

## **SECTION 119 – MANDATORY REQUIREMENTS FOR LIGHTING CONTROL DEVICES, BALLASTS, AND LUMINAIRES**

Any ~~lighting control device, ballast, or luminaire subject to the requirements of Section 119 automatic time switch control device, occupant sensor, motion sensor, photosensor, or automatic daylighting control device~~ shall be installed only if the manufacturer has certified to the ~~Energy Commission~~, that the device complies with all of the applicable requirements of ~~Section 119 Subsections (a) through (f) and Subsections (h) through (j), and if the device is installed in compliance with Subsection (g)(m).~~

~~Lighting control devices may be individual devices or systems consisting of two or more components. For control systems consisting of two or more components, such as an Energy Management Control System (EMCS), the manufacturer of the control system shall certify each of the components required for the system to comply with Section 119.~~

(a) **All Devices: Instructions for Installation and Calibration.** The manufacturer shall provide step-by-step instructions for installation and start-up calibration of the device.

~~(b) All Devices: Status Signal. The device shall have an indicator that visibly or audibly informs the device operator that it is operating properly, or that it has failed or malfunctioned.~~

~~EXCEPTION to Section 119 (b): Photosensor or other devices where a status signal is infeasible because of~~

~~(b) Indicator Lights. Indicator lights integral to lighting control devices shall consume no more than one watt of power per indicator light.~~

(c) **Automatic Time Switch Control Devices.** Automatic time switch control devices or system shall:

1. Be capable of programming different schedules for weekdays and weekends; and
2. Have program backup capabilities that prevent the loss of the device's ~~program schedules for at least 7 days, and the device's time and date~~ setting for at least ~~10-72~~ hours if power is interrupted.

(d) **Occupant Sensors, ~~and~~ Motion Sensors, and Vacancy Sensors.** Occupant sensors, ~~and~~ motion sensors, and vacancy sensors shall be capable of automatically turning off all the lights in an area no more than 30 minutes after the area has been vacated, and shall have a visible status signal that indicates that the device is operating properly or that it has failed or malfunctioned. The visible status signal may have an override switch that turns the signal off. In addition, ultrasonic and microwave devices shall have a built-in mechanism that allows calibration of the sensitivity of the device to room movement in order to reduce the false sensing of occupants, and shall comply with either Item 1 or 2 below, as applicable:

1. If the device emits ultrasonic radiation as a signal for sensing occupants within an area, the device shall:
  - A. Have had a Radiation Safety Abbreviated Report submitted to the Center for Devices and Radiological Health, Federal Food and Drug Administration, under 21 Code of Federal Regulations, Section 1002.12 (1996), and a copy of the report shall have been submitted to the California Energy Commission; and
  - B. Emit no audible sound; and
  - C. Not emit ultrasound in excess of the decibel (dB) values shown in TABLE 119-A, measured no more than five feet from the source, on axis.
2. If the device emits microwave radiation as a signal for sensing occupants within the area, the device shall:
  - A. Comply with all applicable provisions in 47 Code of Federal Regulations, Parts 2 and 15 (1996), and have an approved Federal Communications Commission Identifier that appears on all units of the device and that has been submitted to the California Energy Commission; and
  - B. Not emit radiation in excess of one milliwatt per square centimeter measured at no more than five centimeters from the emission surface of the device; and
  - C. Have permanently affixed to it installation instructions recommending that it be installed at least 12 inches from any area normally used by room occupants.

(e) **Multi-Level Occupant Sensor.** Multi-level occupant sensors shall have an automatic OFF function that turns off all the lights, and either an automatic or a manually controlled ON function capable of meeting all the multi-level and uniformity requirements of Section 131(b) for the controlled lighting. The first stage shall be capable of activating between 30-70% of the lighting power in a room either through an automatic or manual action, and may be a switching or dimming system. After that event occurs the device shall be capable of all of the following actions when manually called to do so by the occupant:

1. Activating the alternate set of lights.
2. Activating 100% of the lighting power.
3. Deactivating all lights.

(ef) **Automatic Daylighting Control Devices.** Automatic daylighting control devices used to control lights in daylit zones shall:

