

Wireless Controls Cut Lighting Costs

Key Points

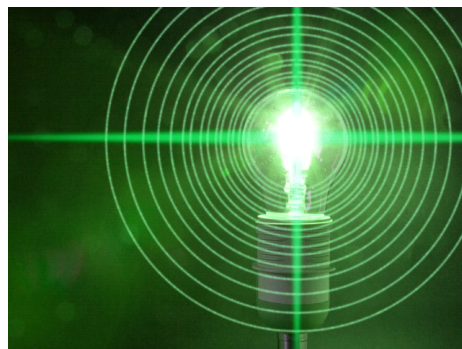
- Wired lighting control systems reduce energy use, but are often difficult to install in retrofit situations.
- Wireless networking provides advanced control functionality without the expense of dedicated wiring.
- In one study, wireless controls combined with LED lighting reduced energy use by 78 percent.

Wired lighting control systems have been in use for many years as an effective means for reducing energy costs. However, installing wired controls in existing buildings can be time consuming and disruptive to business. If lighting energy waste is hard-wired into your operating budget, radio-frequency (RF) wireless technology provides a flexible and cost-effective control option.

The benefits of going wireless

In RF wireless systems, control devices communicate through radio waves, eliminating the need for hard wiring. For your business, wireless controls offer a number of potential advantages:

- Flexibility—control devices can be placed in almost any location without the limitations imposed by the need for hard-wiring.
- Scalability—controls can be applied to a single area or an entire facility. Devices can be moved and the system can be expanded without difficulty.
- Ease of installation—no need for a hard-wired infrastructure. Control devices can be installed with minimal disruption to business operations.
- Cost savings—quick and easy set-up requires less labor, reducing installation costs.



Taking control

Lighting controls save energy while matching lighting conditions to occupant needs using occupancy sensing, dimming, daylighting, task tuning and scheduling. High-efficiency LED lighting is inherently dimmable and starts instantly, making it a perfect fit for use with wireless controls.

In its simplest form, a wireless control system includes light switches embedded with RF receivers that communicate with relays attached to light fixtures. Adding sensors helps reduce energy costs and improve the work atmosphere. Wireless photosensors or occupancy sensors turn lights off in unoccupied spaces or dim lights to take advantage of natural lighting. A software interface controls the system through a computer or mobile device.

Calling the signals

The major components of a wireless lighting control system include relays, switches, sensors and a central control interface. Wireless control devices use fixture power, batteries or energy harvesting, which captures and uses energy from the surrounding environment. The communication range varies from 30 feet to more than 100 feet and signals often penetrate glass, wood and plaster. Mesh networking capability allows wireless units to overcome physical barriers.

To integrate with other control systems, wireless devices must use the same communication standard or protocol. For example, ZigBee (*IEEE 802.15.4*) is a popular open-source RF wireless communication standard. Some wireless device manufacturers have developed proprietary standards. Wireless systems can be standalone units or they can supplement an existing lighting control operation or building automation system.

Wireless controls in action

The U.S. Department of Energy tested the effectiveness of wireless lighting controls combined with an LED fixture retrofit in a 6,800-square-foot office building. The test area consisted mostly of open office space with some private offices and other rooms.

Overall, the LED fixtures combined with wireless controls reduced lighting energy use by 78 percent. Occupants surveyed responded



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favorably regarding their satisfaction with the light levels provided by the LED fixtures, as well as the performance of the lighting controls.

Wireless networking enables advanced lighting control functionality without the expense of dedicated wiring. It's a good fit for a variety of business settings, but it can be most effective in applications with significant lighting energy use and minimal existing controls.

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