PART 1  GENERAL

1.01  SCOPE

A. Furnish and install Manual Transfer Switches (MTS) and Non-Automatic Transfer Switches (NATS) having the ratings, features/accessories and enclosures as specified herein and as shown on the contract drawings.

1.02  RELATED SECTIONS

A. Section 16671A – Transient Voltage Surge Suppression
B. Section 16475 – Circuit Breakers and Fusible Switches – Low Voltage
C. Section 16901 – Microprocessor-Based Metering Equipment
D. Section 16904 – Microprocessor Trip Units for Low-Voltage Circuit Breakers

1.03  REFERENCES

A. The transfer switches and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of UL and NEMA as follows:

1. UL 1008 – Transfer Switches
2. UL 991
3. NFPA 70 – National Electrical Code
5. NFPA 110 – Emergency and Standby Power Systems
6. NEMA ICS 10 – AC Transfer Switch Equipment
7. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems
8. IEC 801-2, 3, 4, and 5
9. CISPR 11
10. Compliant with FCC Part 15, Subpart B, Class A.

1.04  SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:

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

B. Where applicable, the following additional information shall be submitted to the Engineer:
   1. Busway connection
   2. Connection details between close-coupled assemblies
   3. Composite front view and plan view of close-coupled assemblies
   4. Key interlock schematic drawing and sequence of operations
   5. Mimic bus.

1.05 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:
   1. Final as-built drawings and information for items listed in section 1.04
   2. Wiring diagrams
   3. Certified production test reports
   4. Installation information
   5. Seismic certification as specified

B. The final (as-built) drawings shall include the same drawings as the construction drawings and shall incorporate all changes made during the manufacturing process.

1.06 QUALIFICATIONS

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

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

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

D. ’Provide Seismic tested equipment as follows:

* Note to Spec. Writer – Optional
1. The equipment and major components shall be suitable for and certified by actual seismic testing to meet all applicable seismic requirements of the [latest International Building Code (IBC)] [latest California Building Code (CBC) with OSHPD Amendments]. [The equipment shall have OSHPD Special Seismic Certification (OSP) Pre-Approval].

2. The Project Structural Engineer will provide site specific ground motion criteria for use by the manufacturer to establish SDS values required.

3. The IP rating of the equipment shall be 1.5

4. The Structural Engineer for the Site will evaluate the SDS values published on the [Manufacturer's] [OSHPD] website to ascertain that they are "equal to" or "greater than" those required for the Project Site.

5. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.
   a. The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed civil engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon the above criteria to verify the seismic design of the equipment.
   b. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.
   c. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

1.07 REGULATORY REQUIREMENTS
   A. Provide a certificate of compliance with UL 1008 for the transfer switches furnished under this section.

1.08 DELIVERY, STORAGE AND HANDLING
   A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.09 FIELD MEASUREMENTS

1.10 OPERATION AND MAINTENANCE MANUALS
   A. Equipment operation and maintenance manuals shall be provided with each assembly shipped, and shall include instruction leaflets and instruction bulletins for the complete assembly and each major component.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Eaton
   B. _________
C. *__________*

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

**Note to Spec Writer:** Select from the table below to fill in the data required for 2.02A

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### TABLE 16496A-1

<table>
<thead>
<tr>
<th>Ampere Rating</th>
<th>Upstream Circuit Breaker</th>
<th>Suggested Breaker Rating</th>
<th>Rating When Used With Upstream Fuses</th>
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<td></td>
<td>240V 480V 600V</td>
<td>Maximum Fuse Rating</td>
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<td>100</td>
<td>100 65 25</td>
<td>200</td>
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<tr>
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<td>65 50 25</td>
<td>1600</td>
</tr>
</tbody>
</table>

The transfer switch shall have equal 3-second withstand; closing and interrupting ratings of *__________* amperes at *__________* volts.

B. The transfer switch shall be 100% equipment rated for continuous duty.

C. The transfer switch shall be 100% equipment rated for continuous duty as shown on the drawings and shall conform to the applicable requirements of UL 1008 for emergency system total load.

D. The manual transfer switches shall be fully rated for all types of loads, inductive and resistive, without over-sizing, either open or enclosed.

