February 2013

Electronic Ballast Inrush Current Causing Switch Failures

Background
The Electrical Safety Authority (ESA) has become aware of incidents of switch failures causing injury, when existing switches were used to control luminaires retrofitted with electronic ballasts. Electronic ballasts can have inrush currents when energizing that far exceed that of magnetic ballasts, even though their load current is less. Although the duration of inrush current is very short, it can be much greater than operating or steady state current. 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 circuit characteristics. This can exceed the ability of the switch to endure the inrush current. Switches, when controlling electronic ballasts, are subject to the inrush current of the ballast upon energizing. This may damage mechanical switches and contacts. This can occur even when the load current of the ballasts connected is well within the current rating of the switches.

Other switching devices such as relays, contactors and switch rated circuit breakers can also be affected. Manually operated switches are a particular concern since the user’s hands are in contact with the device.

Excessive inrush current can cause switch contacts to wear prematurely, and in some cases arcing across the switch contacts can cause an arc plume to be emitted.

Direction
The Electrical Safety Authority is informing users, contractors, installers, designers and maintenance personnel to consider the inrush current of the electronic ballasts when designing or retrofitting a fluorescent lighting system.

Means such as using electronic ballasts with inrush current limiting features, switching devices with zero-crossing switching features, and other steps can be used to mitigate the effects of inrush current in lighting circuits with electronic ballasts.
For more information see references below.

- Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts – NEMA 410

- Guide to Specifying High-Frequency Electronic Ballasts
  http://www.lrc.rpi.edu/nlpip/publicationDetails.asp?id=137&type=3

- American National Standard for Lamp Ballasts—High Frequency Fluorescent Lamp Ballasts

- EFC Guidelines for General Purpose Switches When Retrofitting Lighting Installations With Electronic Ballasted Lighting
  www.electrofed.com