
PART 1 GENERAL**1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions and the following specification sections apply to all Work herein:
1. Section 26 00 10 - General Requirements
 2. Section 26 00 20 - Scope of Work
 3. Section 26 05 19 - Electrical Conductors - 600 Volts
 4. Section 26 05 26 - Grounding and Bonding
 5. Section 26 08 13 - Testing
 6. Section 26 32 13 - Engine Generators

1.2 SUMMARY

- A. Furnish and install automatic transfer switches as specified herein and as required for proper control and distribution of the normal and standby power sources throughout the Project as indicated on the Drawings.

1.3 REFERENCE STANDARDS

- A. Each automatic transfer switch and all components shall be designed, manufactured and tested in accordance with the latest applicable industry standards including the following:
1. UL Standard 1008 - Automatic Transfer Switches
 2. NEMA ICS1-109 - Test and Test Procedures for Automatic Transfer Switches
 3. NEMA ICS2-447 - Air Conditioning Automatic Transfer Switch
 4. ANSI/IEEE C37.90a - Voltage Surge Withstand Capabilities
 5. NFPA 20 - Centrifugal Fire Pumps
 6. NFPA 70 - National Electrical Code (NEC)
 7. NFPA 99 - Health Care Facilities
 8. NFPA 110 - Emergency and Standby Power Systems

- B. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

1.4 SUBMITTALS AND PROPOSALS

- A. The following submittal data shall be furnished according to the General Conditions and Section 26 00 10 and shall include, but not be limited to:
1. Automatic Transfer Switches* including electrical construction and operational details, complete with physical dimensions, materials, connector details, nameplate data, voltage, current and short circuit ratings, factory test reports, installation details, etc.
 2. Proposed test procedures, recording forms, test equipment, and list of personnel and qualifications for all tests proposed. Refer to Section 26 08 13 titled "Testing" for additional requirements.
 3. Field Test Schedule.
 4. Field Test Reports.
- B. All items or equipment listed above with asterisks (*) shall be certified by the manufacturer using Manufacturer Certification "MCA" as set forth in Section 26 00 10. See Section 26 00 10 for certification requirements.

1.5 WARRANTY

- A. Comply with the requirements of the General Conditions and Section 26 00 10.

PART 2 PRODUCTS**2.1 ACCEPTABLE MANUFACTURERS**

- A. If it complies with these Specifications, automatic transfer switches manufactured by one of the following manufacturers will be acceptable:
1. Automatic Switch Company (ASCO)
 2. Russelectric
 3. Zenith

2.2 RATINGS

- A. Automatic transfer switches shall be located as indicated on the Drawings and shall be rated for a normal source of 480Y/277 Volts, three (3) phase, four (4) wire power or 480 Volts, three (3) phase, three (3) wire power as indicated on the Drawings. The full load continuous duty ratings shall not exceed allowable NEMA Standards. The switches shall be capable of transferring 600% rated current at 0.50 power factor between the 480Y/277 Volts or 480 Volts AC sources, which are 120° out of phase. The time of transfer shall not exceed 1/6th of a second and shall be accomplished without any evidence of source to source arc over.

