Electronic fluorescent ballast inrush current and its effect on switches

Inrush Current and Electronic Fluorescent Ballasts

Inrush current is a momentary surge in current that can occur when an electrical device, such as an electronic fluorescent ballast, starts. Though the duration of inrush current lasts for only a fraction of a second, inrush current can be much greater than operating or steady state current. For example, electronic fluorescent ballasts can generate momentary inrush currents which exceed 200 amps due to the charging of capacitors contained in these ballasts.

The level of inrush current for each installation can vary significantly depending on the type and number of ballasts installed on a circuit and the power supply characteristics. Multiple ballasts on a circuit can further increase inrush currents. The level of inrush current is also affected by the amount of impedance in the power distribution system. The power distribution system resistance is dependent upon the size of the supply transformer and length and size of the wire runs.

What effect does inrush current have on switches?

General use snap switches are tested to the requirements contained in Underwriters Laboratories Inc. Standard UL 20. This standard contains inrush current testing at levels up to 226 amps. Inrush levels exceeding this amount can potentially damage switches.

Excessive loading from ballasts can cause switch contacts to wear prematurely. Switch contacts may weld together, which leaves the switch permanently on. In other cases involving the use of ballasts, arcing or popping sounds may be heard when the switch is turned on or off. In very rare instances, an arc plume can be emitted from the switch opening.

What should be done to ensure a successful installation and minimize inrush current?

Efforts should be made to maintain reasonable loading on switches based on the number of ballasts on a circuit and the impedance of the power supply. Determine the inrush current drawn by the ballast you have selected. Consider using ballast manufacturers that offer electronic fluorescent ballasts with current inrush limiting.

Also consider lighting controls that feature zero-crossing circuitry offered by Pass & Seymour/Legrand® or Watt Stopper® (www.wattstopper.com). This technology works by switching at the instant the AC voltage is zero. This minimizes inrush current and turn-off voltage transients that might damage the relay, the circuit breakers, or the ballast itself. By utilizing zero voltage switching, the reliability and longevity of lighting products are maintained.

If you suspect that your switch installation is experiencing problems that may be associated with a high level of inrush current, please contact your P&S representative so an appropriate assessment can be made.

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