**SECTION 26 36 00**

**TRANSFER SWITCHES**

**PART 1 GENERAL**

1. SECTION INCLUDES
   1. Automatic transfer switch
   2. Manual transfer switch
2. REFERENCES
   1. NEMA ICS 1 ‑ Industrial Control and Systems: General Requirements
   2. NEMA ICS 2 ‑ Controllers, Contactors and Overload Relays Rated 600 Volts
   3. NEMA ICS 6 ‑ Enclosures
   4. NFPA 110 – Standards For Emergency And Stand-By Power Systems
3. QUALITY ASSURANCE
   1. Manufacturer shall be a company specializing in manufacturing of automatic-transfer equipment with a minimum 3-years of experience.
4. SUBMITTALS
   1. Submit product data under provisions of Section 01 30 00.
   2. Submit product data for transfer witches showing overall dimensions, electrical connections, electrical ratings, and environmental requirements.
   3. Submit manufacturer's installation instructions under provisions of Section 01 30 00.
5. OPERATION AND MAINTENANCE DATA
   1. Submit operation and maintenance data under provisions of Section 01 77 00.
   2. Include instructions for operating equipment.
   3. Include instructions for operating equipment under emergency conditions.
   4. Identify operating limits, which may result in hazardous or unsafe conditions.
   5. Document the ratings of equipment and each major component.
   6. Include routine preventive maintenance and lubrication schedule.
   7. List the special tools, maintenance materials, and replacement parts.
   8. Submit manufacturer’s diagnostic literature and software package.
   9. See Section 01 91 00 – Commissioning and Section 01 78 23 – Operations and Maintenance Data for additional requirements
6. COMMISSIONING
   1. Commissioning of a system or systems specified in this section is part of the construction process.
   2. Documentation and testing of these systems, as well as training of the Owner’s operation and maintenance personnel, is required in cooperation with the Owner's Representative and the Commissioning Authority.
   3. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure.
   4. Refer to Section 01 77 00 - Contract Closeout, for substantial completion details.
   5. Refer to Section 01 91 00, Commissioning, for detailed commissioning requirements.
   6. Warranty
   7. Provide manufacturer's 5-year warranty under provisions of Section 01 77 00.

**PART 2 PRODUCTS**

1. MANUFACTURERS
   1. Kohler Generators
   2. Caterpillar Inc.
   3. Cummins Power Generators
   4. ASCO Power Technologies
2. AUTOMATIC TRANSFER SWITCH
   1. Description: NEMA ICS 2 automatic transfer switch.
   2. Configuration: Electrically operated mechanically held transfer switch.
3. MANUAL TRANSFER SWITCH
   1. Description: NEMA ICS 2 manual transfer switch.
   2. Configuration: Electrically operated mechanically held transfer switch.
   3. Sequence of Operation: Switch position is to be selected by control switch mounted in switch cover.
4. AUTOMATIC SEQUENCE OF OPERATION
   1. Initiate time delay to start alternate source engine generator upon initiation by normal source monitor.
   2. Time delay to start alternate source engine generator shall be 0 to 10 seconds, adjustable.
   3. Initiate transfer load to alternate source upon initiation by normal source monitor and permission by alternate source monitor.
   4. Time delay before transfer to alternate power source shall be 0 to 5 minutes, adjustable.
   5. Initiate retransfer load to normal source upon permission by normal source monitor.
   6. Time delay before transfer to normal power shall be 0 to 30 minutes, adjustable bypass time delay in event of alternate source failure.
   7. Time delay before engine shut down shall be 0 to 30 minutes, adjustable of unloaded operation.
   8. Engine Exerciser
      1. Start engine every 7 days; run for 30 minutes before shutting down.
      2. Bypass exerciser control if normal source fails during exercising period.
   9. Alternate System Exerciser: Transfer load to alternate source during engine exercise period.
   10. All other setting shall be per NFPA 110.
5. ENCLOSURE
   1. ICS 6 Type as required to meet conditions of installation unless indicated on the Drawings.
6. ACCESSORIES
   1. Indicating Lights: Mount in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, and SWITCH POSITION.
   2. Test switch: Mount in cover of enclosure to simulate failure of normal source.
   3. Return to normal switch: Mount in cover of enclosure to initiate manual transfer from alternate to normal source.
   4. Transfer switch auxiliary contacts: One normally open and one normally closed.
   5. Normal Source Monitor: Monitor each line of normal source voltage and frequency; initiate transfer when voltage drops below 90% or frequency varies more than 3% from rated nominal value.
   6. Alternate Source Monitor: Monitor alternate source voltage and frequency; inhibit transfer when voltage is below 90% or frequency varies more than 3% from rated nominal voltage.
   7. In-Phase Monitor
   8. Switched Neutral: Non-Overlapping contacts

**PART 3 EXECUTION**

1. EXAMINATION
   1. Verify that surfaces are ready to receive work.
   2. Verify field measurements are as shown on Drawings.
   3. Verify that required utilities are available, in proper location, and ready for use.
   4. Beginning of installation means acceptance of existing conditions.
2. INSTALLATION
   1. Install in accordance with manufacturer's instructions.
   2. Install in accordance with NFPA 110.
3. FUNCTIONAL PERFORMANCE TESTING
   1. System Functional Performance Testing is part of the Commissioning Process.
      1. The Contractor shall perform the Functional Performance Testing and the Commissioning Authority shall witness and document the test.
      2. Refer to Section 01 91 00, for functional performance tests and commissioning requirements.
   2. Complete and submit the systems readiness checklist for each piece of equipment in this section.
   3. Perform the functional performance testing of Panelboards as part of the Emergency Generator System Functional Performance testing.
4. DEMONSTRATION AND TRAINING
   1. Training of the Owner’s operation and maintenance personnel is required in cooperation with the Owner's Representative.
      1. Competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems.
      2. Schedule the instruction in coordination with the Owner's Representative after submission and approval of formal training plans.
      3. Refer to Section 01 91 00, Commissioning, for further contractor training requirements
   2. Provide demonstration and training for all types of transfer switches installed in this project.

END OF SECTION