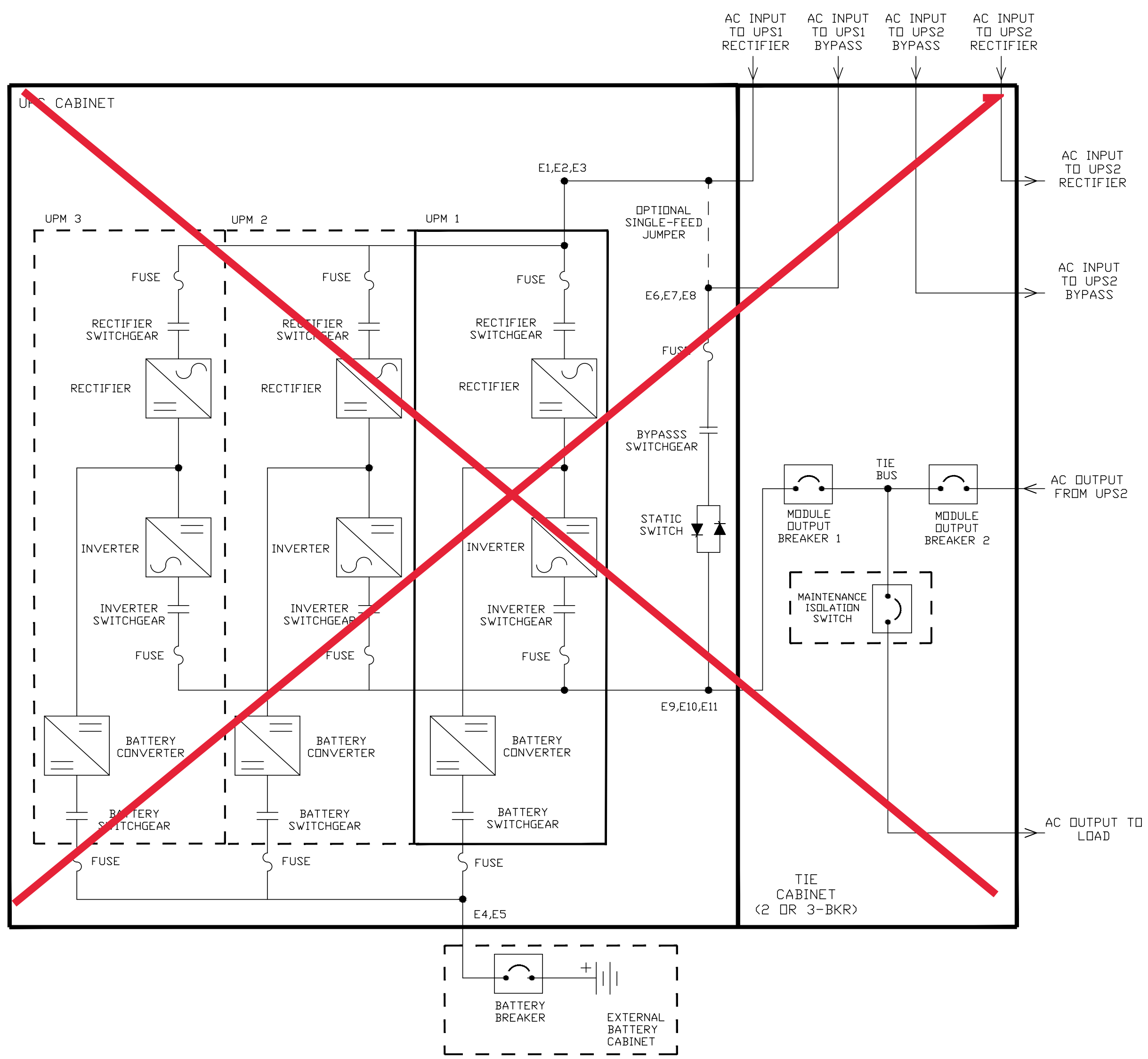
CUSTOMER WIRING (SIAC-B 4 BREAKER CONFIGURATION)

WIRES	ACCEPTED WIRE RANGE	TORQUE RATING N*M [LB.IN]	RECOMMENDED MINIMUM WIRE SIZE FOR 75 DEG C COPPER STRANDED WIRE (WIRE SIZES ARE FOR 100KW)
INPUT PHASE WIRES (RECTIFIER INPUT BREAKER)	(1) 4AWG-350MCM PER PHASE	19.9 [177]	(1) 4/0 PER PHASE
BYPASS AC INPUT (TERMINAL BLOCK)	(2) 6AWG-250MCM PER PHASE	31.0 [275]	(1) 4/0 PER PHASE
OUTPUT PHASE WIRES (TERMINAL BLOCK)	(2) 6AWG-250MCM PER PHASE	31.0 [275]	(1) 2/0 PER PHASE
GROUND WIRE	(6) 14AWG-1/0	5.1 [45]	6AWG

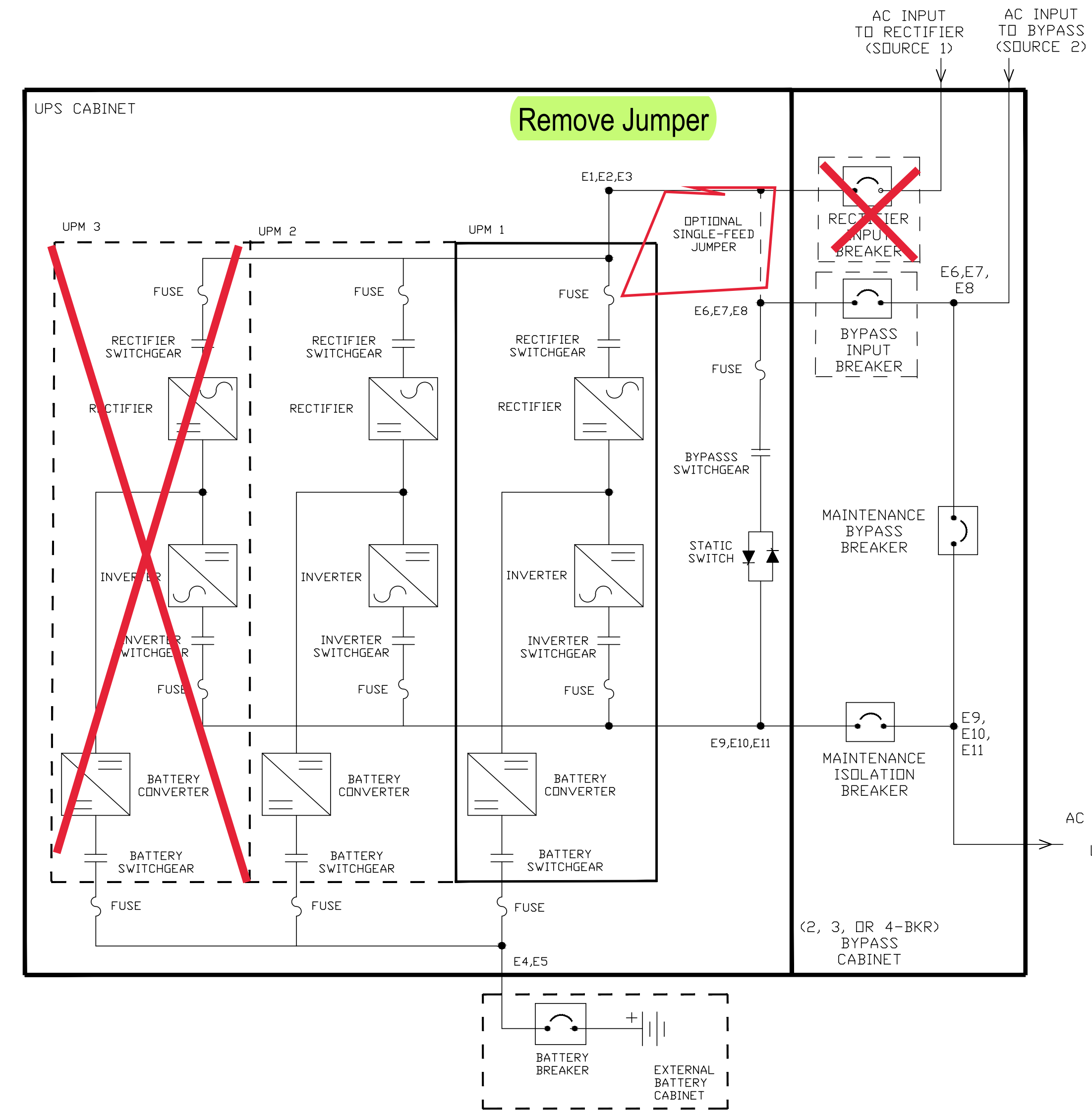
CUSTOMER WIRING (SIAC-T 2 OR 3 BREAKER CONFIGURATION)

WIRES	ACCEPTED WIRE RANGE	TORQUE RATING N*M [LB.IN]	RECOMMENDED MINIMUM WIRE SIZE FOR 75 DEG C COPPER STRANDED WIRE (WIRE SIZES ARE FOR 100KW)
MOB1 / MOB2 TIE (2 BREAKER CONFIGURATION)	(1) 6AWG-500MCM	56 [500]	(1) 300 MCM
MAINTENANCE ISOLATION BREAKER (3 BREAKER CONFIGURATION)	(1) 4AWG-350MCM	20 [180]	(1) 300 MCM
GROUND WIRE	(4) 14 AWG-1/0	5.1 [45]	4AWG

METRIC	THIRD ∠ PROJECTION	EATON CORPORATION			
DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.					
DESCRIPTION: 93PM-100 FRAME WITH SIDECAR UPS SITE PLAN					
ORIGINATED: RANDEV_A	29OCT2012	ECO: ECO-135286	NAME: P-110000128	REVISION: 11	SIZE: A1
MODIFIED: MULE V	20-FEB-2018				SCALE: 3:50
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING		STATE: RELEASE	
SAFETY:					SHEET: 2 OF 3
APPROVED:					



NOTE: AC INPUT TO RECTIFIER IS NOT USED IN SINGLE FEED CONFIGURATION.
DASHED LINES INDICATE OPTIONAL FEATURES/COMPONENTS.



NOTE: AC INPUT TO RECTIFIER IS NOT USED IN SINGLE FEED CONFIGURATION.
DASHED LINES INDICATE OPTIONAL FEATURES/COMPONENTS.

BREAKER AND FUSE INFORMATION - 93PM UPS			
BREAKER/FUSE APPLICATION	MANUFACTURER	PART NUMBER	QUANTITY/LOCATION
RECTIFIER INPUT FUSE	BUSSMAN	160FEE	3 PER POWER MODULE (UPM)
INVERTER OUTPUT FUSE	BUSSMAN	160FEE	3 PER POWER MODULE (UPM)
DC FUSE	BUSSMAN	FWH-200B	6 PER UPS
BYPASS FUSE	BUSSMAN	170M3420	3 PER UPS

UPS WITH SIDECAR	PACKAGED ENVELOPE DIMENSIONS MM [IN]		
	WIDTH	DEPTH	HEIGHT
	987 [38.86]	1230 [48.43]	1975 [77.76]

BREAKER AND FUSE INFORMATION - SIAC-B					
CONFIGURATION	KAIC	TYPES OF BREAKERS			
		MAINTENANCE ISOLATION BREAKER	MAINTENANCE BYPASS BREAKER	BYPASS INPUT BREAKER	RECTIFIER INPUT BREAKER
2 BKRS CONFIGURATION	STD KAIC	JGS3150FAG	JGS3150FAG	-	-
	HIGH KAIC	JGH3150FAG	JGH3150FAG	-	-
3 BKRS CONFIGURATION	STD KAIC	JGS3150FAG	JGS3150FAG	JGS3200FAG	-
	HIGH KAIC	JGH3150FAG	JGH3150FAG	JGH3200FAG	-
4 BKRS CONFIGURATION	STD KAIC	JGS3150FAG	JGS3150FAG	JGS3200FAG	JGS3200FAG
	HIGH KAIC	JGH3150FAG	JGH3150FAG	JGH3200FAG	JGH3200FAG

BREAKER AND FUSE INFORMATION - SIAC-T			
CONFIGURATION	TYPES OF BREAKERS		
	MAINTENANCE ISOLATION BREAKER	MODULE OUTPUT BREAKER UPS 1	MODULE OUTPUT BREAKER UPS 2
UPS WITH SIAC-T [1+1]/[2+0]	-	FD3150W	FD3150W
UPS WITH SIAC-T [1+1]	FD3150W	FD3150W	FD3150W
UPS WITH SIAC-T [2+0]	JGE3250FAGC	FD3150W	FD3150W

METRIC | THIRD ∠ PROJECTION | EATON CORPORATION

DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.