2.3 GENERAL

- A. The automatic transfer switches shall be the product of a quality manufacturer regularly engaged in the design, development and manufacture of electromagnetic switching devices with adequate testing facilities and a recognized quality control program to insure product output reliability, performance and safety. Through existing listings of automatic transfer switches in the current issue of the Electrical Construction Material List of the UL, a qualified manufacturer will have demonstrated his ability to produce such products applicable to all classes of loads as well as for use between a utility source and an emergency power source. A Certificate of Compliance shall be submitted upon request, verifying mechanical operation and electrical capabilities.
- B. Automatic transfer switches shall be suitable for either bus or cable connections, and UL listed as such, as indicated on the Drawings. All cables shall be terminated using compression fittings. Compression fittings shall be provided by the automatic transfer switch manufacturer, installed on the switch at the factory, and as required in Section 26 05 19 titled "Electrical Conductors - 600 Volts". The manufacturer shall provide detailed Product Data for each switch indicating the orientation of both the compression fittings and any necessary adapter plates. See Section 26 00 10 for additional submittal requirements.
- C. The switches shall be able to close on inrush current equal to the withstand current rating as defined by UL 1008 and a minimum of 20 times normal without excessive burning or welding of the contacts. Switches shall have the inherent ability to withstand fault currents of 200,000 amperes rms symmetrical for 1/4 cycle when used with Class J, RK1 and L current limiting fuses in upstream overcurrent protective devices, without damage to any components or any separation of the main contacts. When used with molded case circuit breakers only in upstream overcurrent protective devices, the switch shall have the inherent ability to withstand the available fault current at the switch as indicated on the Drawings, in accordance with UL-1008 Standards, without damage to any components or any separation of the main contacts. Switch shall be ASCO Series 7000 or approved equal.
1. The main contacts shall be silver alloy, protected by arc barriers and arc quenchers. Switches 600 amps and over shall have separate arcing contacts and segmented type main contacts.
 2. The switches shall be specifically designed for automatic transfer switch service and must be capable of handling all classes of loads on a break before make basis as defined in UL-1008, latest edition (Industrial Control Equipment). All components of the switches (including controls, relays, timers, etc.) shall be provided, wired and UL listed as a complete package by a single manufacturer. Switches utilizing adapted devices such as molded case circuit breakers, circuit interrupters, disconnect switches, etc., which were not originally intended to repeatedly open and close load current to six hundred percent (600%) of rated current at 0.4 to 0.5 power factor, are not acceptable.
 3. The switches shall be electrically operated and mechanically held in each direction by a solenoid or motor mechanism momentarily energized from the source to which the load is to be transferred. The operating mechanism shall mechanically lock the switches in each position without the use of hooks, latches, springs or semipermanent magnets. Disarrangement of any part or failure of any coil shall not permit either a neutral position nor shall it cause both sides to be closed at the same time. The

switches must be inherently double throw with both sets of main contacts moving simultaneously. The operating mechanism shall not be dependent upon critical mechanical and/or electrical adjustments or utilize miniature type limit switches or similar nonindustrial type components. A handle or knob for manual operation of the main poles shall be provided for maintenance purposes. The handle shall permit the operator to stop the contacts at any point of travel to properly inspect and maintain the contacts.

4. The normal source voltage shall be monitored across all three (3) phases in each switch and adjusted to detect failure when any one (1) phase or leg drops below seventy percent (70%) of normal and to sense restoration when all phases or legs have returned to at least ninety percent (90%) of normal. A voltage frequency sensing circuit shall prevent transfer of the load to the emergency source until it has reached at least ninety percent (90%) of rated voltage and ninety-five percent (95%) of rated frequency. All relays shall have silver alloy contacts and all interface relays shall have a minimum rating of 10 amperes and adequate wiring space. They must meet or exceed NEMA and IEEE Standards for industrial type control relays. They must also be field adjustable and must have replaceable contacts. They shall operate without flutter or false response when the voltage is slowly varied to dropout and pickup values.

