Introduction to Lighting Controls

Features

Lighting controls are input/output devices and systems that accept information (control signal), decide what to do in response (lighting controller/microprocessor enacting a control algorithm), and then adjusts lighting power accordingly to change the status of connected lighting and/or plug load (power controller).

Inputs may be manual (switch, dimmer, keypad, remote, tablet, etc.) or automatic (sensor or signal from a computer or another system). Outputs include On/Off or stepped switching, continuous or stepped dimming, color, and/or data.

Control Strategies

Lighting control strategies include manual control, occupancy sensing, time scheduling, daylight response, institutional task tuning, color tuning, plug load control, demand response, and data generation. Often, these strategies are layered in the same space.

Control Zoning

A control zone is one or more light sources controlled simultaneously and uniformly. The general trend is toward smaller control zones with distributed intelligence to maximize flexibility and energy savings. The ultimate expression of this trend is luminaire-level lighting controls (LLLC).

Controls Narrative

The controls narrative is a written document that lays out the sequence of operations for the control solution. It describes system outputs to various inputs for each control point. This document is important because it serves as a project roadmap for the intended solution. Many energy codes require a controls narrative.

Interoperability

For a control system to provide proper operation, compatibility is required between the driver/ballast and light source, driver/ballast and control strategy and control devices, and the devices must be able to communicate if needed.

Connecting Control Points

Control devices may operate standalone or be connected in room-based and centralized building-/campus-based systems. Devices may communicate using wiring or wirelessly. Wiring may be line-voltage (limited control options), low-voltage (more control options), or digital low-voltage (greater flexibility, potential for two-way communication of data and using the same cabling for luminaire power).

Commissioning

All lighting control systems should undergo a commissioning process that includes a controls narrative, field verification and testing, and documentation and training.