A Reminder – Electrical Overstress

Since the last time I wrote on this topic, I have gathered more information worth sharing. But first, let's revisit the basics of electrical overstress (EOS). EOS can simply be described as an electrical component that is operated beyond its maximum rated electrical limit accidently or deliberately according to its rating on the specification sheet. In landscape lighting EOS can occur with a hot plug-in, a lighting strike, or a poorly made connection.

Years ago, halogen and incandescent light sources were the normal lamps used in landscape lighting. During an installation it was a common practice by many contractors to install lamps while the system was on. This is known as a "hot plug-in". This practice has been widely used especially if a contractor was out providing maintenance on a lighting system. As we have evolved into the era of LED light sources, the practice of hot plugging should be avoided because the LED lamp or integrated fixture is a solid- state light source. For those of you who have ever worked with audio system, you know that it is not acceptable to plug in an audio speaker while the amplifier is on. This could cause the speaker to be damaged or blow out. An LED lamp or integrated fixture is no exception. A hot plug-in can cause an electrical overstress on many parts of the internal circuitry of an LED lamp or integrated fixture. EOS can also have an adverse effect on a fixture that requires a remote low voltage driver. More recently we have seen several other reasons for electrical overstress.

Caution when Retrofitting

If you have held an LED lamp in your hand you will notice that the weight is much heavier than the glass halogen. It is very important to keep this in mind when preforming a retrofit. Halogen lamps run much hotter than the LED. Over time, heat can cause damage to the socket. The tension springs will expand and contract eventually becoming loose. The weight of the lamp can cause it to lean thus not making a firm contact. This is especially important if the lamp is in an inverted state, like a tree downlight. Don't forget this fixture is constantly being shaken in some way. A new socket with a clip can allow for a solid connection to the new LED lamp and avoid EOS due to a poorly made connection.

Cable Connections

Over the years I have seen many cable connections that have failed. Some of these were quite dangerous. One of the most common errors that I have seen is a failure to use the correct size connector. Direct bury connections are a great when used properly. However, it is very important to use the correct one for the application. As with any product follow the specifications on the box. Failure to do so could result in fire or EOS.

Common Signs of EOS

- One or more diodes is out; in this case, the bonding wires that hold the phosphor LED chip have been burnt.
- Pungent burnt smell emitted from the lamp. In some cases, the back of the lamp may have a burn mark or hole; this happens especially with a lightning strike.

How best to avoid hot plugging? When performing maintenance on an older system, unplug the transformer before installing the LED lamp or integrated fixture to ensure the power is off to the socket. This same method can also be used on new installations with a standard landscape lighting transformer. If you happen to be working with a smart app driven transformer, ensure the remote control has the system off. Most of the smart phone apps will allow for a simple on and off for the transformer. Ultimately, to avoid EOS, make sure to have solid potted cable connections and no power to the fixtures upon installation. If a situation arises where lightning has caused the EOS, check to see if the homeowner's insurance will cover lightning damages.

Here's to a successful and happy 2020 – make safety a priority!

Kevin Smith
National Technical Support and Trainer
Brilliance LED LLC
Kevin.Smith@Brillianceled.com