DESCRIPTION: 93PM-100 FRAME WITH SIDECAR UPS SITE PLAN

ORIGINATED: RANDEV_A	29OCT2012	ECO: ECO-135286	NAME: P-110000128	REVISION: 11	SIZE: A1
MODIFIED: MULE V	20-FEB-2018			STATE: RELEASE	SCALE: NTS
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING			SHEET: 3 OF 3
SAFETY:					
APPROVED:					

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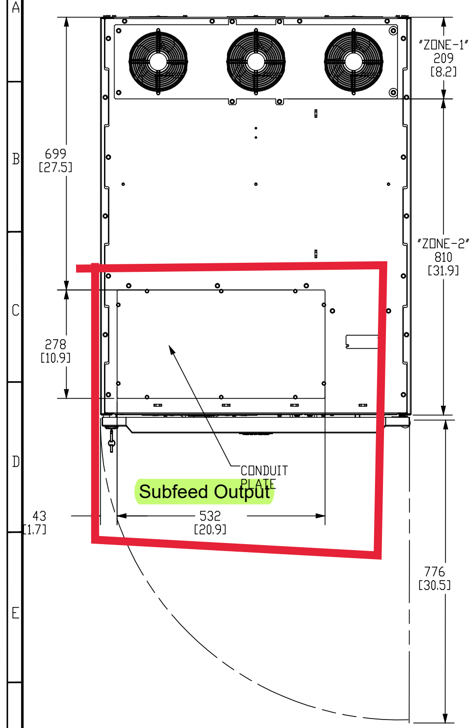
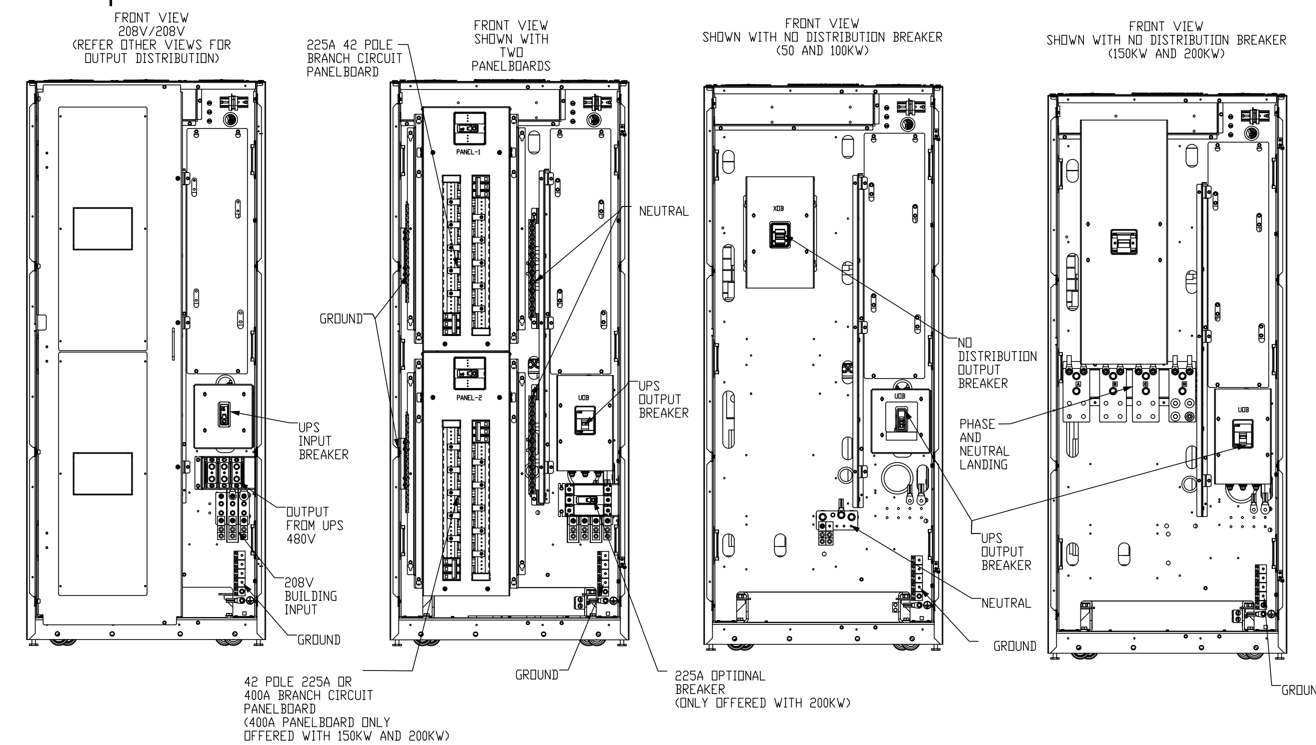
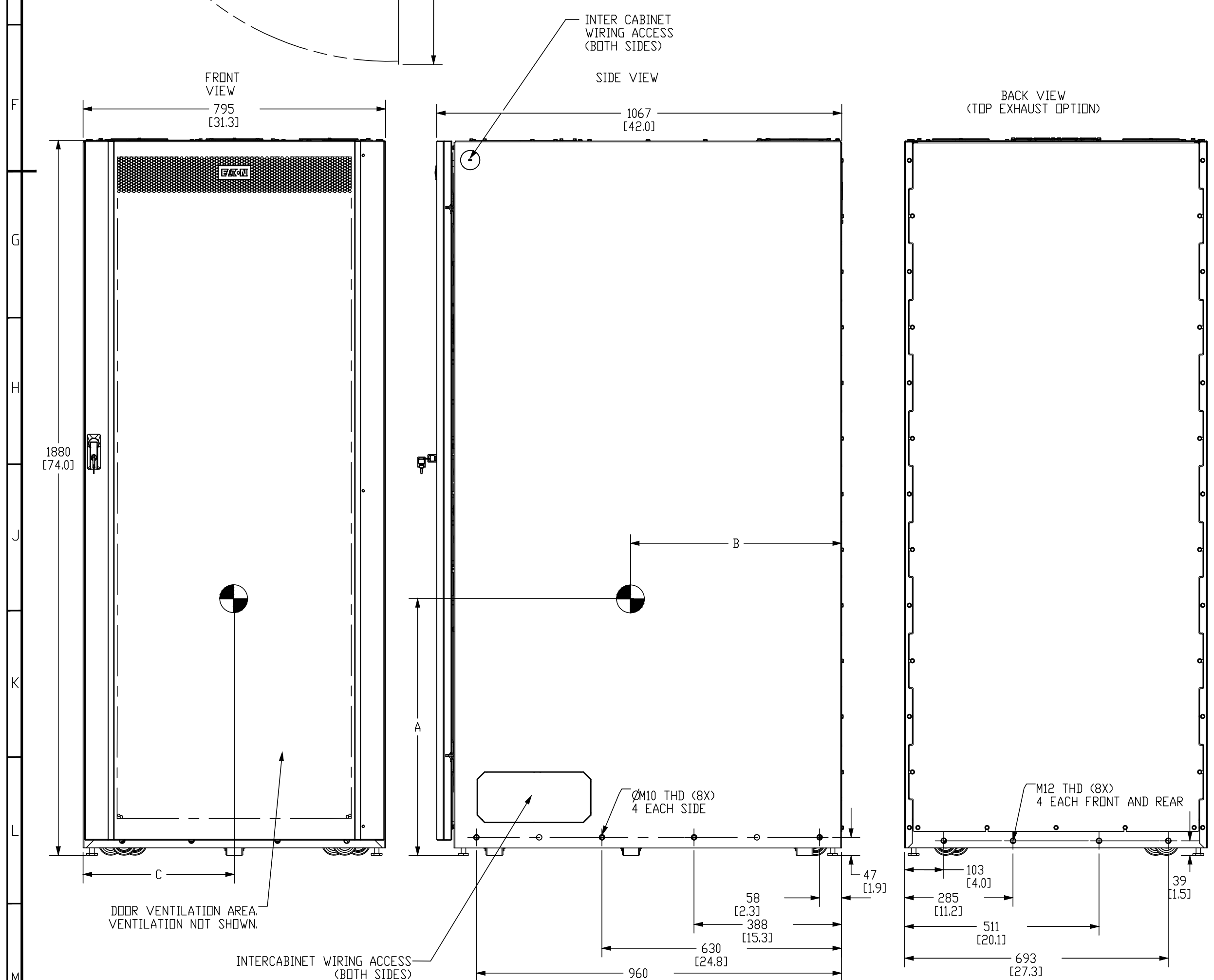
A1

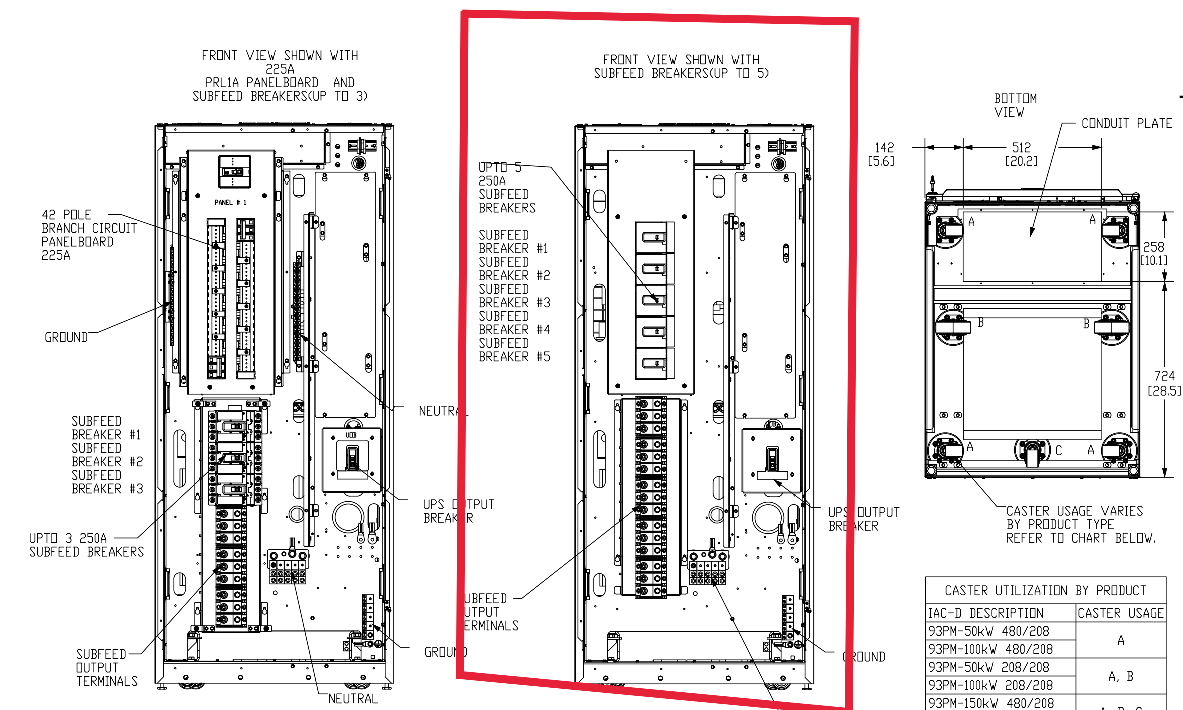
GO/NEG-Alt-Date: BUQ50220X4K2-0000-3/1/2024		Job Name: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:



