SECTION 263623 - AUTOMATIC AND NON-AUTOMATIC TRANSFER SWITCHES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of transfer switches, of types and ratings required in this Section, whose products are Listed and Labeled for the purpose intended. Third party agencies shall be amongst those accredited by the NCBCC (North Carolina Building Code Council) to label electrical and mechanical equipment. Subject to compliance with requirements provide equipment equivalent to that provided by one of the following manufacturers:

Automatic Switch Company (ASCO)
Russelectric Inc.
Zenith Controls Inc.
Onan Corporation

Codes and Standards:

Electrical Code Compliance: Comply with applicable State electrical code requirements of the authority having jurisdiction and NEC as applicable to construction and installation of electrical power transfer switches.

Testing Laboratory Compliance: Comply with applicable requirements of UL 1008, "Automatic Transfer Switches," and UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide transfer switches and components that are Listed and Labeled. Third party agencies shall be amongst those accredited by the NCBCC (North Carolina Building Code Council) to label electrical and mechanical equipment.

NEMA Compliance: Comply with applicable requirements of NEMA Stds Pub/No.'s ICS 2, "Industrial Control Devices, Controllers and Assemblies," ICS 6 and 250, pertaining to transfer switches.

NFPA Compliance: Comply with applicable requirements of NFPA 101; "Code for Safety to Life from Fire in Buildings and Structures," pertaining to transfer switches.

SUBMITTALS

Submittals shall be made in strict accordance with the requirements of Section 019913. Specific submittal requirements are defined in each section of this Division.

Product Data: Submit manufacturer's data and installation instructions for electrical power transfer switches.

Shop Diagrams: Submit layout drawings of electrical power transfer switches showing accurately scaled equipment locations and spatial relationships to associated electrical equipment in proximity.

Wiring Diagrams: Submit wiring diagrams for electrical transfer switches, and associated control devices showing connections to prime and alternate power sources, electrical load, and equipment components. Differentiate between portions of wiring that are manufacturer-installed and portions that are field-installed.

PART 2 - PRODUCTS

AUTOMATIC TRANSFER SWITCHES

General: Except as otherwise indicated, provide manufacturer's standard design, materials and components as indicated by published product information, designed and constructed as recommended by manufacturer for duty indicated, and as required for a complete installation.

Automatic Transfer Switches: Provide factory fabricated, Listed per UL Standard 1008, automatic transfer switches and auxiliary equipment rated 100 Amperes, 480Y/277 Volts, 3 phase, 4 wire, 60 Hz, 4-pole. Neutral contacts shall have the same rating as the phase contacts. Switches shall be double throw construction, with positive electrical and mechanical interlocking by a simple mechanical beam to prevent simultaneous closing. Switch shall be mechanically held in both normal and emergency positions. The switch shall perform quick-make, quick-break operation. The switch shall be approved for manual operation under full load by integrally mounted, permanently attached manual operating handles. Switch operator shall be powered by 120 Volt AC sources provided by transformers within the transfer switch enclosure. Molded case circuit breaker type switches are not acceptable.

Provide wall mounted welded steel NEMA Type 1 enclosure with swing out service panel and door locks. All transfer switch coils, springs, and control elements shall be easily visible and conveniently removable from the front of the transfer switch without major disassembly or disconnection of power conductors. Main contacts shall be of silver alloy composition. Coat enclosure with manufacturer's standard color acrylic enamel finish over a corrosion-resisting primer.

Provide the Following Features in Addition to Automatic Transfer Function:

Remote engine starting contacts.

Indicating lights to indicate emergency transfer switch position: red for emergency power, green for normal power. Additional indicating lights for exercising mode active and in-phase monitor active. Provide a pushbutton test switch which simultaneously tests all indicator lights.

Solid state undervoltage sensors monitoring all three phase.

Provide exerciser clock to set the day, time and duration of generator set exercising period, including "WITH/WITHOUT LOAD" selector switch, 7 day dial minimum.

Provide battery charger, SCR voltage regulated type, float and taper features, 6 Amp at 24 VDC, with charging ammeter and fuse protection.

One additional normally open contact on both normal and emergency relays.

One set of normally open auxiliary contacts for remote indication of normal power failure.

Programmed transition feature from 0.5 to 5.0 seconds.

