SECTION 16496

ENCLOSED AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.1 SCOPE

A. Provide enclosed automatic transfer switch (ATS) as described herein and shown on the drawings.

1.2 REFERENCES

A. IEC 61000-4-2 – Electromagnetic Compatibility (EMC) – Part 4-2: Testing and Measurement Techniques – Electrostatic Discharge Immunity Test (Current Edition)

B. IEC 61000-4-4 – Electromagnetic Compatibility (EMC) – Part 4-4: Testing and Measurement Techniques – Electrical Fast Transient/Burst Immunity Test (Current Edition)

C. IEC 6100-4-5 – Electromagnetic Compatibility (EMC) – Part 4-5: Testing and Measurement Techniques – Surge Immunity Test (Current Edition)

D. IEEE C37.90.1 – Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus (Current Edition)

E. MIL STD 461E – Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment (Current Edition)

F. NEMA ICS 1 – Industrial Control and Systems: General Requirements (Current Edition)

G. NEMA ICS 10 – Industrial Control and Systems: AC Transfer Switch Equipment (Current Edition)

H. NETA ATS – Standard for Acceptance Testing Specifications (Current Edition)

I. NFPA 70 - National Electrical Code (Current Edition)

J. UL 1008 – Standard for Transfer Switch Equipment (Current Edition)

1.3 SUBMITTALS FOR REVIEW

A. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, display features, dimensions and enclosure details.

1.4 SUBMITTALS FOR INFORMATION

A. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.5 SUBMITTALS FOR CLOSEOUT

A. Operation Data: Instructions for operating equipment under emergency conditions when engine generator is running.

B. Maintenance Data: Routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications:

1. Company specializing in manufacturing the Products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of Project.

2. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

3. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years documented experience.

D. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 MAINTENANCE SERVICE

A. Provide service and maintenance of transfer switches for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cummins-Onan

B. ASCO

C. Caterpillar

D. Russell Electric

2.2 AUTOMATIC TRANSFER SWITCH

A. Description: NEMA ICS 10, three pole automatic transfer switch.

B. Configuration:

1. Electrically operated, mechanically held transfer switch.

2. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a single-solenoid mechanism, momentarily energized. Main operators which include overcurrent disconnect devices will not be accepted. The switch shall be mechanically interlocked to ensure only one of two possible positions, normal and emergency.

3. The switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

4. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand current capability and be protected by separate arcing contacts.

5. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.

6. ATS designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

7. Neutral conductors are to be solidly connected. A neutral conductor terminal plate with fully rated AL-CU pressure connectors shall be provided.

2.3 SERVICE CONDITIONS

A. Service Conditions: NEMA ICS 10.

2.4 PRODUCT OPTIONS AND FEATURES

A. Microprocessor Control Panel:

1. The control panel shall direct the operation of the transfer switch. The panel's sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance, and inherent serial communications capability. The control panel shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the control panel to be disconnected from the transfer switch for routine maintenance.

2. The control panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers.

3. The control panel shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:

a. Ring Wage Test per IEEE C37.90.1.

b. Electrostatic Discharge Immunity - IEC 61000-4-2.

c. Electrical Fast Transient Immunity - IEC 61000-4-4.

d. Surge Immunity - IEC 6100-4-5.

e. Electromagnetic Interference - Mil Std 461, Class 3C.

B. Voltage and Frequency Sensing:

1. The voltage of each phase of the normal source shall be monitored, with pickup adjustable from 85% to 100% of nominal and dropout adjustable from 75% to 98% of pickup setting.

2. Single-phase voltage sensing of the emergency source shall be provided, with pickup voltage adjustable from 85% to 100% of nominal and independent frequency sensing with pickup adjustable from 90% to 100% of nominal.

3. Repetitive accuracy of all settings shall be within +/- 2% over an operating temperature range of -20°C to 70°C.

4. Voltage and frequency settings shall be field adjustable in 1% increments without the use of tools, meters or power supplies. Actual settings shall be clearly defined in the operator's manual.

C. Time Delays:

1. A time delay shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Adjustable from 0 to 6 seconds.

2. A time delay shall be provided on transfer to emergency, adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency.

3. A time delay shall be provided on retransfer to normal, adjustable from 0 to 30 minutes. Time delay shall be automatically bypassed if emergency source fails and normal source is acceptable.

4. A time delay shall be provided on shutdown of engine generator for cool down, adjustable from 0 to 60 minutes.

5. All time delays shall be fully field adjustable without the use of tools.

D. Additional Features:

1. A set of DPDT gold-flashed contacts rated 10 amps, 32 VDC shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred. Also, provide a "commit/no commit to transfer" selector switch to select whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.

2. A momentary-type test switch shall be provided to simulate a normal source failure.

3. Auxiliary contacts, rated 10 amps, 480 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact closed, when the ATS is connected to the emergency source.

4. Indicating lights shall be provided, one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).

5. Engine Exerciser - An engine generator exercising timer shall be provided, including a selector switch to select exercise with or without load transfer. The exerciser shall be programmable to enable exercise for 1 minute to 24 hours per day in 1 minute increments for 1 to 7 days per week.

6. In-phase Monitor - An In-phase monitor or programmed transition shall be inherently built into the controls. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents and shall not require external control of power sources. The in-phase monitor shall be specifically designed for and be the product of the ATS manufacturer.

7. An Inhibit-to-Transfer auxiliary switch shall be included with each Automatic Transfer Switch. When switched to the “Disable” position the switch will disable transfer but allow for the generator to start. Manual operation of this switch to the “Enable” position will re-enable all automatic transfer functions.

8. ATS control panel shall be capable of displaying phase-to-neutral and phase-to-phase voltage, phase current, frequency, watts and volt-amps. Provide instrumentation, terminals, current transformers (CTs), and CT shorting terminals as required. Phase current shall be measured at the load side of the ATS.

9. An integral TVSS shall be supplied on the load side of the transfer switch. TVSS shall have AIC ratings matching or exceeding the ATS. See Section 16100 - Electrical.

2.5 ADDITIONAL REQUIREMENTS

A. Withstand and Closing Ratings: The ATS shall be rated as shown on the drawings but not less than 22,000 amperes symmetrical. The ATS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1-1/2 and 3 cycle, long-time ratings. ATSs that are not tested and labeled with 1-1/2 and 3 cycle (any breaker) ratings and have series, or specific breaker ratings only are not acceptable.

B. Tests and Certification:

1. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage and frequency are in compliance with the specification requirements.

2. The transfer switch and control panel shall be subjected to a dielectric strength test per NEMA ICS 1-109.21.

3. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.

4. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation, and servicing in accordance with ISO 9001.

2.6 ENCLOSURE

A. Enclosure: NEMA 4X stainless steel.

B. Finish: Manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surface is suitable for transfer switch installation.

3.2 PREPARATION

A. Provide concrete equipment pads as required.

3.3 INSTALLATION

A. Manufacturer's instructions

B. Provide engraved plastic nameplates under the provisions of Section 16100 - Electrical.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.22.3.

C. Programmable functions shall be configured per Owner’s direction.

3.5 MANUFACTURER'S FIELD SERVICES

A. Prepare and start systems.

B. Check out transfer switch connections and operations and place in service.

3.6 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation of transfer switch in normal and emergency modes.

END OF SECTION