NOTES:
1. THE SYSTEM MUST BE INSTALLED ON A LEVEL FLOOR SUITABLE FOR COMPUTER OR ELECTRONIC EQUIPMENT.
2. THE SYSTEM MUST BE INSTALLED IN A TEMPERATURE AND HUMIDITY CONTROLLED INDOOR AREA FREE OF CONDUCTIVE CONTAMINANTS.
3. AMBIENT TEMPERATURE RANGE:- 5-40C (41-104F) AT AN ELEVATION UP TO 1500M WITHOUT DERATING.MAXIMUM RELATIVE HUMIDITY:- 95% NON-CONDENSING.
4. IAC-D CABINET CLEARANCES:
   FRONT OF THE CABINET:
   ALL CABINETS: 914mm[36.0"]
   FROM TOP OF THE CABINET (TOP EXHAUST):
   50KW(480V/208V): 203mm [8.0"]
   50KW(208V/208V),100KW(480V/208V),100KW(208V/208V),150KW(480V/208V), 200KW(480V/208V): 457mm[18.0"] ALWAYS IN ZONE-1,
   ZONE-2 CAN BE LESS THAN 457mm[18.0"] WITH REAR SERVICE ACCESS.
   FROM REAR OF THE CABINET(REAR EXHAUST):
   50KW(480V/208V) AND 100KW(480V/208V): 203mm [8.0"]
   50KW(208V/208V),100KW(208/208),150KW(480V/208V), 200KW(480V/208V): 457mm[18"]
5. TOP AND BOTTOM CABLE ENTRIES THROUGH REMOVABLE ACCESS PLATES ARE STANDARD FOR ALL CONFIGURATIONS.
6. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRIC CODES.
7. SOURCE INPUT TO DISTRIBUTION CABINET:3 PHASES, GROUND. OUTPUT FROM DISTRIBUTION CABINET:3 PHASES,NEUTRAL,GROUND.
8. THE ACCESSORY CABINET CAN BE INSTALLED IN LINE-UP-AND-MATCH OR STANDALONE CONFIGURATION.THE CABINET DOES NOT ALLOW WIRE PASS THROUGH FROM OTHER ADJACENT CABINETS.
9. SPECIFICATIONS ARE SUBJECT TO CHANGE.







CASTER UTILIZATION BY PRODUCT	
IAC-D DESCRIPTION	CASTER USAGE
93PM-50kW 480/208	A
93PM-100kW 480/208	
93PM-50kW 208/208	A, B
93PM-100kW 208/208	
93PM-150kW 480/208	A, B, C
93PM-200kW 480/208	

WEIGHT AND CENTER OF GRAVITY

	A MM [INCH]	B MM [INCH]	C MM [INCH]	WEIGHT KG [LBS]
93PM-50KW 480/208 IAC-D WITH (2) 225A PANELBOARDS	649 [25.5]	497 [19.5]	367 [14.4]	521 [1148.6]
93PM-50KW 208/208 IAC-D WITH (2) 225A PANELBOARDS	854 [33.6]	443 [17.4]	392 [15.4]	698 [1538.8]
93PM-100KW 480/208 IAC-D WITH (2) 225A PANELBOARDS	695 [27.4]	535 [21.0]	373 [14.7]	628 [1384.5]
93PM-100KW 208/208 IAC-D WITH (2) 225A PANELBOARDS	906 [35.6]	437 [17.2]	363 [14.3]	903 [1990.7]
93PM-150KW 480/208 IAC-D WITH 225A 400A PANELBOARDS	704 [27.7]	481 [18.9]	387 [15.2]	909 [2003.5]
93PM-200KW 480/208 IAC-D WITH 225A 400A PANELBOARDS	698 [27.5]	473 [18.6]	388 [15.3]	977 [2153.5]

METRIC | THIRD ∠ PROJECTION | EATON CORPORATION | EATON

DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.

DESCRIPTION: 93PM IAC-D SITE PLAN

ORIGINATED: RANDEV_A	SEP-20-2012	ECO: ECO-137772	NAME:	REVISION: 12	SIZE: A1
MODIFIED: A.SHAH	30 MAR 2018		P-110000116		SCALE: 1:50
CHECKED:		DOCUMENT TYPE:		STATE: RELEASE	
SAFETY:		PRO-E DRAWING			SHEET: 1 OF 3
APPROVED:					

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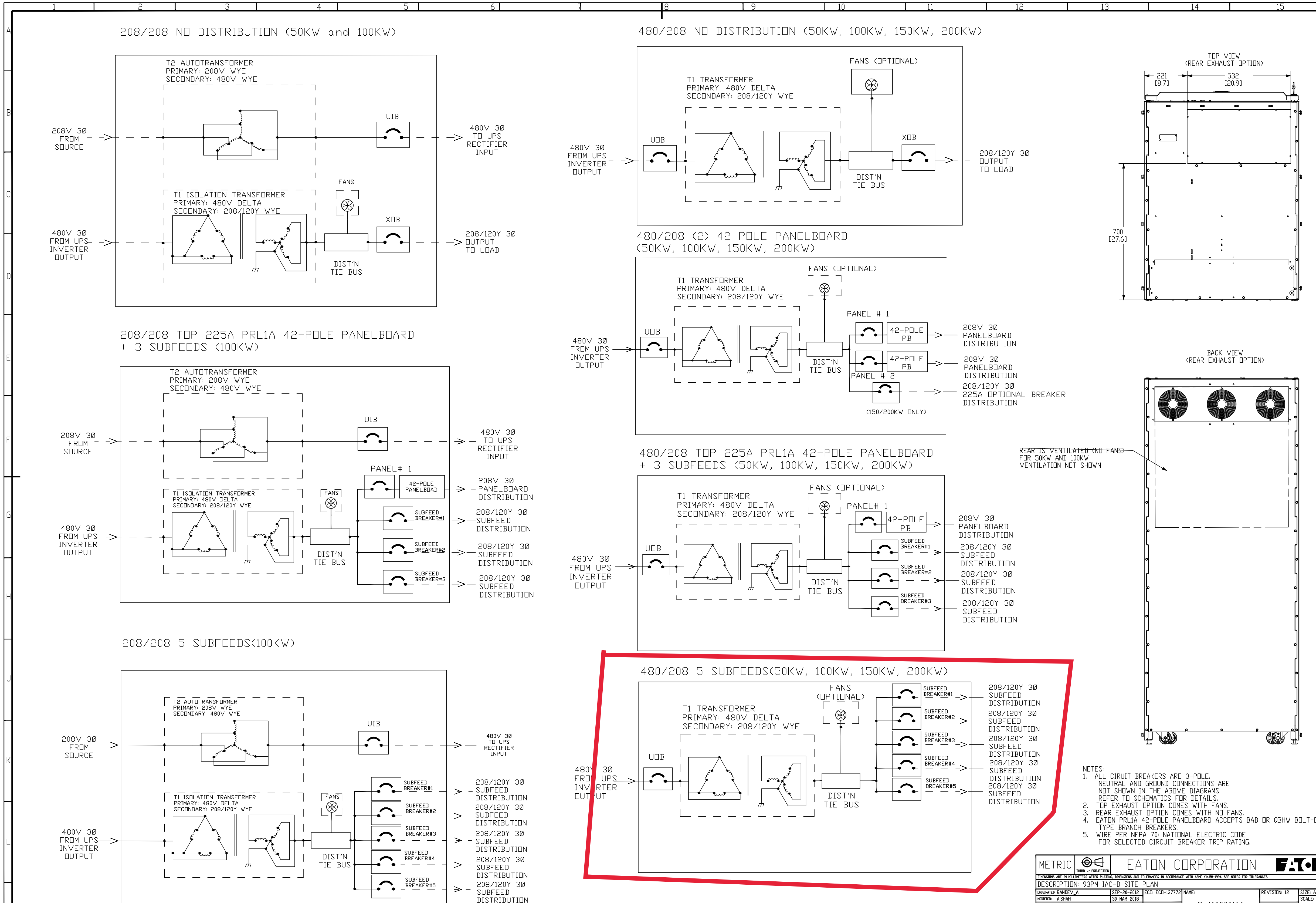
A1

GO/NEG-Alt-Date: BUQ50220X4K2-0000-3/1/2024		Job Name: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM	
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:	



NOTES:
1. ALL CIRUIT BREAKERS ARE 3-POLE. NEUTRAL AND GROUND CONNECTIONS ARE NOT SHOWN IN THE ABOVE DIAGRAMS. REFER TO SCHEMATICS FOR DETAILS.
2. TOP EXHAUST OPTION COMES WITH FANS.
3. REAR EXHAUST OPTION COMES WITH NO FANS.
4. EATON PRL1A 42-POLE PANELBOARD ACCEPTS BAB OR QBHW BOLT-ON TYPE BRANCH BREAKERS.
5. WIRE PER NFPA 70: NATIONAL ELECTRIC CODE FOR SELECTED CIRCUIT BREAKER TRIP RATING.

