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POWER AND INTEGRATED BUILDING SYSTEMS

Standby Systems, Part II **December 2003**
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This is the conclusion of a two-part article that began in the November issue. This part provides important information for listing and National Electrical Code requirements for installations of emergency, legally required standby and optional standby systems.

Transfer switches are required for all three different classifications, as well as for the essential electrical systems required by Article 517 for healthcare facilities. Sections 700.6(C) and 701.7(C) require automatic transfer switches to have electrically operated and mechanically held contacts. Electrically operating the contacts ensures power within 10 seconds of power loss, while mechanically holding the relay contacts in a closed position ensures that loss of power to the transfer coil will not cause premature opening of the contacts. Mechanically held contacts will also prevent contact chatter from low voltage or other causes and will help ensure positive contact connection during operation. The change to this section in the NEC also correlates with the requirements found in NFPA 110, the Standard for Emergency and Standby Power Systems.

Transfer equipment for emergency systems must be approved by the authority having jurisdiction and must be identified for emergency use by listing or labeling. All boxes and enclosures associated with the emergency system, including transfer switches, generators and power panels, must be permanently marked to readily identify this equipment as a component of the emergency system. This will help prevent inadvertent shorting of normal power to these systems and will help prevent intermixing of normal power with emergency power.

As mentioned in the previous paragraph, emergency circuits must be kept separate from all other circuits by installation in their own raceways and can only supply emergency loads. Section 700.9 requires all wiring and equipment for emergency use to be kept entirely independent of all other wiring and equipment. There are three exceptions: within transfer switch enclosures for exit or emergency luminaires supplied from normal power and emergency power, within a common junction box supplying an exit or emergency luminaire, or within a common junction box supplying unit lighting equipment, such as emergency floodlights.

The basic standard used to investigate transfer switches used in emergency systems (Articles 517 and 700), legally required standby systems (Article 701) and optional standby systems (Article 702), plus their accessories, is UL 1008, the standard on Transfer Switch Equipment. This standard covers both automatic and non-automatic (manual) transfer switches in the 6,000A and less at 600V and under category. There are also transfer switches in the over 600V up to 38kV range but these are not covered by UL 1008.

There are transfer switches that are designed so the load cannot remain simultaneously disconnected from both normal power and alternate power when either or both power sources are energized and available. There are also transfer switches that are rated and marked as “Suitable For Use As Service Equipment” with or without integral overcurrent protection built into the transfer switch. Transfer switches suitable for use as service equipment are usually provided with an accessible means to independently disconnect power. However, any transfer switch with a handle that is not accessible from the exterior of the switch enclosure should not be manually

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opened under load conditions.

Transfer switches are rated in Amperes and are usually considered to be suitable for total system transfer for loads as diverse as electric-discharge lamps, motors and motor controls, electric-heating loads and tungsten-filament lamps, within the Ampere rating marked on the nameplate of the transfer switch. However, transfer switches with integral overcurrent protection may be restricted to use at 80 percent of the rated current of the transfer switch, similar to other feeder overcurrent protective devices as noted in Section 215.3 of the NEC. If this 80 percent restriction applies to the transfer switch, the switch will be marked as “Continuous Load Current Not To Exceed 80 Percent of Switch Rating.”

Transfer switches are marked with short-circuit current ratings. Transfer switches rated at 100A or less are suitable for use on circuits having an available short-circuit current rating not greater than 5,000A symmetrical and those larger than 100A are suitable for use on circuits having an available short-circuit current ratings of 10,000A symmetrical or 20 times the transfer switch rating, whichever is higher. To achieve the desired short-circuit current rating, the switch may require a current-limiting overcurrent protective device be installed ahead of the switch to ensure the available short-circuit current does not exceed the rating of the transfer switch.

In order to install the transfer switch properly, the manufacturer’s installation instructions should be followed. If these are not readily available, the installation instructions should be obtained from the manufacturer to ensure these critical components of the emergency, legally-required standby and optional standby systems are installed properly and in accordance with its listing.

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