

## TASK 4.8

### PROVIDE TECHNICAL FOUNDATION ON BEHALF OF MANUFACTURERS TO OVERCOME NAGGING INSTALLATION BARRIERS IN EXISTING BUILDINGS

#### Practices for Installing Occupancy Sensors

A roundtable conducted in February 2002 brought together manufacturers, market transformation groups, specifiers, government agencies, and utilities to discuss barriers to widespread penetration of automatic shut-off lighting controls. One of the recommendations from this group was to encourage, aggressively, the widespread deployment of automatic shut-off lighting controls in new and existing C/I buildings.

In addition to the roundtable, LRC staff participated in a field visit to witness occupancy sensor installations at a company in New Jersey. Professional installers conducted the installation and participating staff learned a number of lessons during the visit. A site visit report is attached in Appendix 4.8 - A.

Automatic shut-off controls turn off lamps when a signal is received from an occupancy sensor, a building automation system (BAS), or a timer located locally or remotely in a lighting circuit panel box. The main goal of automatic shut-off controls is to turn off the lights when no one is occupying the space. Based on recommendations from the roundtable, this task focused on best practices for installing occupancy sensors to help increase the penetration of these controls into C/I applications.

Automatic shut-off controls have a high penetration on new construction as a result of energy-code provisions, ease of installation, and potential energy savings. Penetration of automatic shut-off controls in existing buildings is poor, however, with the “hassle factor,” (aggravation) perceived or real, seen as the greatest barrier to acceptance. The hassle factor associated with automatic shut-off, particularly with occupancy sensors, may be a result of poor sensor positioning in the space, the wrong choice of sensor for the application, poor product labeling, lack of commissioning settings on sensors, or complexity and uniqueness of installation.

As an attempt to help overcome this specific barrier, the LRC, following the recommendations from the roundtable, developed the following best practice document for installing occupancy sensors. We performed this task as an attempt to fill gaps and/or simplify information currently available in the manufacturers’ literature. Recommendations that will help address nagging installation barriers of occupancy sensors are given to manufacturers and installers. Although just a starting point, this can be a useful tool and can help reduce the real and perceived “hassle factor” associated with installing, commissioning, and using occupancy sensors.

#### 1. Best Practices for Manufacturers

In order to minimize installation and commissioning time and hassle, manufacturers should:

- Supply circuit schematics or documentation explaining inputs and outputs to the sensors and power packs.
- Use the same wire color scheme across manufacturers. This will facilitate the installation of sensors and power packs or any other components that are not from the same manufacturer.
- Supply documentation on how to override the system after the power packs are installed. In general, power packs are installed before the sensor and installers do not have enough information about how to override the system after the sensor is installed.
- Develop a diagnostic interface that can be plugged in each power pack and sensor to speed up commissioning and diagnosing problems.
- Include zero-delay setting to the sensor to allow faster commissioning.
- Set up a 24-hour hotline customer service to allow nightshift installers to have customer support at night.

## 2. Best Practices for Installers

In order to properly install and commission occupancy sensors, the installers should:

- Never disable manual controls when installing occupancy sensors; existent light switch should be supplemented, not replaced, by the occupancy sensor.
- Provide a sufficient number of sensors, placed appropriately, in open plan offices. Saving money by reducing the number of occupancy sensors used in open plan area may result in poor performance and thus, dissatisfaction and rejection.
- Place occupancy sensors in areas where small movements are made (e.g., near desks, over bathroom stalls).
- Put two sensors in hallways, one at each end, pointing toward the center of the controlled area to provide good coverage and avoid false triggering.
- Use BX cable instead of conduits to ease the wiring process.
- While commissioning and re-commissioning, increase the time delay, if sensor sensitivity is turned down, to allow the lights to be on longer without movement.

In addition to the tips above, the LRC developed a prototype “laminated sheet” that can be used on site by installers. This prototype “laminated sheet” will help installers select the best occupancy sensor for the application and shows examples of installations in typical applications