METRIC	THIRD ∠ PROJECTION	EATON CORPORATION	
DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.			
DESCRIPTION: 93PM IAC-D SITE PLAN			
ORIGINATED: RANDEV_A	SEP-20-2012	ECO: ECO-137772	NAME: P-110000116	REVISION: 12	SIZE: A1
MODIFIED: A.SHAH	30 MAR 2018				SCALE: 1:50
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING		STATE: RELEASE	
SAFETY:					SHEET: 2 OF 3
APPROVED:					

GO/NEG-Alt-Date: BUQ50220X4K2-0000-3/1/2024		Job Name: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:

IAC-D RATING [KVA]	CUSTOMER WIRING	ACCEPTED WIRE RANGE	TORQUE RATING N*M [IN-LB]	RECOMMENDED MINIMUM WIRE SIZE FOR 75 DEG C COPPER STRANDED WIRE
50 KVA	480V INPUT PHASE WIRE	(1) 14 AWG TO 1/0	5.6 [50]	(1) 3 AWG
	480V INPUT BONDING GROUND WIRE	14 AWG TO 1/0	5.1 [45]	(1) 8 AWG
	OUTPUT PHASE WIRE (NO DISTRIBUTION BREAKER)	(1) 3 AWG TO 350 MCM	31 [275]	(1) 250MCM
	OUTPUT NEUTRAL WIRE (NO DISTRIBUTION BREAKER)	(2) 6 AWG TO 300 MCM	31 [275]	(2) 4/0
	OUTPUT GROUND WIRE (NO DISTRIBUTION BREAKER)	14 AWG TO 1/0	5.6 [50]	(1) 3 AWG
	208V INPUT PHASE WIRE	(2) 6 AWG TO 300 MCM	31 [275]	(1) 250 MCM
	208V INPUT BONDING GROUND WIRE	(2) 14 AWG TO 1/0	5.1 [45]	(1) 4 AWG
	480V OUTPUT PHASE WIRE TO UPS	(1) 14 AWG TO 1/0	5.6 [50]	(1) 2 AWG
	480V OUTPUT TO UPS BONDING GROUND WIRE	(2) 14 AWG TO 1/0	5.1 [45]	(1) 8 AWG
	480V INPUT PHASE WIRE FROM UPS	(1) 6 AWG TO 500 MCM	56.5 [500]	(1) 3 AWG
	480 V INPUT FROM UPS BONDING GROUND WIRE	(2) 14 AWG TO 1/0	5.1 [45]	(1) 8 AWG
100 KVA	480V INPUT PHASE WIRE	(1) 4 AWG TO 350 MCM	20 [177]	(1) 2/0
	480V INPUT BONDING GROUND WIRE	14 AWG TO 1/0	5.1 [45]	(1) 6 AWG
	OUTPUT PHASE WIRE (NO DISTRIBUTION BREAKER)	(2) 2 AWG TO 500 MCM	42 [372]	(2) 250 MCM
	OUTPUT NEUTRAL WIRE (NO DISTRIBUTION BREAKER)	(4) 6 AWG TO 300 MCM	31 [275]	(4) 2/0
	OUTPUT GROUND WIRE (NO DISTRIBUTION BREAKER)	14 AWG TO 1/0	5.6 [50]	(1) 3 AWG
	208V INPUT PHASE WIRE	(2) 6 AWG TO 300 MCM	31 [275]	(2) 250 MCM
	208V INPUT BONDING GROUND WIRE	(2) 14 AWG TO 1/0	5.1 [45]	(2) 2 AWG
	480V OUTPUT PHASE WIRE TO UPS	(1) 4 AWG TO 4/0	5.6 [50]	(1) 4/0
	480V OUTPUT TO UPS BONDING GROUND WIRE	(2) 14 AWG TO 1/0	5.1 [45]	(1) 6 AWG
	480V INPUT PHASE WIRE FROM UPS	(1) 6 AWG TO 500 MCM	56.5 [500]	(1) 2/0
	480 V INPUT FROM UPS BONDING GROUND WIRE	(2) 14 AWG TO 1/0	5.1 [45]	(1) 6 AWG

IAC-D RATING [KVA]	CUSTOMER WIRING	ACCEPTED WIRE RANGE	TORQUE RATING N*M [IN-LB]		RECOMMENDED MINIMUM WIRE SIZE FOR 75 DEG C COPPER STRANDED WIRE
150 KVA	480V INPUT PHASE WIRE	(2) 2/0 TO 250 MCM	31 [275]		(2) 2/0
	480V INPUT BONDING GROUND WIRE	14 AWG TO 1/0	5.1 [45]		(2) 4 AWG
	OUTPUT PHASE WIRE (NO DISTRIBUTION BREAKER)	CUSTOMER SUPPLIED LONG BARREL 2-HOLE LUG	-		(3) 250MCM
	OUTPUT NEUTRAL WIRE (NO DISTRIBUTION BREAKER)	CUSTOMER SUPPLIED LONG BARREL 2-HOLE LUG	-		(3) 500MCM
	OUTPUT GROUND WIRE (NO DISTRIBUTION BREAKER)	14 AWG TO 1/0	5.6 [50]		(1) 1 AWG
200 KVA	480 V INPUT PHASE WIRE	(2) 2/0 TO 250 MCM	31 [275]		(2) 2/0
	480V INPUT BONDING GROUND WIRE	14 AWG TO 1/0	5.1 [45]		(1) 1 AWG
	OUTPUT PHASE WIRE (NO DISTRIBUTION BREAKER)	CUSTOMER SUPPLIED LONG BARREL 2-HOLE LUG	-		(4) 250 MCM
	NEUTRAL WIRE (NO DISTRIBUTION BREAKER)	CUSTOMER SUPPLIED LONG BARREL 2-HOLE LUG	-		(4) 500 MCM
	OUTPUT GROUND WIRE (NO DISTRIBUTION BREAKER)	14 AWG TO 1/0	5.6 [50]		(1) 3 AWG
150 KVA 200 KVA	OUTPUT PHASE WIRE 225A OPTIONAL BREAKER	(2) 6 AWG TO 300 MCM	31 [275]		(2) 3/0
	OUTPUT NEUTRAL WIRE (225A OPTIONAL BREAKER)	(2) 6 AWG TO 300 MCM	31 [275]		(2) 300 MCM
50 KVA 100 KVA 150 KVA 200KVA	OUTPUT PHASE WIRE (SUBFEED BREAKERS)	(1) 6 AWG TO 500 MCM	20 [177]		SEE NOTE 5
	OUTPUT NEUTRAL WIRE (SUBFEED BREAKERS)	(2) 6 AWG TO 300 MCM	31 [275]		
	OUTPUT GROUND WIRE (SUBFEED BREAKERS)	14 AWG TO 1/0	5.1 [45]		
	PANELBOARD NEUTRAL WIRE	(64) 6 AWG TO 14 AWG	6 TO 8 AWG	2.8 [25]	SEE NOTE 4 (SHEET 2)
			10 TO 14 AWG	1.7 [15]	
		(22) 1/0	4 TO 6 AWG	5.0 [45]	
			8 AWG	4.5 [40]	
			10 TO 14 AWG	4.0 [35]	
	PANELBOARD GROUND WIRE	(32) 6 AWG TO 14 AWG	6 TO 8 AWG	2.8 [25]	SEE NOTE 4 (SHEET 2)
			10 TO 14 AWG	1.7 [15]	
		(11) 1/0	4 TO 6 AWG	5.0 [45]	
			8 AWG	4.5 [40]	
			10 TO 14 AWG	4.0 [35]	

PRODUCT SPECIFICATIONS

IAC-D RATING	AC INPUT VOLTAGE	AC OUTPUT VOLTAGE	AC INPUT CURRENT	AC OUTPUT CURRENT	OUTPUT VOLTAGE TO UPS	INPUT VOLTAGE FROM UPS	OUTPUT CURRENT TO UPS	INPUT CURRENT FROM UPS	MAX HEAT DISSIPATION AT 100% LOAD [WITH (2) 225A PANELBOARDS]	MINIMUM REQUIRED AIRFLOR AT FULL LOAD
KVA	V	V	AMP	AMP	V	V	AMP	AMP	KW [BTU/HR]	CFM
50	480	208/120	60	139	N/A	N/A	N/A	N/A	2.58 [8803]	NATURAL CONVECTION
50	208	208/120	174	139	480	480	75	60	4.36 [14877]	678
100	480	208/120	120	277	N/A	N/A	N/A	N/A	4.18 [14268]	678
100	208	208/120	347	277	480	480	150	120	5.62 [19176]	678
150	480	208/120	180	416	N/A	N/A	N/A	N/A	2.98 [10168]	678
200	480	208/120	240	555	N/A	N/A	N/A	N/A	3.50 [11943]	678

FUSE AND BREAKER INFORMATION - IAC-D

IAC-D RATING	UPS OUTPUT BREAKER (UOB)		UPS INPUT BREAKER (UIB) (208/208)		XOB (NO DISTRIBUTION)		SUBFEED BREAKER		OPTIONAL BREAKER	PANELBOARD MAIN BREAKER 225A		PANELBOARD MAIN BREAKER 400A		MANUFACTURED BY
KVA	STANDARD KAIC	HIGH KAIC	STANDARD KAIC	HIGH KAIC	STANDARD KAIC	HIGH KAIC	STANDARD KAIC	HIGH KAIC		STD KAIC	HIGH KAIC	STD KAIC	HIGH KAIC	
50	FD3080L	HFD3080L	FD3100L	HFD3100L	KD3175W	HKD3175W	JGS325033WZ1 OR JGS325033WZ1C	JGH325033WZ1 OR JGH325033WZ1C	FD3225L	FD3225	HFD3225	-	-	EATON - CUTLER HAMMER
100	JGS3150FAWZ1	JGH3150FAWZ1	FD3200L	HFD3200L	LGE3350FAW	LGH3350FAW						-	-	
150	KD3400F + KES3250LSI	HKD3400F + KES3250LSI	-	-	MDL3600	HMDL3600						KD3400F +KT3400F	HKD3400F +KT3400T	
200	KD3300W	HKD3300W	-	-	MDL3700	HMDL3700								

IMPEDANCE VALUE FOR TRANSFORMERS

VENDOR P/N	IMPEDANCE (%)	EATON P/N	DESCRIPTION
WPN12131	3.37	P-149000005-131	100 KVA, K13,NON TP1 480/208 DELTA/WYE TRANSFORMER
WPN12132	3.3	P-149000005-132	100 KVA, K13,TP1 480/208 DELTA/WYE TRANSFORMER
WPN19131	3.9	P-149000015-131	200 KVA, K13,NON TP1 480/208 DELTA/WYE TRANSFORMER
WPN19132	3.9	P-149000015-132	200 KVA, K13,TP1 480/208 DELTA/WYE TRANSFORMER
WPN49131	6.1	P-149000032-131	150 KVA, K13,NON TP1 480/208 DELTA/WYE TRANSFORMER
WPN49132	3	P-149000032-132	150 KVA, K13,TP1 480/208 DELTA/WYE TRANSFORMER
WPN50131	2.77	P-149000019-131	50 KVA, K13,NON TP1 480/208 DELTA/WYE TRANSFORMER
WPN50132	3.9	P-149000019-132	50 KVA, K13,TP1 480/208 DELTA/WYE TRANSFORMER
WPV12011	4	P-149000005-011	100 KVA, K1, NON TP1,480/208 DELTA/WYE TRANSFORMER
WPV12012	3.99	P-149000005-012	100 KVA, K1,TP1,480/208 DELTA/WYE TRANSFORMER
WPV19011	5.7	P-149000015-011	200 KVA, K1, NON TP1,480/208 DELTA/WYE TRANSFORMER
WPV19012	5.7	P-149000015-012	200 KVA, K1,TP1,480/208 DELTA/WYE TRANSFORMER
WPV49011	5.02	P-149000032-011	150 KVA, K1, NON TP1,480/208 DELTA/WYE TRANSFORMER
WPV49012	4.56	P-149000032-012	150 KVA, K1,TP1,480/208 DELTA/WYE TRANSFORMER
WPV50011	3.2	P-149000019-011	50 KVA, K1, NON TP1,480/208 DELTA/WYE TRANSFORMER
WPV50012	3.3	P-149000019-012	50 KVA, K1,TP1,480/208 DELTA/WYE TRANSFORMER
N.A	MIN. 2.5	P-149000026	100 KVA AUTO TRANSFORMER
N.A	MIN. 2.5	P-149000029	50 KVA AUTO TRANSFORMER

FUSE / PANELBOARD NAME	MANUFACTURER	PART NUMBER
FUSE	LITTLEFUSE / BUSSMAN	313001 / MDL1 (250V)
PB ASSY, PRL1A, 225A BOLT-ON CB	EATON - CUTLER HAMMER	122950146
PB ASSY, PRL1A , 400A BOLT ON PB CH	EATON - CUTLER HAMMER	122950147

IAC-D	PACKAGED ENVELOPE DIMENSIONS		
	WIDTH	HEIGHT	DEPTH
	980[38.58]	1965[77.36]	1219 [48]

METRIC | THIRD ∠ PROJECTION | EATON CORPORATION

DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.