2.4 TIME DELAYS, FEATURES AND ACCESSORIES

- A. Switches ATS-3A, ATS-62A, and ATS-62B shall be provided with a solid state timer to override momentary dips in the normal source and signal the generator to start after an adjustable time delay of 0 (zero) to six (6) seconds, factory set at three (3) seconds. Provide a lockout relay to prevent transfer until the generating set has reached ninety percent (90%) of rated voltage and ninety-five (95%) of rated frequency.
- B. A separate adjustable zero (0) to five (5) minute time delay set at zero (0) seconds for all transfer switches to delay transfer to emergency power. The load must remain connected to the normal source during this period.
- C. An adjustable time delay on ATS-3B, ATS-17A, ATS-33A, ATS-49A, ATS-62A, and ATS-62B serving elevator loads to operate an SPDT presignal contact three (3) to sixty (60) seconds prior to transfer from a live source to a live source in either direction to allow elevator regenerative power to decay prior to transfer. Contact shall reset immediately after transfer. This time delay shall be bypassed in the event of an actual loss of power at either source.
- D. An in phase monitor fast-action 60° window width relay with zero (0) time delay for all automatic transfer switches to control transfer switching in either direction between normal and emergency sources.
- E. An adjustable time delay on retransfer (0 to 60 minutes) on all automatic transfer switches to assure a stable normal source before returning the load to the normal source. A bypass circuit switch shall override this time delay in the event of simultaneous failure of the emergency source and availability of a suitable normal source.
- F. A manually operated test switch for all automatic transfer switches to test the complete system.
- G. Four pole transfer contacts on ATS-3A, and ATS-62A.
- H. In addition to the other contacts specified herein, provide two (2) sets of auxiliary contacts rated for 10 amperes on all automatic transfer switches 2 closed with the switch in the normal position and 2 closed with the switch in the emergency position).
- I. Engine cool down timer on all automatic transfer switches.
- J. Position indicator lights on all automatic transfer switches.
- K. Other accessories as may be required for automatic operation and/or specified elsewhere.
- L. All automatic transfer switches shall be furnished with NEMA 1 enclosures.

PART 3 EXECUTION**3.1 INSTALLATION**

- A. The Electrical Subcontractor shall install all automatic transfer switches per the manufacturer's recommendations and as indicated on the Drawings.

3.2 FACTORY TESTING

- A. All standard factory tests shall be performed in accordance with the latest version of NEMA and UL Standards.

3.3 FIELD TESTING

- A. After construction Work is complete and prior to NFPA 110 testing of the automatic transfer switch, field testing and inspection shall be conducted on the automatic transfer switch by one of the following companies: ASCO, Russelectric, Zenith or a manufacturer authorized service and testing organization.
1. Verify the nameplate data of the equipment complies with the voltage and capacity indicated on the Contract Drawings and Specifications.
 2. Verify the automatic transfer switch is clean.
 3. Verify all shipping bolts, brackets, etc. have been removed.
 4. Verify unit is anchored and secured.
 5. Verify all equipment internal barriers are installed.
 6. Verify the unit enclosure is grounded.
 7. Verify working space around the equipment complies with the manufacturers recommendations.
 8. Test bolted electrical connections to verify tightness with a calibrated torque wrench.
 9. Test and verify all safety and electrical interlocks are working as designed and specified.
 10. Verify all movable parts are properly lubricated and apply lubricant as needed.
 11. Verify correct operation of all electrical and mechanical indicating and control devices.
 12. Set all automatic transfer switch alarm and control settings including setting adjustable time delay, voltage, and frequency settings in accordance with the Specifications.
 13. Perform manual transfer operation in accordance with manufacturer instructions.
 14. Verify engine start wires, and auxiliary circuits are connected to appropriate terminals on the transfer switch terminal block.
 15. Perform contact resistance test on each phase and neutral power contact. Values shall not exceed normal ranges as indicated in the manufactures published data.
 16. Verify phase rotation.
 17. Perform automatic transfer test as follows:
 - a. Simulating los of normal power.
 - b. Return to normal power.
 - c. Simulate loss of emergency power.
 - d. Simulate all forms of single-phase conditions.
 18. Perform all additional field testing and verification recommended by the manufacturer.
 19. The field test results shall be submitted by the Subcontractor for review. Field test reports shall include, but not be limited to:
 - a. Equipment Name and Nameplate information
 - b. Test performed.
 - c. Test procedure.
 - d. Date(s) and time(s) of testing and verification.
 - e. Checksheet(s) indicating Specification compliance of all items specified herein to be field verified.
 - f. Final test values.
 - g. Additional pertinent data.
 - h. Instruments including documentation that such instruments were properly calibrated at the time of the testing.
 - i. Personnel printed name, title, company, and signature of persons who performed the test.
- B. The Subcontractor shall notify the Engineer and Owner in writing at least two (2) weeks prior to the day of the field test. The Engineer and/or Owner may witness the field test if he so desires.

- C. Refer to Section 26 08 13 for additional testing requirements for automatic transfer switches.

END OF SECTION