1. Be capable of reducing the light output power consumption of the general lighting ~~of in~~ the controlled area by at least two thirds one half in response to the availability of daylight while maintaining relatively uniform illumination throughout the area; and
2. If the device is a dimmer controlling incandescent or fluorescent lamps, provide electrical outputs to lamps for reduced flicker operation through the dimming range, so that the light output has an amplitude modulation of less than 30 percent for frequencies less than 200 Hz, and without causing premature lamp failure; and
3. If the devices reduce lighting in control steps, incorporate time-delay circuits to prevent cycling of light level changes of less than three minutes and have sufficient separation (a manual or automatic means of adjusting the deadband to provide separation) of on and off points for each control step ~~to prevent cycling~~; and
4. If the devices ~~have a time delay, have the capability for the time delay to be overridden or set to less than 5 seconds time delay for the purpose of set up and calibration, and is placed in calibration mode,~~ automatically restore its time delay settings to normal operation programmed time delays after no more than 60 minutes; and
5. Have a setpoint control that easily distinguishes settings to within 10% of full scale adjustment; and
6. Have a light sensor that has a linear response with 5% accuracy over the range of illuminances measured by the light sensor; and
7. Have a light sensor that is physically separated from where calibration adjustments are made, or is capable of being calibrated in a manner that the person initiating calibration is remote from the sensor during calibration to avoid influencing calibration accuracy, and
- 7.8. If the device is a stepped switching control device, show the status of lights in the controlled zone by an indicator on the control device; and
- 8.9. If the controlled electric lighting cannot be viewed from where setpoint adjustments are made; and if the device is a dimming control device, display the light level sensor reading measured by the light sensor during calibration; if the controlled electric lighting cannot be viewed from where setpoint adjustments are made.

**EXCEPTION to Section 119(e) 7 & 8 & 9:** If the control device is part of a networked system with a central display of each control zone status, the status indicator or light level display on each individual control device shall not be required if control setpoint adjustments can be made at the central display.

(f)(g) **Interior Photosensors.** Interior photosensor shall not have a mechanical slide cover or other device that permits easy unauthorized disabling of the control, and shall not be incorporated into a wall-mounted occupant-sensor.

~~(g) **Installation in Accordance with Manufacturer's Instructions.** If an automatic time switch control device, occupant sensor, automatic daylighting control device, or interior photosensor is installed, it shall comply with both Items 1 and 2 below.~~

~~A. Be installed so that automatic daylighting control devices control only luminaires within the daylit area; and~~

~~B. Have photosensor that are either ceiling mounted or located so that they are accessible only to authorized personnel, and that are located so that they maintain adequate illumination in the area in accordance with the designer's or manufacturer's instructions.~~

(h) **Multi-level Astronomical Time-switch Controls.** Multi-level astronomical time-switch controls used to control lighting in daylight zones shall: ~~1. The device shall be installed in accordance with the manufacturer's instructions; and~~

~~2. Automatic daylighting control devices shall:~~

- ~~1. Contain at least 2 separately programmable steps (~~relays~~) per zone that reduces illuminance in a relatively uniform manner as specified in Section 131(b); and~~
- ~~2. Have a separate offset control for each step of 1 to 240 minutes; and~~
- ~~3. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 minutes per year; and~~
- ~~4. Store astronomical time parameters (used to develop longitude, latitude, time zone) for at least 7 days if power is interrupted~~time zone, longitude and latitude in non-volatile memory~~; and~~
- ~~5. Display date/time, sunrise and sunset, and switching times for each step; and~~
- ~~6. Have an automatic daylight savings time adjustment; and~~
- ~~7. Have automatic time switch capabilities specified in Section 119-(c).~~

~~(i) **Automatic Multi-Level Daylighting Controls.** An automatic multi-level daylighting control used to control lighting in daylight zones shall:~~

- ~~1. Meet all the requirements of section 119 (e) for automatic daylighting control devices; and~~
- ~~2. Meet all the multi-level and uniformity requirements of section 131 (b); and~~
- ~~3. Have a light sensor that is physically separated from where setpoint adjustments are made; and~~
- ~~4. Have controls for calibration adjustments to the lighting control device that are readily accessible to authorized personnel.~~

~~(j-i) **Outdoor Astronomical Time-switch Controls.** Outdoor astronomical time-switch controls used to control outdoor lighting as specified in Section 132-(c) shall:~~

- ~~1. Contain at least 2 separately programmable steps channels per function area; and~~
- ~~2. Have the ability to independently offset the on and off times for each channel by 0 to 99 minutes before or after sunrise or sunset; and~~
- ~~3. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 minutes per year; and~~
- ~~4. Store astronomical time parameters (used to develop longitude, latitude, time zone) for at least 7 days if power is interrupted~~time zone, longitude and latitude in non-volatile memory~~; and~~
- ~~5. Display date/time, sunrise and sunset; and~~
- ~~6. Have an automatic daylight savings time adjustment; and~~
- ~~7. Have automatic time switch capabilities specified in Section 119-(c).~~