DESCRIPTION: 93PM IAC-D SITE PLAN

ORIGINATED: RANDEV_A	SEP-20-2012	ECO: ECO-137772	NAME: P-110000116	REVISION: 12	SIZE: A1
MODIFIED: A.SHAH	30 MAR 2018				SCALE: 1:50
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING		STATE: RELEASE	
SAFETY:					SHEET: 3 OF 3
APPROVED:					

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A1

GO/NEG-Alt-Date: BUQ50220X4K2-0000-3/1/2024		Job Name: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:

Eaton Ancillary Device Parts and Labor Coverage
Scope of Work
Attachment R-10

If Customer has purchased Corrective Maintenance Coverage for the UPS "Power Module" and ancillary devices are directly connected to the covered equipment, parts and labor coverage may extend to the ancillary device based on the device type. "Directly connected" is defined as electronically controlled or interfaced to a Power Module. Ancillary devices may be eligible for optionally purchased parts and labor coverage.

Regardless of ancillary device parts and labor coverage, preventive maintenance of these ancillary devices is limited to inspection and testing via an optionally purchased UPS Power Module (or other device) preventive maintenance scope of work. There shall be no separate field activity report beyond the relevant comments from the UPS preventive maintenance report (FAR).

Covered ancillary device types (if connected to covered equipment, these devices assume parts and labor coverage of covered equipment):

- SBM (System Bypass Module), which includes UL 1778 "Uninterruptible Power Systems" version – Ancillary coverage includes static switch but only if parts and labor coverage is purchased on all associated UPS modules
- SSBM (Switchboard System Bypass Module), which includes UL 891 "Switchboards" version or UL1558 "Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear" version – Ancillary coverage includes static switch but only if parts and labor coverage is purchased on all associated UPS modules
- MBP – Maintenance Bypass Panel
- IAC – Integrated Accessories Cabinet
- Remote monitor panel
- Hot Tie
- Parallel cabinet
- Battery cabinet and battery breakers (excludes battery jars, cells or battery parts)

Covered components within covered ancillary devices shall include the electronic control portion designed and built by Eaton (Powerware series) for metering, monitoring, and controls for transferring of loads. Items covered include logic boards, power supplies, relays, and control circuitry, SSBM displays, Hot-Tie Display and programmable logic controllers (PLC).

Excluded components within covered ancillary devices shall be: circuit breakers, power quality metering, transient voltage surge suppressors (TVSS), metering and switches, non-UPS operation related control circuitry, non-UPS operation related programmable logic controllers (PLC).

Excluded ancillary device types (parts and labor coverage may be optionally purchased):

- Batteries (EBM, EBC)
- Battery Monitoring Systems
- IDC – Integrated Distribution Cabinet
- Switchgear (coverage not available for purchase)
- Standalone STS – Static Transfer Switch device (e.g., Cyberex Switch)
- PDU – Power Distribution Unit

GO/NEG-Alt-Date:		Job Name:
BUQ50220X4K2-0000-3/1/2024		Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:

- PDR – Power Distribution Rack
- RPP – Remote power Panel
- EMS-UGK
- Battery Disconnect Circuit Breaker
- Flywheel
- ATS/MTS – Automatic or Manual Transfer Switch
- TVSS – Transient Voltage Surge Suppressor
- PFC – Power Factor Correction
- ePDU
- Racks and cabinets
- Software (e.g., Foreseer)

GO/NEG-Alt-Date:		Job Name:
BUQ50220X4K2-0000-3/1/2024		Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0
Item Number:	Catalog Number:	Designation:
	9PG10N0009E20R2	

EATON CORPORATION
UPS SERVICES – TERMS AND CONDITIONS (T-0)

TERMS AND CONDITIONS: These terms and conditions, the quotation and Scope(s) of Work (the "Agreement"), are the final expression of the contract for the sale of UPS services by Eaton Corporation ("Contractor"), and supersede all prior terms, quotations, statements(s) of work, purchase orders, correspondence or communications whether written or oral between Eaton Corporation and the customer. ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY CUSTOMER (THE "CUSTOMER"), ARE REJECTED UNLESS EXPRESSLY AGREED TO IN WRITING BY CONTRACTOR.

1. DEFINITIONS: The terms listed below shall have the following meanings:
"Battery" is the electric storage portion of a UPS.
"Covered Equipment" is the equipment as listed on the quote.
"CPM" is the Contracted Period of Maintenance or Hours of Service.
"Drop Ship Items" are capacitors, fans, equipment upgrades (modifications), batteries, battery monitoring systems, battery containment, battery materials, racks and cabinets.
"Emergency Service" is all services provided on an as needed basis that is not scheduled in advance.
"PCS" is Pre-Contract Survey inspection.
"Power Module" is the electronic portion of a UPS or other power quality device.
"Scope of Work" is the services, procedures, methods, exclusions and coverage as purchased by the Customer
"Service" is the installation, maintenance (including Preventive Maintenance as defined in Scope of Work Attachment R-2), repair, inspection, adjustment, and remote monitoring services (including the PredictPulse Service as defined in Scope of Work, Attachment R-32, R-36 or R-37) performed on the Covered Equipment by Contractor or otherwise provided by Contractor in connection with the Covered Equipment.
"UPS" is an Uninterruptible Power Supply which is comprised of the Power Module and Batteries.

2. ELIGIBILITY: All Covered Equipment that has a lapse in Service or warranty coverage greater than ninety (90) days is subject to a PCS prior to eligibility for Service under this Agreement. Customer will be charged at Contractor's current Time and Material Service Rate Schedule (Exhibit 1-PCS and Attachment X-1). A list of the equipment requiring a PCS will be incorporated into this Agreement.

3. HOURS OF SERVICE: Contractor will provide scheduled and emergency services portal-to-portal 8:00AM to 5:00 PM Monday-Friday ("5X8 Service") excluding all observed holidays. The Customer may purchase extended hours of scheduled and Emergency Service coverage ("7x24 Service") including Emergency Service being provided on public holidays (5 U.S.C. 6103). Scheduled services are not available on observed holidays.

4. ON-SITE RESPONSE TIME: Upon Service request the Contractor will arrive at the location of the Covered Equipment the next business day. If purchased by Customer and the Covered Equipment is located within one hundred (100) miles of a Contractor service location, Contractor will arrive at location of Covered Equipment within eight (8), four (4) or two (2) CPM hours. Response time does not include battery replacement service.

5. LABOR AND MATERIAL RATES: Customer shall be billed at Contractor's current Time and Material Rate Schedule (Attachment X-1) for Service purchased outside the Scope(s) of Work. This excludes any flat-rate quoted by Contractor representative.

6. ENGINEERING CHANGES: All engineering changes deemed necessary by Contractor will be installed during scheduled Service visits during the CPM. Any engineering changes deemed optional by Contractor will be offered to Customer on an as-available, per charge basis.

7. CUSTOMER'S RESPONSIBILITY:
A. Communication and Scheduling - Customer shall contact Contractor's Customer Reliability Center (1-800-843-9433) to schedule all Service and other requests. Preventive Maintenance or Services is deemed fulfilled if (i) the Customer fails to schedule or (ii) does not permit Service to be completed within ninety (90) days of the scheduled service date.

B. Movement - If Covered Equipment is moved to another location within the United States, Service coverage will continue at Contractors option if: (i) Customer notifies Contractor in writing at least thirty (30) days in advance of power-down of Covered Equipment and, (ii) Contractor supervises the power-down, disconnection, rigging, packing, movement, unpacking, reinstallation and re-start of the Covered Equipment and Customer will be charged at current Time and Material Service Rate Schedule.

C. Escort - During the provision of Service, Customer will have a representative present at Service site at no cost to the Contractor.

D. Access - Customer shall grant unobstructed access to the Covered Equipment to be serviced, as well as adequate working space in the immediate vicinity as may be required for the Contractor to perform Services. Prior to a site visit, the Customer and

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Contractor must agree on site access requirement costs. These costs will be invoiced by the Contractor following completion of Services.

8. TERM AND TERMINATION: The initial term of this Agreement shall be the service period defined on the applicable quote. Following the expiration of the initial term, this Agreement shall automatically renew for successive twelve (12) month periods. Contractor will provide notice of updated pricing prior to the expiration of the initial term or any subsequent renewal term. Customer or Contractor may terminate this Agreement at any time upon thirty (30) days written notice to the other, subject to Section 16.

9. BATTERIES AND DROP SHIP ITEMS: Prices stated in a quote do not include installation, freight, and handling charges unless these items are listed and priced in the quote. Prices stated in a quote are F.O.B. factory (unless otherwise stated) and title and risk of loss to each article sold by Contractor to Customer shall pass to Customer upon delivery at the F.O.B. point.

Shipment estimates are after receipt of Customer's purchase order. If approval of drawings are required, then shipment estimates are after receipt of written approval. If the Customer cannot accept delivery of batteries, Customer will arrange for storage. Contractor is not be liable or responsible for any damages or loss for delay or default in delivery due to force majeure. Customer may not cancel its purchase order because of such delays.

Customer may cancel its purchase order with prior written notice to Contractor subject to cancellation charges for capacitors, fans, equipment upgrades (modifications), batteries and Drop Ship Items as follows: (i) between 0-30 days prior to shipment, 100% of the total invoice, and (ii) greater than 30 days prior to shipment, 50% of the total invoice. Changes made to an order may be subject to increase or decrease in purchase order amount, change order charges, and changes in schedule date. Customer is responsible for return freight charges related to cancellation.

10. END OF SERVICE LIFE ("EOSL"): Contractor may designate a Power Module as "End of Service Life" which means limited parts are available and Service will be provided on a best efforts basis. This designation will be indicated on the quote for Service renewal and will serve as Contractor's notice of limited service support and its recommendation to replace or decommission the Power Module. If Contractor cannot perform or complete a covered repair, Contractor may terminate coverage subject to Section 8. Customer may request a pro-rated refund for the terminated portion of this Agreement, subject to Section 16.

11. INSURANCE: During the term of this Agreement, Contractor, at its own cost and expense, shall maintain in full force and effect the following insurance with sound and reputable insurers: (i) worker's compensation insurance in accordance with the statutory requirements of the state where the Service is to be performed; (ii) automobile liability insurance on all motor vehicles licensed for highway use, both owned and non-owned; and (iii) commercial general liability insurance for bodily injury and property damage.

12. WARRANTY: Contractor shall perform all Service in a professional and workmanlike manner. Contractor warrants repairing or replacing defective parts or materials and correcting defective workmanship reported to Contractor and/or diagnosed by Contractor's personnel during the term of this Agreement. Contractor warrants its corrective maintenance per the scope of work and replacement parts to be free from defects in material and workmanship for the term of this Agreement or for a period of ninety (90) days from the completion date of the repair or replacement of parts or materials, whichever is longer. In the event the parts or materials fail to meet published specifications due to a defect in parts or materials or workmanship covered by this Warranty, Contractor, at its discretion, will repair or replace the warranted parts or materials at no cost to Customer. This Warranty shall not apply to any Power Module and/or Battery that has been: (i) subject to damage caused by accident, fire, flood, lightning, vandalism, acts of God, Customer's neglect, misuse, misapplication, incorrect connection or external damage; (ii) subject to repair or alteration by Customer (or a third party) not authorized by Contractor in writing; or (iii) moved without thirty (30) days' notice to Contractor. Contractor reserves the right to supervise the move. THIS WARRANTY IS EXCLUSIVE EXCEPT FOR WARRANTY OF TITLE. CONTRACTOR DISCLAIMS ALL OTHER WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE CONTRACTOR'S SOLE LIABILITY AND CUSTOMER'S EXCLUSIVE REMEDY FOR FAILURE OF CONTRACTOR TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF CUSTOMER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHERWISE. Parts or materials supplied, but not manufactured by Contractor, are warranted solely by the manufacturer. Contractor's obligation under this Warranty is conditioned upon receipt of all payments due from Customer.

