



future automation

APPLICATION NOTES:

INRUSH CURRENT ON LED LIGHTING
SWITCH-MODE POWER SUPPLIES

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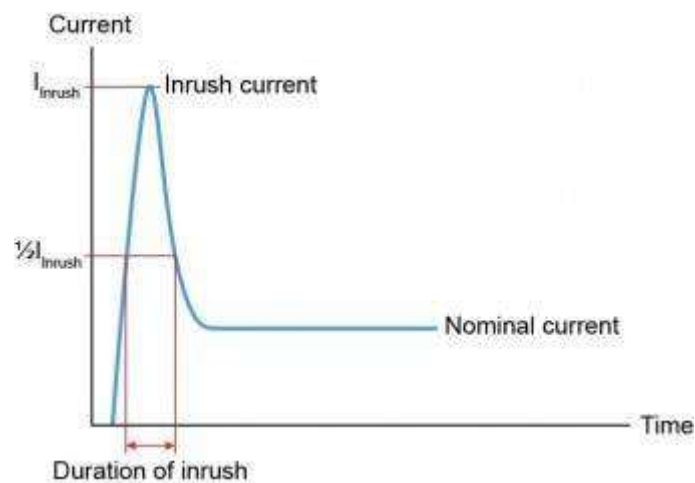
INTRODUCTION

A common problem with modern LED drivers and switch-mode power supplies is a large peak current pull at switch on referred to as "Inrush Current"

LED devices run at a much lower voltage than mains and incorporate circuitry to reduce the voltage and converting to DC with circuitry to smooth the output.

As part of the smoothing circuitry it often contains inductors and electrolytic capacitors that store and smooth the dc voltage, these cause low impedance at switch on and as such momentarily for split seconds draws a huge current (20 times the normal steady current) This can represent a problem for relays and switches and also cause false tripping of circuit breakers.

This is the reason the Circuit Breaker industry has moved from Type B curve to Type C curve to allow for these start-up loads. However, it is not good practice to keep lengthening the curve on these breakers as they need to protect against real faults.



A good LED driver or switch mode power supply will have built-in current limiting eradicating the problem of passing the inrush current down the chain to the circuit breakers. Beware of non-branded or cheap imported units, do a bit of homework before purchasing.

SOLUTION

Often the issue is discovered late in the project (LED drivers have already been fitted etc.) and the inrush false trips are only discovered during the commissioning phase.

Ideally, measure the inrush current so you are sure this is the issue.

Use a meter with a current clamp that has an inrush (sometimes called maximum current setting) e.g. Fluke 376 or Fluke 381

There are ways of dealing with inrush.

Obtain a current limiter e.g. Meanwell ICL-16R or ICL-16L these ideally need to go between the lighting controller and the lighting Driver that way they will prolong the life of the lighting controller as well as stop the tripping.



Having multiple LED drivers on one circuit will compound the problem so split the circuits up so there are fewer drivers to a controller/RCBO which will help. (consult driver manufacturer but I have seen a rule of thumb that said no more than 8 per driver/breaker)

Adding individual components such as MOV Varistors will not help as that will clamp the voltage, not the current.

DIAGRAM SHOWING INLINE CURRENT LIMITER