### 2.03 CONSTRUCTION

A. Manual Transfer Switch (MTS) shall be manually operated by a permanently attached manual operator.

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* Note to Spec. Writer – Insert data in blanks
* Note to Spec. Writer – Select one
E. Non-Automatic Transfer Switch (NATS) shall be electrically operated by integrally mounted pushbuttons. The transfer switch shall consist of completely enclosed contact assemblies. Control power for electrical operation shall be derived from a control power transformer connected to the line side of the source to which the load is being transferred. Transfer switch shall have pilot lights that indicate the following:

1. NORMAL Source connected {12C}
2. EMERGENCY Source connected {12D}
3. NORMAL Source available {12G}
4. EMERGENCY Source available {12H}

F. Main contacts shall be designed to withstand multiple fault currents and shall meet UL 489 and/or UL 1087 requirements.

G. The transfer switch shall be mechanically interlocked to prevent cross connection of sources when operated.

H. Transfer switches shall be capable of being operated manually under full rated load conditions. Removable manual operating handles are not acceptable. Manual operators requiring source or load disconnection prior to manual operation are not acceptable.

I. On transfer switches requiring a fourth pole for switching the neutral, the neutral shall be fully rated with equal withstand, closing and interrupting ratings to the power poles. Switched neutral poles which are add-on or overlap, or that are not capable of breaking full rated load current are not acceptable.

2.04 WIRING/TERMINATIONS

A. Terminal blocks shall conform to NEMA ICS 4. Terminal facilities shall be arranged for entrance of external conductors from the top or bottom of the enclosure. The main transfer switch terminals shall be suitable for the termination of conductors shown on the plans.

2.05 ENCLOSURE

A. Each transfer switch shall be provided in a ‘[NEMA 1] [NEMA 12] [NEMA 3R] [NEMA 4] [NEMA 4X] enclosure suitable for use in environments indicated in the drawings.

2.06 FINISH

A. NEMA 1, 12 or 3R enclosures shall be painted with the manufacturer’s standard light gray ANSI 61 paint. NEMA 4 or 4X shall be stainless steel, non-painted.

2.07 ACCESSORIES

A. The following accessories shall be provided:

1. Main contact assemblies for ‘[NORMAL] [and] [EMERGENCY] source(s) shall be equipped with thermal magnetic or electronic trip units and AB DE-ION arc extinguishers. Trip units shall have adjustable instantaneous trip values for each pole. Tripping mechanisms shall be designed “trip-free” so that the contacts cannot be held closed against an abnormal circuit condition {16N/E/B/S}. [Insert data or references from Sections 16475 and 16904 as required]

* Note to Spec. Writer – Optional
PART 3 EXECUTION

3.01 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.

1. Insulation check to ensure the integrity of insulation and continuity of the entire system
2. Visual inspection to ensure that the switch matches the specification requirements and to verify that the fit and finish meet quality standards
3. Mechanical tests to verify that the switch’s power sections are free of mechanical hindrances
4. Electrical tests to verify the complete electrical operation of the switch and to set up time delays and voltage sensing settings of the logic.

B. The manufacturer shall provide three (3) certified copies of factory test reports.

3.02 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer’s recommendations and the contract drawings.

3.03 FIELD QUALITY CONTROL

A. Provide the services of a qualified factory-trained manufacturer’s representative to assist the contractor in installation and start-up of the equipment specified under this section for a period of _____ working days. The manufacturer’s representative shall provide technical direction and assistance to the contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

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* Note to Spec. Writer – Optional
* Note to Spec. Writer – Select one
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16496A-6 03/04/14
B. The contractor shall provide three (3) copies of the manufacturer’s field start-up.

3.04 MANUFACTURER’S CERTIFICATION

A. A qualified factory-trained manufacturer’s representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer’s recommendations.

B. The Contractor shall provide three (3) copies of the manufacturer’s representative’s certification.

3.05 TRAINING

A. The contractor shall provide a training session for up to five (5) owner’s representatives for [___] normal workdays at a jobsite location determined by the owner.

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

3.06 INSTALLATION

A. The contractor shall install all equipment per the manufacturer’s recommendations and the contract drawings.

B. All necessary hardware to secure the assembly in place shall be provided by the contractor.

C. The equipment shall be installed and checked in accordance with the manufacturer’s recommendations.

3.07 FIELD SERVICE

A. The manufacturer of the ATS shall also have a national service organization that is available throughout the contiguous United States and is available on call 24 hours a day, 365 days a year.

* Note to Spec. Writer – Insert data in blanks