13. ASSIGNMENT: Neither party shall assign this Agreement or any of its rights and interests without the prior written consent of the other party. Upon written notice to the other party, either party may assign this Agreement or any of its rights and interests to: (i) any parent, subsidiary, affiliated or successor corporation; or the purchaser of any of these entities; (ii) any corporation to which the party has sold all or substantially all of its assets (including the purchaser of any of the party's subsidiaries); or (iii) any corporation or legal entity with which the party may merge or consolidate.

14. INDEMNITY: Contractor shall defend, indemnify and hold harmless Customer, its officers, employees and agents (Indemnified Parties), from and against any and all claims, causes of action or suits brought against the Indemnified Parties to the extent they result directly from (1) bodily injury to or death of any person or damage to or destruction of any property caused by the negligent acts or willful misconduct of Contractor, its agents or employees, and (2) any violation of federal or state law,

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regulation, order, rule or of any other governmental authority having jurisdiction by Contractor, its employees or agents, while Contractor is performing work on site. The Indemnified Party shall cooperate in a reasonable manner to provide information and access to personnel related to the defense of any indemnified claim.

15. LIABILITY: The remedies of the Customer set forth in this Agreement are exclusive and are its sole remedies for any failure of Contractor to comply with its obligations hereunder. IN NO EVENT SHALL CONTRACTOR OR CUSTOMER, OR THEIR RESPECTIVE OFFICERS, DIRECTORS, EMPLOYEES OR AGENTS BE LIABLE TO THE OTHER FOR ANY AND ALL CLAIMS ARISING OUT OF (A) DAMAGE TO PROPERTY OR EQUIPMENT, OTHER THAN DIRECT DAMAGES TO EQUIPMENT SOLD OR SERVICED HEREUNDER, OR (B) ANY INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES, SUCH AS, BUT NOT LIMITED TO, DELAY DAMAGES, LOST PROFITS OR REVENUE, LOSS OF DATA, LOSS OF USE OR LOST OPPORTUNITY THAT RESULT FROM OR IN CONNECTION WITH ANY CLAIM(S) OR CAUSE(S) OF ACTION, WHETHER BROUGHT IN CONTRACT OR IN TORT, EVEN IF CONTRACTOR OR CUSTOMER KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. WITH THE EXCEPTION OF THIRD PARTY CLAIMS FOR BODILY INJURY, PROPERTY DAMAGE DEATH, GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, THE TOTAL CUMULATIVE LIABILITY OF CONTRACTOR ARISING FROM OR RELATED TO THIS AGREEMENT WHETHER THE CLAIMS ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, SHALL NOT EXCEED THE PRICE OF THE PRODUCT OR SERVICES ON WHICH SUCH LIABILITY IS BASED.

16. PAYMENT: All payments are due net thirty (30) days in full from the date of invoice, unless otherwise mutually agreed upon in writing. Customer shall be invoiced for, and shall pay for, all Service not expressly provided for by the terms, such as site calls involving no-fault found inspections where no corrective maintenance was required. Contractor reserves the right to refuse to provide any further Service until all due payments have been received. In the event of an early termination: i) Customer is liable for any Service performed prior to the effective date of termination; and (ii) Contractor, at its discretion, will provide a credit against any advance payments received as follows: a) for fixed-rate Agreements, a pro-rated amount based on the terminated portion of the fixed-price fee due Contractor; or b) for any new work outside of the Services provided in this Agreement, an amount based on the difference between the amount paid by Customer prior to the effective date of early termination and the actual cost of Service completed (including emergency repair calls) by Contractor prior to the effective date of early termination, or c) for pre-paid multi-year contracts if Customer terminates the Agreement partway through the Agreement term, Customer will be entitled to a refund of the unused portion of the contract MINUS the applied discount for the pre-payment.

17. TAX: Contractor's price is exclusive of any applicable tax. All orders will be subject to applicable sales tax unless a current tax exemption certificate is on file with Contractor covering the state where Covered Equipment under this Agreement is located.

18. PARTS: Unless otherwise agreed to by the parties in writing, all parts removed for replacement shall be Contractor's property. Parts used from Customer-owned spare parts kit shall be replaced by Contractor at no cost. Replacement parts shall be new or of the same quality as new.

19. FORCE MAJEURE: Seller shall not be liable for failure to perform or delay in performance due to fire, flood, strike or other labor difficulty, act of God, act of any governmental authority or of the Buyer, riot, embargo, fuel or energy shortage, car shortage, wrecks or delays in transportation, or due to any other cause beyond Seller's reasonable control. In the event of delay in performance due to any such cause, the date of delivery or time for completion will be extended by a period of time reasonably necessary to overcome the effect of such delay.

20. CHOICE OF LAW: This Agreement shall be construed in accordance with and governed by the laws of the State of Ohio, or in the jurisdiction where the Service has been performed.

21. MODIFICATION OR WAIVER: The terms and conditions of this Agreement cannot be modified or waived except by a writing signed by the parties and waiver by Contractor or Customer of any provision in any one instance shall not constitute a waiver as to any other instance. If a provision of this Agreement is invalidated for any reason, this Agreement remains binding except for such invalid provision.

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Critical Power and Digital Infrastructure Division
Addendum To
Domestic U.S.A. General Terms and Conditions of Sale for
Distribution and Control Products and Services

This Addendum ("Addendum") amends the Terms and Conditions of Sale set forth in Eaton's Selling Policy 25-000 and is incorporated by reference into and is a part of the Terms and Conditions of Sale. In the event there is any conflict or inconsistency between this Addendum and the Terms and Conditions of Sale set forth in Eaton's Selling Policy 25-000, this Addendum shall govern and control.

This Addendum applies to Eaton's Critical Power and Digital Infrastructure Division (CPDI) product offerings.

This addendum does not apply to Uninterruptible Power Supply preventative maintenance services, refer to Eaton's UPS Services Terms and Conditions (T-0).

Witness Tests/Customer Inspection. Standard factory tests may be witnessed by the Buyer at Seller's factory for an additional charge per Product type. Buyer may final-inspect Products at the Seller's factory for an additional charge per Product type. Pricing will be provided at the time of quotation.

Warranty for Products. Unless provided separately to Buyer, Seller warrants that the Products manufactured by it will conform to Seller's applicable specifications and be free from failure due to defects in workmanship and material for one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

In the event any Product fails to comply with the foregoing warranty Seller will, at its option, either (a) repair or replace the defective Product, or defective part or component thereof, F.O.B. Seller's facility freight prepaid, or (b) credit Buyer for the purchase price of the Product. All warranty claims shall be made in writing.

Seller requires all non-conforming Products be returned at Seller's expense for evaluation unless specifically stated otherwise in writing by Seller. This warranty does not cover failure or damage due to storage, installation, operation, or maintenance not in conformance with Seller's recommendations, including as set forth in these Terms and Conditions of Sale, and industry standard practice or due to accident, misuse, abuse, or negligence. This warranty does not cover breach of data or system security, including that of information technology infrastructure, computers, software, hardware, databases, electronic systems (including database management systems), and networks. This warranty does not cover reimbursement for labor, gaining access, removal, installation, temporary power, or any other expenses, which may be incurred in connection with repair or replacement. This warranty does not apply to equipment not manufactured by Seller. Seller limits itself to extending the same warranty it receives from the third-party supplier, to the extent such third party permits assignment of its warranty.

Limitation on Warranties for Products. THE FOREGOING WARRANTIES ARE EXCLUSIVE EXCEPT FORWARRANTY OF TITLE. SELLER DISCLAIMS ALL OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE SELLER'S SOLE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR FAILURE OF SELLER TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE BUYER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE.

Eaton Corporation.
8609 Six Forks Road, Raleigh, NC 27615, USA
Eaton.com

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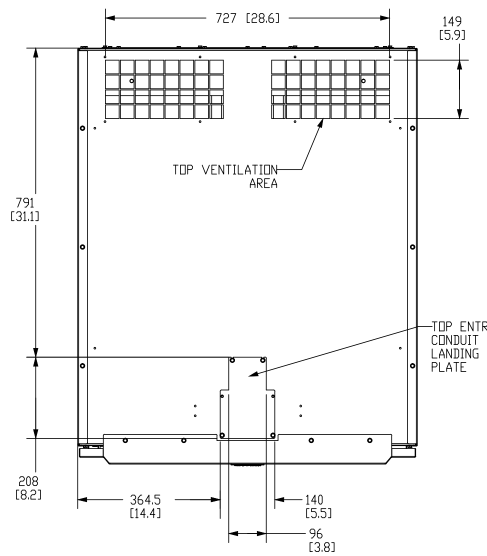
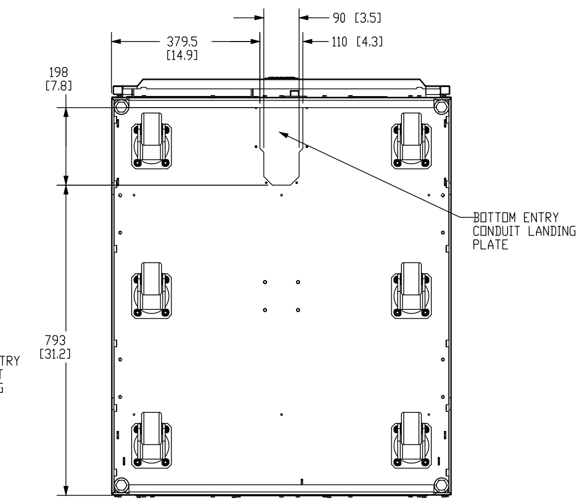
Item Number:	Catalog Number:	Designation:
	9PG10N0009E20R2	

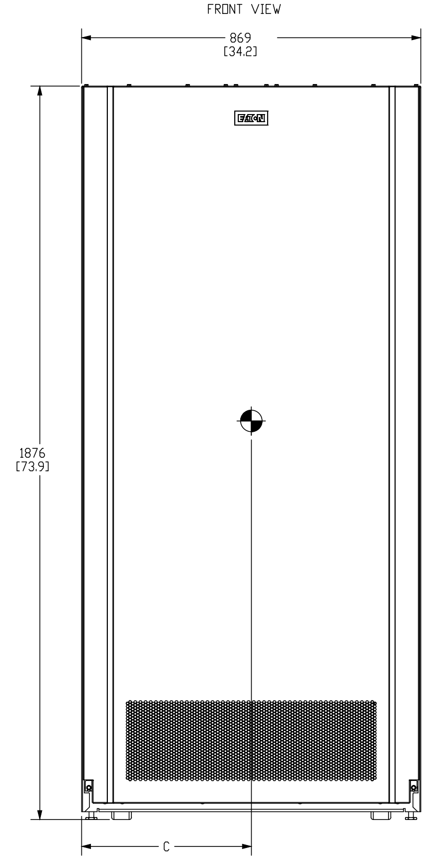
TOP VIEW
(TOP EXHAUST CONFIGURATION)



