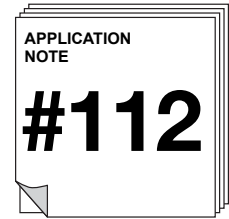# LUTRON®

For Your Information ...

Power Factor of Electronic Fluorescent Ballasts

Overview

Power Factor measures how efficiently an electrical device utilizes power during its operation. In electronic ballasts, the input power from the line is used to operate the ballast, and provide power to the lamps. Power factor compares the product of the input current and voltage, to the power made available to the ballast and lamps:

$$\text{Power Factor} \ = \ \frac{\text{Input Power}}{\text{Line voltage x Line current}}$$

Power factor is generally expressed as a ratio.

Discussion

The electrical design of a device determines whether the input current and voltage are converted to maximum power within the unit. If the current is in-phase with the voltage, the power utilization is maximized. When the two are out of phase, some amount of power cannot be efficiently converted. Ballast Power Factor does not directly indicate the current supplied through the lamps, or how efficiently the lamps produce light when operated on a particular ballast.

What is actual power?

For the operation of any electrical device, there are two quantities to consider - actual power use and apparent power use. The product of root mean square (rms) voltage and rms current supplied to the load through the power line is the apparent power usage.

The actual power use is the power converted by the device input-circuitry and made available to the lamp-ballast system. Actual power and apparent power are not generally equal due to design constraints, and this ratio is expressed as power factor.

Range of ballast power factor

High power factor products are rated greater than 0.9. Lutron electronic dimming ballasts achieve greater than 0.95 power factor by efficient design and use of high-quality components. Utility companies discourage low power factor devices because of their high device losses.

Power factor correction

Inductive loads generally have low power factors and present day designs add sophisticated circuitry to achieve a power factor close to 1. The solution is called power factor correction (pfc) and ensures more efficient power.

Need additional assistance? Call the Lutron Technical Support Center *1-800-523-9466*.
Please provide exact model number when calling.

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Summary

Power factor describes the relationship between the apparent and actual power use in any electrical device. The two quantities are not necessarily the same because of the input circuitry of an electrical load. High ballast power factor is preferable as input current is minimized.

Worldwide Technical and Sales Assistance

If you need assistance call the toll-free *Lutron Technical Support Center.* 24 hours/day + 7 days/week
Please provide exact model number when calling.

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