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## Electronic ballast inrush current causing switch failures

### Background

The Electrical Safety Authority (ESA) has become aware of incidents where switch failures have caused injury when existing switches were used to control luminaires retrofitted with electronic ballasts. Switches, when energizing ballasts, are subject to the inrush current. The issue is the result of the possibility for electronic ballasts having an inrush current that exceeds that of magnetic ballasts. 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. This may exceed the ability of the switch to endure the inrush current, which may damage mechanical switches and contacts.



Other switching devices such as relays, contactors and switch rated circuit breakers may 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 to be emitted.

### Direction

ESA is asking users, contractors, installers, designers and maintenance personnel to consider the inrush current when installing, maintaining or retrofitting a fluorescent lighting system that includes electronic ballasts.

ESA recommends:

- Use electronic ballasts with inrush current limiting features, such as ballasts designed with zero voltage crossing;
- Verify with ballast manufacturer total inrush current and verify with the switch manufacturer that the switch will withstand ballasts' total inrush current
- For 120 V applications, use ballasts that meets NEMA 410 or ANSI standards c82.2.
- For control devices, use solid state lighting control devices (certified to CSA standard C22.2 No.184), or T-rated general use switches.

### Note

Ballasts that meet NEMA 410 or ANSI standards c82.2 and solid state lighting control devices (certified to CSA standard C22.2 No.184) have a means to limit peak inrush current to a pre-determined levels.

CSA Standard for electronic ballasts, C22.2 No. 74, has been updated in 2016 to include testing requirements that will demonstrate a means to limit peak inrush current to a pre-determined levels. Since these testing requirements will come in effect on July 1, 2018, industry should be aware of the above recommendations.

For more information see references below.

- Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts – NEMA 410  
<http://www.nema.org/Standards/Pages/Performance-Testing-for-Lighting-Controls-and-Switching-Devices-with-Electronic-Drivers-and-Discharge-Ballasts.aspx#download>

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- Guide to Specifying High-Frequency Electronic Ballasts  
<https://www.lrc.rpi.edu/programs/NLPIP/pdf/VIEW/Guide2.pdf>
  - American National Standard for Lamp Ballasts—High Frequency Fluorescent Lamp Ballasts  
<http://www.nema.org/Standards/Pages/American-National-Standard-for-Lamp-Ballasts-High-Frequency-Fluorescent-Lamp-Ballasts.aspx>
  - EFC Guidelines for General Purpose Switches When Retrofitting Lighting Installations With Electronic Ballasted Lighting  
[www.electrofed.com](http://www.electrofed.com)