

GENERAL

This guideline is intended to provide basic guidelines to be followed when an automatic transfer switch is installed. *Note: See MUHC Design Guidelines for additional requirements.*

DESIGN GUIDELINES

1. Transfer switch shall be designed for automatic operation.
2. Transfer switch function may be included in a generator docking station.
3. Open or closed transition equipment may be used depending on the application.
4. Closed transition equipment shall synchronize both sources for any transfer when both sources are active. Closed transition switch shall only allow a momentary connection of both sources tied together.
5. Design shall include a review and update of electrical systems studies as required by guideline 260573 – Low Voltage Electrical System Studies. Design shall not cause existing or added switchgear to become underrated.
6. Transfer switch shall switch all phases and neutral circuits. Neutral circuit shall be fully rated.
7. Controller shall have ability to automatically return to normal source after settable time delay.
8. Automatic transfer switches (ATS) shall have required number of poles, amperage, voltage, and withstand current ratings shown on the plans.
9. Each automatic transfer shall consist of an inherently double throw power transfer switch unit and a microprocessor controller, interconnected to provide complete automatic operation.
10. Transfer switches and control panels shall be the product of the same manufacturer.
11. Codes and Standards - The automatic transfer switches and accessories shall conform to the requirements of:
 - 4.1 UL 1008 - Standard for Automatic Transfer Switches
 - 4.2 NFPA 70 - National Electrical Code
 - 4.3 NFPA 110 - Emergency and Standby Power Systems
 - 4.4 IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
 - 4.6 NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches
 - 4.7 NEC Articles 700, 701, 702
 - 4.8 International Standards Organization ISO 9001: 2000
12. Microprocessor Controller
 - 12.1. Voltage and Frequency Sensing
 - 12.1.1. The voltage of each phase of the normal source shall be monitored, with pickup adjustable to 95% of nominal and dropout adjustable from 70% to 90% of pickup setting.
 - 12.1.2. Single-phase voltage and frequency sensing of the emergency source shall be provided.
 - 12.1.3. Time Delays
 - 12.1.3.1. An adjustable time delay shall be provided to override momentary normal source outages and delay all transfer and engine starting signals.

- 12.1.3.2. An adjustable time delay shall be provided on transfer to emergency, adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency.
 - 12.1.3.3. A generator stabilization time delay shall be provided after transfer to emergency.
 - 12.1.3.4. An adjustable time delay shall be provided on retransfer to normal, adjustable to 30 minutes. Time delay shall be automatically bypassed if emergency source fails and normal source is acceptable.
 - 12.1.3.5. A 5-minute cool down time delay shall be provided on shutdown of engine generator.
 - 12.1.3.6. All adjustable time delays shall be field adjustable without the use of special tools.
13. A push-button type test switch shall be provided to simulate a normal source failure.
 14. A push-button type switch to bypass the time delay on transfer to emergency, the engine exerciser period on the retransfer to normal time delay whichever delay is active at the time the push-button is activated.
 15. External input/output:
 - 15.1. A set of contacts rated 5 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.
 - 15.2. Auxiliary contacts, rated 10 amps, 250 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. Contacts shall be wired to building automation system to enunciate transfer switch is connected to emergency source.
 - 15.3. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal.
 - 15.4. Terminals shall be provided to indicate actual availability of the normal and emergency sources, as determined by the voltage sensing pickup and dropout settings for each source.
 - 15.5. Terminals shall be provided for a remote contact which shall be wired to building automation system to enunciate Transfer Switch Trouble.
 16. 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). Also provide indicating lights for both normal and emergency source availability.
 17. Engine Exerciser - An engine generator exercising timer shall be provided, including a selector switch to select exercise with or without load transfer.
 18. An "In Phase" monitor 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 monitor shall be specifically designed for and be the product of the ATS manufacturer.
 19. 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, frequency and time delay settings are in compliance with the specification requirements.

COMMISSIONING

System will be placed in service only after verification of meeting all design/installation guidelines.