

OCCUPANCY SENSORS FOR LIGHTING AND VENTILATION OF CLASSROOMS

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The selection of heating and ventilation control strategies depends on decisions made by the Owner, Architect, and Electrical Engineer regarding occupancy sensor technology and light switch operatory strategy.

Sensor Technology

Two technologies are commonly used in commercial buildings: Passive Infrared, and Ultrasonic.

Infrared sensors detect infrared (heat) radiation emitted from moving people in the room. The technology is called "passive" because the room and its occupants are not exposed to any kind of emission from the sensor. Since infrared light travels only in a straight line, the sensor must have line-of-sight coverage of all areas of the room. This limitation is also an advantage in that extraneous (false) signals can be easily avoided when the sensor is properly placed; this feature is called "100% coverage cut-off". According to the leading manufacturer (Watt Stopper®), infrared technology offers "superior performance" and is appropriate for classrooms. False "On" signals are unlikely, but false "Off" signals are possible. (If the lights go out by mistake in an occupied room, occupants need to get in the line-of-sight of the sensor and make a movement.)

Ultrasonic sensors are like SONAR. They emit high frequency sound waves and process the reflected sound to detect motion. The sound waves are in the range of 25,000 to 40,000 cycles per second; human hearing extends to about 20,000. According to the manufacturer, the sound waves "pose no hazardous side effects to humans". Some people prefer not to expose themselves or their children to ultrasound. Ultrasonic sensors do not have line-of-sight limitations; they can "see" around corners and through partitions. This ability can be a disadvantage if the sensor "sees" the outdoors, vibrating equipment, or turbulent airflow. According to the manufacturer, ultrasonic sensors (alone) are not appropriate for classrooms. False "On" signals are possible, but false "Off" signals are unlikely.