

## **SECTION 16495 - TRANSFER SWITCHES**

### **General:**

**System Description:** The following is a brief functional description of the system:

**Submittals:** Submit product data and wiring diagrams for field- installed wiring.

**Electrical Component Standard:** Comply with NFPA 70 "National Electrical Code" for components and installation.

**NFPA Compliance:** Comply with NFPA Standard 99, "Standard for Essential Electrical Systems for Health Care Facilities," and NFPA Standard 110, "Standard for Emergency and Standby Power Systems."

**NEMA Compliance:** Comply with NEMA standards: ICS 1, "General Standards for Industrial Control"; ICS 2, "Industrial Control Devices, Controllers and Assemblies"; and ICS 6, "Enclosures for Industrial Controls and Systems."

**UL Listing and Labeling:** Provided items specified in this section that are listed and labeled by UL for emergency service under UL 1008.

**UL Compliance:** Comply with UL Standard 1008, "Automatic Transfer Switches," except where requirements of these specifications are stricter.

### **Products:**

**Manufacturers:** Subject to compliance with requirements, provide products by the following:

Automatic Switch Co.  
Caterpillar, Inc.  
Generac  
Kohler Co.  
Katolite  
Onan Corp.

**Transfer Switch Products, General:** The following requirements apply to automatic and non-automatic transfer switch and bypass/isolation switch products:

#### **Courthouse ATS**

**Ratings:** Provide a 1000 Amp, three (3) pole, 250 Volt transfer switch in a NEMA 3R, free-standing outdoor, non-walk-in enclosure. ATS to be Service Entrance Rated with Main Breaker Disconnect rated 100K AIC @ 208 Volts 3Ø.

#### **Public Health Building ATS**

**Ratings:** Provide a 400 Amp, three (3) pole, 250 Volt transfer switch, rated 120/208 Volt, 3Ø, 4W in a NEMA 3R, wall mounted enclosure.

## General Requirements

Tested-Fault Current Rating: Exceed the indicated available RMS symmetrical fault current at the equipment terminals for closing and withstand ratings based on testing in accordance with UL 1008, conducted at full-rated system voltage and 20 percent power factor.

Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 deg C to 70 deg C. Components shall meet or exceed voltage surge withstand capability when tested in accordance with ANSI Standard C37.90.1, "IEEE Guide for Surge Withstand Capability (SWC) Tests."

Enclosures: General-purpose NEMA 3R in accordance with UL 508, "Electric Industrial Control Equipment," except as otherwise indicated.

Factory Wiring: Train and bundle factory wiring and identify consistently with shop drawings, either by color code or by numbered or lettered wire and cable tape markers at all terminations. Provide designated terminal blocks for field wiring, and arrange power terminal and field wiring space to be suitable for top, side, or bottom entrance of feeder conductors as indicated. Provide pressure-type terminals suitable for copper or aluminum conductors of sizes indicated.

Electrical operation, where indicated, shall be accomplished by a non-fused momentarily energized solenoid or electric- motor- mechanism, mechanically and electrically interlocked in both directions. Transfer switches using components of molded case circuit breakers or contactors not designed for continuous duty repetitive switching between active power sources are not acceptable.

Switch action for double-throw-type switches shall be mechanically held in both directions.

Switch Contacts: Silver composition for switching load current with separate arcing contacts where rated 400 amperes and above.

Overcurrent devices shall not be part of transfer switch products.

Automatic Transfer Switches (ATSS): Comply with requirements for Level 1 equipment per NFPA 110, "Standard for Emergency and Standby Power Systems."

Accessories: Provide the following ATS accessories:

Close differential voltage sensing on each phase of normal source. Pick-up voltage shall be adjustable from 85 percent to 100 percent of nominal, and dropout shall be adjustable from 75 percent to 98 percent of the pick up value. Factory set for pick-up at 90 percent and dropout at 85 percent.

System weekly exerciser - user selectable to automatically start, test, and load the generator.