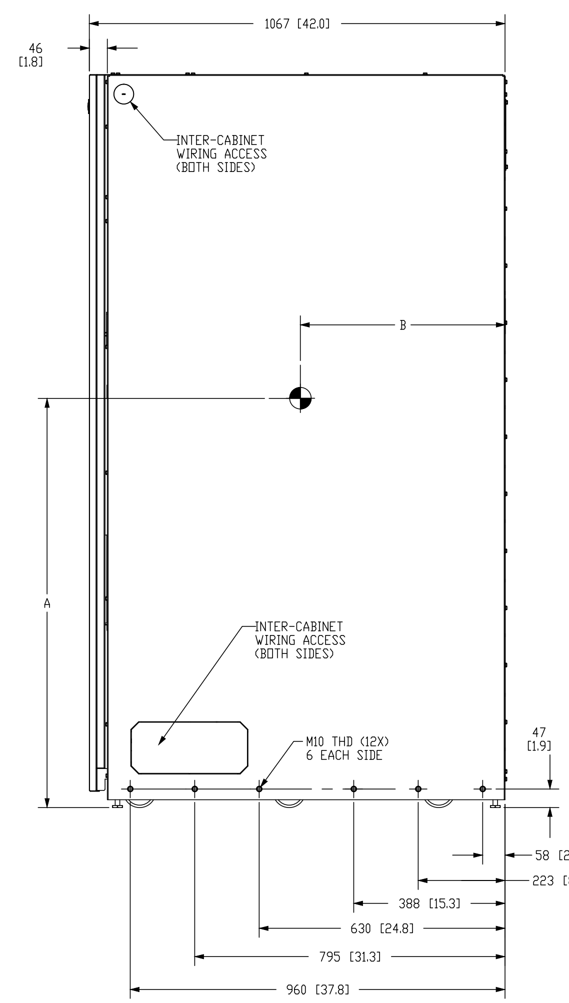
BOTTOM VIEW



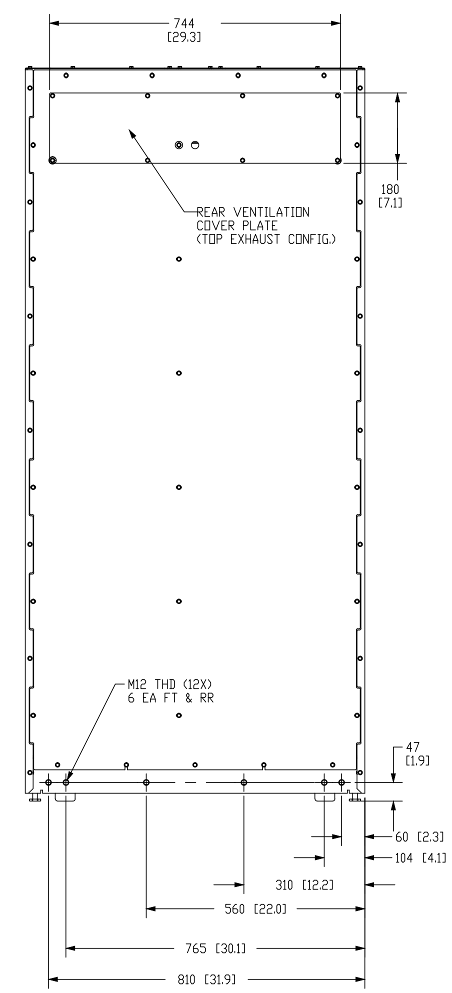
FRONT VIEW



SIDE VIEW



REAR VIEW
(TOP EXHAUST CONFIGURATION)



PRODUCT SPECIFICATIONS		
BATTERY CABINET MODEL	DC VOLTAGE OUTPUT NOMINAL	BATTERY NAMEPLATE CURRENT
IBC-LW	432	247A
IBC-LW	432	371A
IBC-LHW	432	495A
IBC-LW	480	223A
IBC-LW	480	334A
IBC-LHW	480	445A

WEIGHT AND CENTER OF GRAVITY		DIMENSIONS MM (IN)			WEIGHT kg [lbs]
		A	B	C	
432V	IBC-LW WITH 75Ah BATTERIES (E28)	1019 (40.1)	509 (20.0)	454 (17.9)	1385 [3054]
	IBC-LW WITH 100Ah BATTERIES (E39)	1031 (40.6)	507 (20.0)	455 (17.9)	1687 [3720]
	IBC-LW WITH 161Ah BATTERIES (E54)	1038 (40.9)	506 (19.9)	456 (18.0)	1989 [4386]
	IBC-LW WITH 103Ah BATTERIES (B37)	1029 (40.5)	508 (20.0)	455 (17.9)	1717 [3785]
	IBC-LW WITH 95Ah BATTERIES (H41)	1027 (40.4)	508 (20.0)	455 (17.9)	1674 [3691]
	IBC-LW WITH 125Ah BATTERIES (N54)	1036 (40.8)	506 (19.9)	456 (18.0)	2010 [4431]
	IBC-LHW WITH 103Ah BATTERIES (B37)	1029 (40.5)	508 (20.0)	455 (17.9)	1750 [3857]
	IBC-LHW WITH 95Ah BATTERIES (H41)	1027 (40.4)	508 (20.0)	455 (17.9)	1707 [3763]
	IBC-LHW WITH 125Ah BATTERIES (N54)	1036 (40.8)	506 (19.9)	456 (18.0)	2043 [4505]
	IBC-LHW WITH 161Ah BATTERIES (E54)	1036 (40.8)	506 (19.9)	456 (18.0)	2022 [4458]
480V	IBC-LW WITH 75Ah BATTERIES (E28)	969 (38.1)	508 (20.0)	434 (17.1)	1500 [3308]
	IBC-LW WITH 100Ah BATTERIES (E39)	977 (38.5)	507 (20.0)	434 (17.1)	1836 [4048]
	IBC-LW WITH 161Ah BATTERIES (E54)	982 (38.7)	505 (19.9)	434 (17.1)	2179 [4803]
	IBC-LW WITH 103Ah BATTERIES (B37)	975 (38.4)	507 (20.0)	434 (17.1)	1876 [4136]
	IBC-LW WITH 95Ah BATTERIES (H41)	975 (38.4)	507 (20.0)	434 (17.1)	1829 [4032]
	IBC-LW WITH 125Ah BATTERIES (N54)	981 (38.6)	506 (19.9)	434 (17.1)	2202 [4855]
	IBC-LHW WITH 103Ah BATTERIES (B37)	975 (38.4)	507 (20.0)	434 (17.1)	1902 [4193]
	IBC-LHW WITH 95Ah BATTERIES (H41)	975 (38.4)	507 (20.0)	434 (17.1)	1855 [4089]
	IBC-LHW WITH 125Ah BATTERIES (N54)	981 (38.6)	506 (19.9)	434 (17.1)	2228 [4913]
	IBC-LHW WITH 161Ah BATTERIES (E54)	980 (38.6)	506 (19.9)	434 (22.1)	2205 [4861]

IBC-LW/LHW	PACKAGED ENVELOPE DIMENSIONS MM [IN]		
	WIDTH	DEPTH	HEIGHT
	1054 [41.50]	1219 [48.00]	1975 [77.76]

NOTES:
1. THE SYSTEM MUST BE INSTALLED ON A LEVEL FLOOR SURFACE SUITABLE FOR COMPUTER OR ELECTRONIC EQUIPMENT.
2. THE SYSTEM MUST BE INSTALLED IN A TEMPERATURE AND HUMIDITY CONTROLLED INDOOR AREA FREE OF CONDUCTIVE CONTAMINANTS.
3. AMBIENT TEMPERATURE RANGE 5-40degC [41-104degF]
   RECOMMENDED OPERATING RANGE: 20-25degC [68-77degF]
   UL 924 ONLY:20-30degC [68-86degF].
   RELATIVE HUMIDITY: 5%-95% NON-CONDENSING.
4. WEIGHT: SEE TABLE, SOME OPTIONS WILL WEIGH LESS. WEIGHTS DO NOT INCLUDE CUSTOMER WIRING.
5. MINIMUM 914mm [36"] FRONT ACCESS NEEDED FOR SERVICING.
6. VENTILATION IS BY MEANS OF NATURAL CONVECTION AND CAN BE CONFIGURED FOR TOP OR REAR. MINIMUM 203mm [8"] CLEARANCE IN REAR IS NEEDED FOR REAR VENTILATION, OR MINIMUM OF 203mm [8"] CLEARANCE ON TOP IS NEEDED FOR TOP VENTILATION.
7. THE UPS BATTERY CABINET CAN BE INSTALLED IN LINE-UP-AND-MATCH OR STANDALONE CONFIGURATIONS.
8. TOP AND BOTTOM CABLE ENTRY THROUGH REMOVABLE CONDUIT LANDING PLATE.
9. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRIC CODES.
10. POWER HOOKUP TO UPS: POSITIVE, NEGATIVE, GROUND.
   FOR LINE-UP-AND-MATCH USE FACTORY SUPPLIED POWER WIRE(S) FOR POSITIVE AND NEGATIVE.
   IBC-LW REQUIRES ONE 2/0 AWG PER POLE FOR LINE-UP-AND-MATCH,
   IBC-LHW REQUIRES TWO 2/0 AWG WIRES PER POLE FOR LINE-UP-AND-MATCH.
   WHEN USED WITH 93PM-50, -100, -150, -200:
   REMOTE INSTALLATION OF MORE THAN 2 IBC-LW CABINETS OR MORE THAN 1 IBC-LHW CABINET WILL REQUIRE CUSTOMER SUPPLIED DC TIE BREAKER.
   WHEN USED WITH 93PM-400: REMOTE INSTALLATION OF MORE THAN 4 IBC-LW CABINETS OR MORE THAN 2 IBC-LHW CABINET WILL REQUIRE CUSTOMER SUPPLIED DC TIE BREAKER.
11. EACH BATTERY STRING OF 36 BATTERIES = 432VDC, 1 STRING PER CABINET.
   EACH BATTERY STRING OF 40 BATTERIES = 480VDC, 1 STRING PER CABINET.
12. SPECIFICATIONS ARE SUBJECT TO CHANGE.

METRIC | THIRD ANGLE PROJECTION | EATON CORPORATION

DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.