Under/over frequency sensor for generator side of automatic transfer switch.

Panel mounted switch to control transfer switch position.

Terminal connector strip, pre-connected for external remote control of the transfer switch position.

The automatic transfer switch control panel for three-phase service shall utilize solid-state sensing on normal and emergency for automatic, positive operation. The following shall be provided:

For three-phase switches all phases of the normal shall be monitored line-to-line.

Close differential voltage sensing shall be provided on all phases.

The pickup voltage shall be adjustable from 85 percent to 100 percent of nominal and the dropout voltage shall be adjustable from 75 percent to 98 percent of the pickup value.

The transfer to emergency will be initiated when source drops below a range of 70-95% of rated voltage (factory set at 85%) The transfer switch shall transfer to emergency as soon as the generator voltage has reached a range of 75-100% of rated voltage (factory set at 90%) and generator rated frequency of 85-100% (factory set at 90%).

A time delay to override momentary normal source outages to delay all transfer switch and engine starting signals.

The time delay shall be field adjustable from 0.5 to 6 seconds and factory set at three (3) seconds.

After restoration of normal power on all phases to 90% of rated voltage, an adjustable time delay period shall delay re-transfer to normal power until it has stabilized. If the emergency power source should fail during the time delay period, the time delay shall be by-passed and the switch shall return, immediately, to the normal source.

The time delay shall be field adjustable from 0 to 30 minutes and factory set at 5 minutes. Key operated bypass shall be provided.

An unloaded running time delay for emergency generator cool-down.

The time delay shall be field adjustable from 0 to 5 minutes and factory set at five (5) minutes.

A time delay on transfer to emergency.

Initially set at zero but field adjustable up to one (1) minute for controlled timing of load transfer to emergency, where indicated.

Independent single-phase voltage and frequency sensing of the emergency source.

The pickup of voltage shall be adjustable from 85% to 100% of nominal.

The pickup frequency shall be adjustable from 90% to 100% of nominal.

A contact that closes when normal source fails for initiating engine starting, rated 10 Amperes, 32 VDC.

Contacts to be gold plated for low voltage service.

Two (2) auxiliary contacts that are closed when transfer switch is connected to normal and two (2) auxiliary contacts that are closed when transfer switch is connected to emergency.

Rated 10 Amperes, 250 Volts, 60 Hz AC.

A test switch to momentarily stimulate normal source failure.

Generator exercising time switch with load/no-load selector switch.

PART 3 - EXECUTION

FACTORY TESTING

Certified laboratory test data on a switch of the same design and rating shall be provided to confirm the following switching abilities: Overload and endurance at 480 Volts AC per Tables 21.2, 23.1 and 23.2 of UL Standard No. 1008 when enclosed according to Paragraph 1.6; temperature rise tests after the overload and endurance tests to confirm the ability of the transfer switches to carry their rated current within the allowable temperature limits of the insulation in contact with current-carrying parts.

Withstand and Closing (WCR) Testing: Switches shall be tested in accordance with UL 1008 to close into and withstand fault currents according to the following table:

WITHSTAND CURRENT RATINGS WHEN USED WITH "ANY CIRCUIT BREAKERS"	
RMS Symmetrical Amps	
Switch Rating (Amps)	WCR
100	42,000
200	42,000

No welding of contacts will be permitted. Transfer switch must be operable to alternate source after the withstand current tests. Switch shall pass dielectric tests at 1,960 Volts, RMS, minimum after the withstand current test.

All Production Units Should Be Subjected to the Following Factory Tests: The complete automatic transfer switch shall be tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operation transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements; the switch shall be subjected to a dielectric strength test per NEMA Standard No. 1-109.21; the control panel shall meet or exceed the voltage surge withstand capability in accordance with IEEE Standard No. 472-1974 (ANSI Standard No. C37-.90a-1974) and the impulse withstand voltage test in accordance with the proposed NEMA Standard No. ICS 1-109.

The manufacturer shall provide a notarized letter certifying compliance with all the requirements of this specification. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the Specifications other than those stipulated at the time of submittal shall be included in the certification.

PERSONNEL TRAINING

Building Operating Personnel Training: Train Owner's building personnel in procedures for starting-up, testing and operating transfer switches and auxiliary equipment.

END OF SECTION 263623