Time-delay override of normal source voltage sensing shall delay all transfer and engine start signals. Adjustable 0 to 6 seconds, and factory set at 1 second.

Voltage/frequency lockout relay and sensing of the emergency source shall be provided to prevent premature transfer. Voltage pick-up shall be adjustable from 85 to 100 percent of nominal. Factory set to pick-up at 90 percent of nominal. Pick-up frequency shall be adjustable from 90 percent to 100 percent of nominal. Factory set to pick-up at 95 percent.

System test switch, momentary type.

Retransfer time delay to normal or preferred power source: adjustable from 0 to 30 minutes and factory set at 30 minutes. Provide automatic defeat of the delay upon loss of voltage or sustained under voltage of the emergency source, provided the normal supply has been restored.

Pilot lights to indicate source to which the load is connected.

Engine starting contacts, one isolated normally closed and one isolated normally open. Contacts shall be gold flashed or plated and rated 10 amperes at 32 V d.c.

Engine Shutdown Contacts: Instantaneous, to initiate shutdown sequence at remote engine-generator controls after retransfer of the load to normal or preferred source.

Unassigned Auxiliary Contacts: Two normally open SPDT contacts for each switch position.

Rating: 10 amperes at 240 V a.c.

Source Available Indicating Lights: A green indicating light to supervise the normal power source with a nameplate engraved "NORMAL SOURCE AVAILABLE," and a red indicating light to supervise the emergency power source with a nameplate engraved "EMERGENCY SOURCE AVAILABLE." Supervision of sources shall be via the transfer switch normal and emergency source sensing circuits, respectively.

Transfer Override Switch: To override automatic retransfer control so the ATS will remain connected to the emergency power source regardless of the condition of the normal source. Provide a pilot light to indicate the override status.

Operation: Electrically actuated by push-buttons designated "Normal Source" and "Emergency Source." Switch shall be capable of transferring the load in either direction with either or both sources energized.

Double-Throw Switching Arrangement: Incapable of pauses or intermediate position stops during switching sequence.

Wiring: Conform to Division 16 Section "Wires and Cables" for conductors between transfer switches and remote annunciator panels for hard-wired connections. Conform to Division 16 Section "Control/Signal Transmission Media" for links between transfer switches and remote annunciator panels for data circuits.

Finishes: Clean ferrous surfaces to be painted free of oil, grease, welding slag, and spatter, mill scale, corrosion, and dirt. Paint with rust-inhibiting primer and finish enamel. Apply primer to clean, dry surface immediately after cleaning. Use manufacturer's standard material and procedure except as required to produce a total dry film thickness not less than 2.5 mils. Use finish coat of manufacturer's approved standard color. Provide a finish free from runs, sags, peeling, and other defects.

Execution:

Check connectors, terminals, bus joints, and mountings for tightness. Tighten field connected connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B.

Grounding: Provide equipment grounding connections for transfer switch units as indicated and as required by NEC. Tighten connectors to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounding.

Preliminary Tests: Perform electrical tests as follows:

Check for electrical continuity of circuits and for short circuits.

Field Tests: Energize transfer switches and demonstrate functioning of all devices, components, and sequences. Give seven calendar days' advance notice of the tests, and perform tests in presence of Owner's representative.

Coordinate Tests with tests of generator plant and run concurrently with them. Tests shall include the following:

Tests for Transfer Switches: Demonstrate each sequence and operational function at least five times.

Tests for ATSS: Include the following:

Simulate power failure of normal source.

Simulate power failure of emergency source with normal sources available.

Test Failures: Correct deficiencies identified by tests and make ready for retest. Verify equipment meets the specified requirements.

Reports: Maintain a written record of observations and tests. Report defective materials and workmanship and retest corrected defective items. Submit written test reports. Include a record of all adjustable relay settings and measured time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

Warranty: Provide a five (5) year comprehensive limited warranty – refer to Specification 16621 for details.

**END OF SECTION 16495**