

# Automatic Transfer Switches

## Why Test?

To ensure the integrity of an emergency or standby power system, it must be tested on a regular basis. An emergency power system is made up of several different electrical components. Generators, batteries, automatic transfer switches, manual transfer switches, uninterruptible power supply units and paralleling controls are all equipment that can be used to assemble an emergency power system.

One of the most misunderstood devices in an emergency power system is the Automatic Transfer Switch (ATS). ATS's automatically switch a load from a preferred source (normal) to a backup source (emergency) upon a normal source failure. Unfortunately, because of their complexity, ATS's are often not tested for fear that if there is a problem, it will disrupt the critical loads. Several ATS testing methods have been devised that don't actually test the ATS, but give the operator a false sense of equipment integrity. These methods create two problems. First, the testing does not teach the operator how to ensure that the ATS is operating properly. Second, an ATS problem will not show up until there is a critical need for the backup power system. Both of these conditions are unacceptable for a facility that has invested in a backup power system. It is better to discover an ATS problem during a controlled test rather than during an unexpected outage.

## Which Tests?

The actual tests performed on an ATS vary according to the facility's requirements and the manufacturer's recommendations. Following are the most common maintenance tests:

*Inspect for physical damage*  
*Perform manual transfer*  
*Verify interlock operation*  
*Perform bypass isolation functions*  
*Check normal voltage sensing pickup*  
*Check normal voltage sensing dropout*  
*Monitor engine start sequence*  
*Check emergency voltage sensing pickup*  
*Check emergency frequency pickup*  
*Record override momentary outage time delay*  
*Record transfer to emergency time delay*  
*Record retransfer to normal time delay*  
*Test normal contact resistance*  
*Test emergency contact resistance*  
*Verify inphase monitor operation*  
*Verify test switch function*  
*Check indicating lights*  
*Perform mechanical operator inspection/lubrication*  
*Check tightness of all wire terminations*  
*Perform insulation resistance tests*  
*Clean insulator materials*

## How Often?

The following is an excerpt from NFPA Standard 99 C-3.2. This generalized maintenance guide is provided to assist administrative, supervisory, and operating personnel in establishing and evaluating maintenance programs for emergency electrical generating systems.

### Monthly

- 1 Perform testing of generator sets and transfer switches under load and operating temperature conditions at least every 30 days. A 30-minute exercise period is an absolute minimum, or the engine manufacturer's recommendations should be followed.
- 2 Permanently record all available instrument readings during the monthly test.
- 3 During the monthly test, check the following transfer switch items.
  - Inside clean and free of foreign matter
  - No unusual sounds
  - Terminals and connectors normal color
  - Condition of all wiring insulation
  - All covers tight
  - Doors securely closed

### Annually

- 1 Inspect transfer switch and make repairs/replacement as indicated.

### Every Three Years

- 1 Reevaluate the settings of the voltage sensing and time delay relays.

## Safely Testing an ATS

OSHA states that all personnel who work on or around any energized equipment must be safety trained. Maintenance and testing personnel must be trained in: proper ATS operation; the hazards associated with ATS's; and safety procedures to protect personnel from the hazards.

## Who Performs the Test?

Some local maintenance personnel have the capability to perform ATS testing, but it may be necessary to contract out some of the more advanced testing procedures. When contracting out ATS testing, it is important to verify that the testing company meets the minimum OSHA safety requirements and has ATS factory trained maintenance technicians on staff. This will ensure that a qualified person will be working on the ATS. Additionally, they will be able to answer system questions that facility personnel may have.

Periodic testing is the *only* way to ensure the reliability of the backup power system for critical circuits.



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