DESCRIPTION: 93PM-IBC-LW/LHW SITE PLAN

ORIGINATED: WALLACE_T	10SEP2015	ECO: ECO-137772	NAME: P-110000464	REVISION: 04	SIZE: A1
MODIFIED: V. MULE	06-APR-2018				SCALE: 13:100
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING		STATE: RELEASE	
SAFETY:					SHEET: 1 OF 2
APPROVED:					

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A1

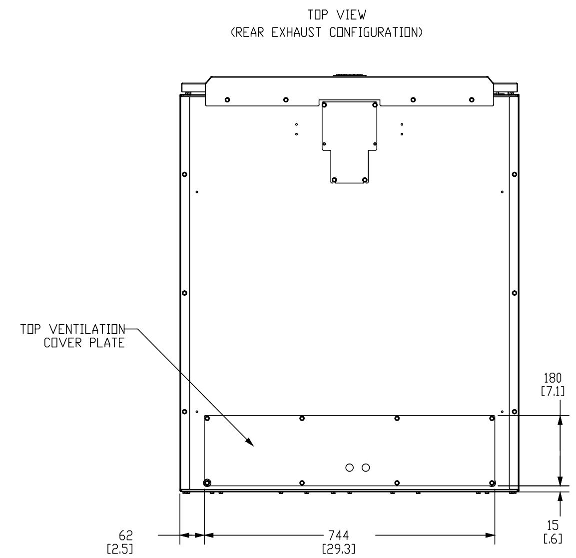
GO/NEG-Alt-Date: BUQ50220X4K2-0000-3/1/2024		Job Name: Seneca Niagara Resort & Casino_BUQ50220X4K2 / B022124SN0717 / 93PM	
Item Number:	Catalog Number: 9PG10N0009E20R2	Designation:	

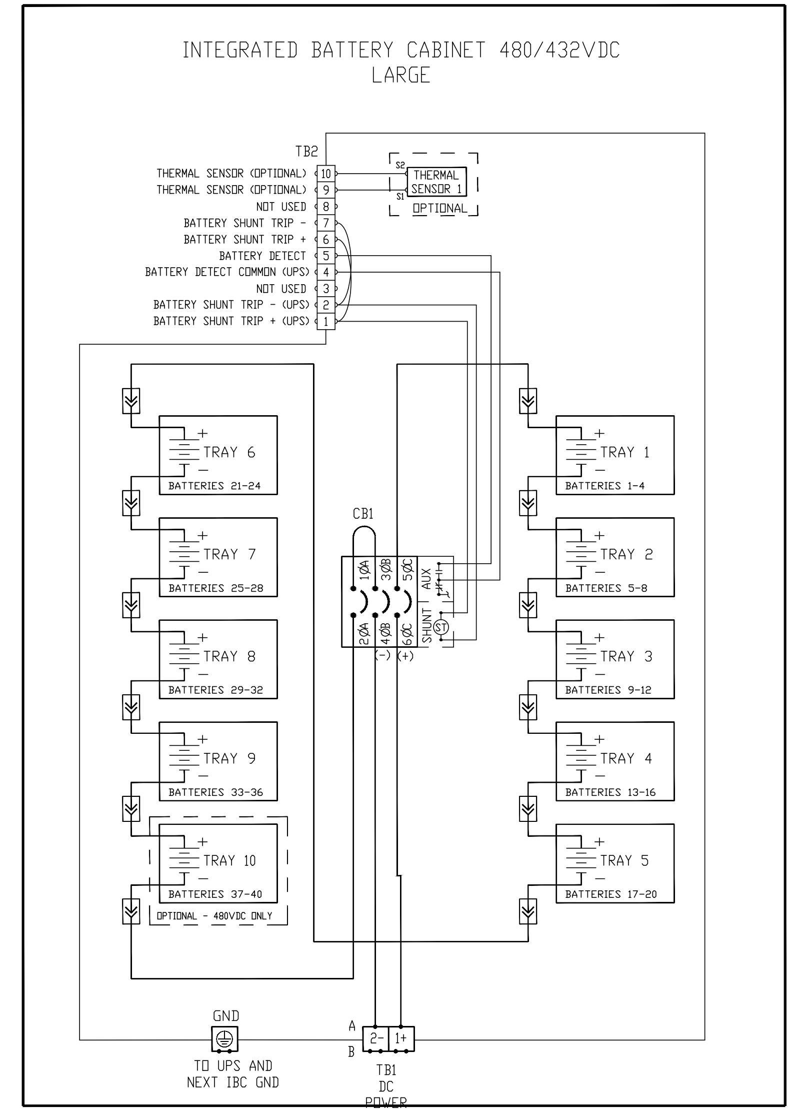
CUSTOMER SUPPLIED WIRING TO 93PM SERIES UPS

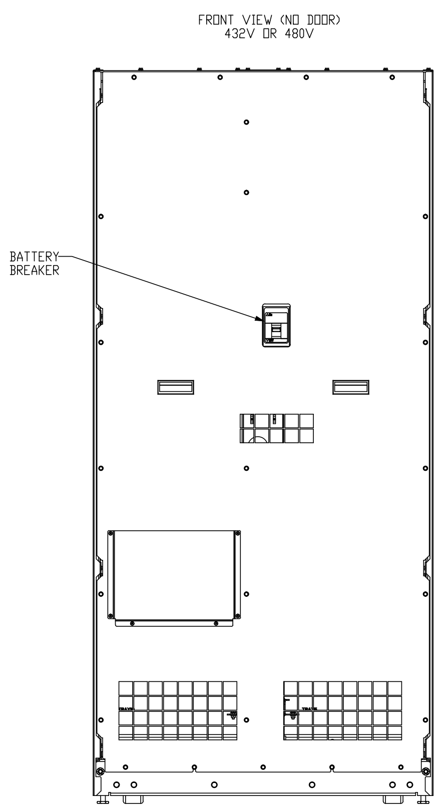
	WIRES	ACCEPTED WIRE RANGE	TORQUE RATING N*M [LB.IN]		RECOMMENDED MINIMUM WIRE SIZE FOR 75 DEG C COPPER STRANDED WIRE
IBC-LW 300A BREAKER	BATTERY WIRES	(2) 6 AWG-350 MCM	31 [275]		(2) 3/0 AWG/POLE
	GROUND WIRES	(6) 14 AWG-1/0	8 AWG	4.5 [40]	(1) 4 AWG
			4 AWG-6 AWG	5.1 [45]	
			3 AWG-1/0	5.6 [50]	
	CONTROL WIRES	12-22 AWG	0.56-0.79 [5-7]		18 AWG
IBC-LW 400A BREAKER	BATTERY WIRES	(2) 6 AWG-350 MCM	31 [275]		(2) 300 MCM/POLE
	GROUND WIRES	(6) 14 AWG-1/0	8 AWG	4.5 [40]	(1) 2 AWG
			4 AWG-6 AWG	5.1 [45]	
			3 AWG-1/0	5.6 [50]	
	CONTROL WIRES	12-22 AWG	0.56-0.79 [5-7]		18 AWG
IBC-LHW 500A BREAKER	BATTERY WIRES	(2) 6 AWG-350 MCM	31 [275]		(2) 300 MCM/POLE
	GROUND WIRES	(6) 14 AWG-1/0	8 AWG	4.5 [40]	(1) 1 AWG
			4 AWG-6 AWG	5.1 [45]	
			3 AWG-1/0	5.6 [50]	
	CONTROL WIRES	12-22 AWG	0.56-0.79 [5-7]		18 AWG

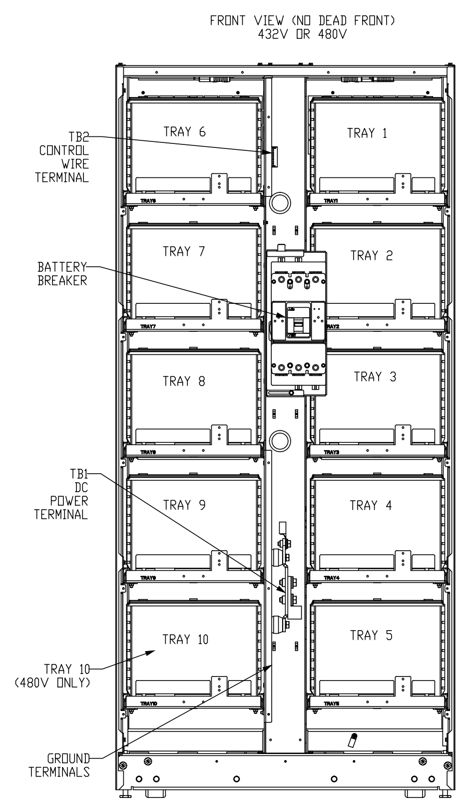
BREAKER AND FUSE INFORMATION

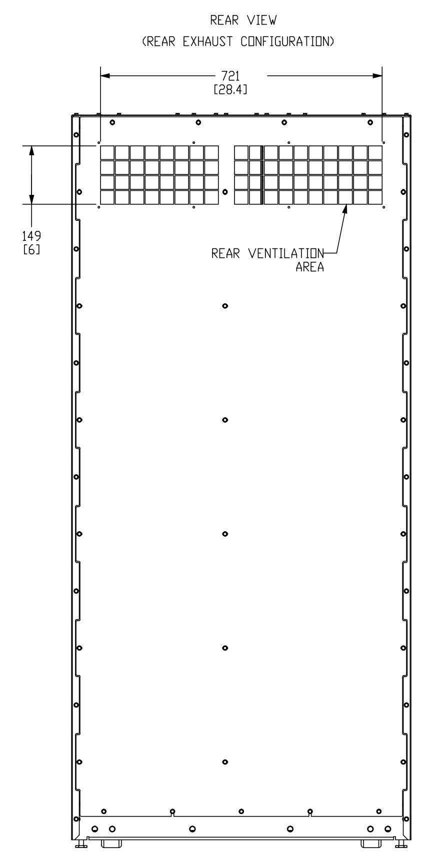
CONFIGURATION	BREAKER/FUSE APPLICATION	MANUFACTURER	PART NUMBER
IBC-LW 432VDC	BATTERY BREAKER (CB1)	CUTLER HAMMER	HKDDC3300WA07S49
			HKDDC3400WA07S49
IBC-LHW 432VDC			LGSDC3500FAW
IBC-LHW 480VDC			











CONTROL WIRING TO UPS (CUSTOMER SUPPLIED)

IBC CABINET	DESCRIPTION
TB2-1	TO BATTERY SHUNT TRIP + (UPS)
TB2-2	TO BATTERY SHUNT TRIP - (UPS)
TB2-4	TO BATT DETECT (UPS)
TB2-5 *	TO NEXT IBC-L TB2-4
TB2-6	TO NEXT IBC-L TB2-1
TB2-7	TO NEXT IBC-L TB2-2
TB2-9	TO UPS BUILDING ALARM
TB2-10	TO UPS BUILDING ALARM

*IN LAST IBC-L, TB2-5 RETURNS BACK TO BATT DETECT COMMON (UPS).

NOTES:
1. SHUNT TRIP WIRED IN PARALLEL FOR MULTIPLE BATTERY CABINETS.
2. BATTERY DETECT WIRED IN SERIES FOR MULTIPLE BATTERY CABINETS.
3. THERMAL SENSOR WIRED IN SERIES FOR MULTIPLE BATTERY CABINETS.

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DIMENSIONS ARE IN MILLIMETERS AFTER PLATING, DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994. SEE NOTES FOR TOLERANCES.

DESCRIPTION: SITE PLAN, IBC-LW/LHW

ORIGINATED: WALLACE_T	10SEP2015	ECO: ECO-137772	NAME: P-110000464	REVISION: 04	SIZE: A1
MODIFIED: V. MULE	06-APR-2018				SCALE: NTS
CHECKED:		DOCUMENT TYPE: PRO-E DRAWING		STATE: RELEASE	
SAFETY:					SHEET: 2 OF 2
APPROVED:					

4.4 Adjustable Subfeed Breakers

The JG-Frame subfeed breakers installed in the IAC-D contain adjustable current trip settings. The continuous current (Ir) values for the corresponding lettered adjustment setting marked on the subfeed breakers are listed in Table 4-1.

To adjust breaker:

1. If not already open, open the front door (see Figure 4-1) by lifting the latch from the bottom and turning to the right (counterclockwise) and swing the door open.
2. Loosen the screws securing the inside distribution panel door and swing the door open.
3. Loosen the screws securing the inside trim plate(s) and remove the plate(s). Retain trim plate(s) and hardware for later use.
4. Using the dial on the subfeed breaker adjust the breaker current rating as required to protect the wiring to the load. See Table 4-1 for the breaker continuous current adjustment letter.
5. Reinstall the inside trim plate removed in Step 3.
6. Close the inside door and secure with screws.
7. Close the outside door and secure the latch.
8. After the IAC-D is installed and wired, return to the applicable Eaton 93PM UPS installation and operation manual listed in paragraph 1.7 to complete the UPS wiring.

Table 4-1. Subfeed Breaker Continuous Current (Ir) Settings

Breaker Setting	Continuous Current (Ir)
A	100A
B	125A
C	150A
D	160A
E	175A
F	200A
G	225A
H	250A