

Green Future: EE-7
Occupancy & Daylighting Controls

- Department of Energy Building Technologies
<http://www.eere.energy.gov/buildings/info/components/lighting/lightingcontrols/occupancysensors.html>

Occupancy sensors turn lights on and off based on their detection of motion within a space.

Some sensors can be also be used in conjunction with dimming controls to keep the lights from turning completely off when a space is unoccupied. This control scheme may be appropriate when occupancy sensors control separate zones in a large space, such as in a laboratory or in an open office area. In these situations, the lights can be dimmed to a predetermined level when the space is unoccupied. Sensors can also be used to enhance the efficiency of [centralized controls](#) by switching off lights in unoccupied areas during normal working hours as well as after hours.

There are three basic types of occupancy sensors:

- Passive infrared
- Ultrasonic
- Dual-technology (hybrid).

Passive infrared (PIR) sensors react to the movement of a heat-emitting body through their field of view. Wall box-type PIR occupancy sensors are best suited for small, enclosed spaces such as private offices, where the sensor replaces the light switch on the wall and no extra wiring is required. They should not be used where walls, partitions, or other objects might block the sensors' ability to detect motion.

Ultrasonic sensors emit an inaudible sound pattern and re-read the reflection. They react to changes in the reflected sound pattern. These sensors detect very minor motion better than most infrared sensors. Therefore, they're good to use in spaces such as restrooms with stalls, which can block the field of view, since the hard surfaces will reflect the sound pattern.

Dual-technology occupancy sensors use both passive infrared and ultrasonic technologies to minimize the risk of false triggering (lights coming on when the space is unoccupied). They also tend to be more expensive.