~~(j) **Manual-On Occupant Sensor (Residential) (Vacancy Sensor).** A residential manual-on occupant sensor (also known as a vacancy sensor) used to comply with § 150(k) shall be a device or system which meets all of the following requirements:~~

- ~~1. Turns off the lighting automatically within 30 minutes or less after the room has been vacated in response to the absence of occupants in the room, and~~
- ~~2. Has a visible status signal in accordance with Section 119(d), and~~

3. Shall not turn on the lighting automatically, except the sensor shall have a grace period of 15 seconds to 30 seconds to turn on the lighting automatically after the sensor has timed out, and
4. Shall not have an override switch that disables the occupant sensor, and
5. Shall not have an override switch that converts the sensor from a manual-on to an automatic-on system.

(k) **Dimmers.** Dimmers used to control lighting shall:

1. Be capable of reducing power consumption by a minimum of 65 percent when the dimmer is at its lowest light level, and
2. If the device is a dimmer controlling incandescent or fluorescent lamps, provide electrical outputs to lamps for reduced flicker operation through the dimming range, so that the light output has an amplitude modulation of less than 30 percent for frequencies less than 200 Hz, and without causing premature lamp failure; and
3. Be listed by a rating lab recognized by the International Code Council (ICC) as being in compliance with Underwriters Laboratories Standards, and
4. If the device is a wall box dimmer designed to be used in a three or more-way circuit with non-dimmable switches, the level set by the dimmer, shall not be overridden by any of the switches in the circuit. The dimmer and all of the switches in the circuit shall have the capability of turning lighting OFF if it is ON, and turning lighting ON to the level set by the dimmer if the lighting is OFF. Any wall box dimmer that is connected to a system with an emergency override function shall be controlled by the emergency override.
5. If the device is a stepped dimmer, shall include an off position to turn lights completely off.

(l) **Track Lighting Integral Current Limiter.** Integral current limiters shall meet the following requirements or a method approved by the Executive Director:

1. Be designed so that the integral current limiter housing is permanently attached to the track so that the track will be irreparably damaged if the integral current limiter housing were to be removed after installation into the track; and
2. Have the volt-ampere (VA) rating of the current limiter clearly marked on the circuit breaker visible for the building officials' field inspection without opening coverplates, fixtures, or panels, and also on a permanent factory-installed label inside the wiring compartment; and
3. Employ tamper resistant fasteners for the cover to the wiring compartment; and
4. Have a conspicuous permanent factory installed label affixed to the inside of the wiring compartment warning against removing, tampering with, rewiring, or bypassing the device.

(m) **High Efficacy LED Lighting Systems.** To qualify as high efficacy for compliance with Section 150(k), a light emitting diode (LED) lighting system shall meet the minimum efficacy requirements in Table 150-C and luminaire power shall be determined as specified by Section 130(d)5.

(n) **Ballasts for Residential Recessed Luminaires.** To qualify as high efficacy for compliance with Section 150(k), any ballast in a residential recessed luminaire shall meet all of the following conditions:

1. Be rated by the ballast manufacturer to have a minimum rated life of 30,000 hours when operated at or below a specified maximum case temperature. This maximum ballast case temperature specified by the ballast manufacturer shall not be exceeded when tested in accordance to UL 1598 section 19.15; and
2. Have a ballast factor of not less than 0.90 for non-dimming ballasts and a ballast factor of not less than 0.85 for dimming ballasts.

(o) **Dimmable Fluorescent Ballasts for Power Adjustment Factor.** To qualify for the Power Adjustment Factor in Section 146(a)2 and Table 146-C, ballasts for T5 and T8 linear fluorescent lamps shall be electronic, dimmable, and shall meet the minimum Relative System Efficiency (RSE) in Table 146-D.

TABLE 119-A ULTRASOUND MAXIMUM DECIBEL VALUES

MIDFREQUENCY OF SOUND PRESSURE THIRD-OCTAVE BAND (in kHz)	MAXIMUM dB LEVEL WITHIN THIRD-OCTAVE BAND (in dB reference 20 micropascals)
Less than 20	80
20 or more to less than 25	105
25 or more to less than 31.5	110
31.5 or more	115