



2019

California Building Energy Efficiency Standards
Title 24 Quick Reference Guide
Non-Residential Lighting Controls

NON-RESIDENTIAL LIGHTING CONTROLS

Section 130.1 MANDATORY INDOOR LIGHTING CONTROLS Nonresidential, high-rise residential and hotel/motel buildings shall comply with the applicable requirements of Section 130.1 (a)-(f), in addition to the applicable requirements of Sections 110.9 and 130.0.

Section 130.1(a) Manual Area Controls	Be readily accessible; and located in the same enclosed area with the lighting it controls; and provide separate control of general, floor/wall/window/case display, ornamental, and special effects lighting.		
Exceptions	Public restrooms having two or more stalls, parking areas, stairwells and corridors may use a manual control not accessible to unauthorized personnel	Malls, auditorium, retail/showroom areas, psychiatric and secure areas in healthcare facilities and other areas where placement of a manual switch poses a health or safety hazard. Switch can be within site of the lights being controlled or have a visual indicator.	In healthcare facilities, restrooms, bathing rooms intended for a single occupant, the lighting control may be located outside but directly adjacent to the door
Section 130.1(b) Multi-level Controls	Required if the general lighting of the enclosed area is >100 ft². or larger with a connected load >0.5 watts per ft². The lighting would require multi-level that allow the level of lighting to be adjusted up or down. The multi-level control steps shall meet the uniformity requirements specified in TABLE 130.1-A		
Exceptions	Spaces with only one luminaire with no more than two lamps.	Classrooms <0.7 W/ft² with a control step between 30-70% power.	<ul style="list-style-type: none"> Healthcare facilities Restrooms
Section 130.1(c) Shut-OFF Controls	All installed indoor lighting shall be controlled with occupant sensors, automatic time-switch control or other control capable of automatically shutting OFF all the lighting when unoccupied. Separate controls for general, display, ornamental and each floor (other than stairwells) not exceeding 5,000 ft². and 20,000 ft². in malls, auditoriums, single tenant retail, industrial.		
Exceptions	<ul style="list-style-type: none"> Continuous use 24/365 Egress lighting, <math>\leq 0.1\text{ W ft}^2</math>. 	<ul style="list-style-type: none"> Electrical equip rooms Healthcare facilities 	<ul style="list-style-type: none"> Emergency lighting which only operates when normal power is absent
Occupancy Sensors-Required	<ul style="list-style-type: none"> Offices <math><250\text{ ft}^2</math>. Multipurpose rooms >math>1000\text{ ft}^2</math>. Restrooms 	<ul style="list-style-type: none"> Classrooms Conference Rooms 20 min max timeout 	<ul style="list-style-type: none"> If Multi-level control is required (>math>100\text{ ft}^2</math> & >math>0.5\text{ W ft}^2</math>.) must be partial on (50%-70%) or manual on (Vacancy)
Occupancy sensors-Full ON to Partial OFF >50% and Auto OFF	<ul style="list-style-type: none"> Stairwells Aisle ways/open areas in warehouses 	<ul style="list-style-type: none"> 20 min max time-out 	<ul style="list-style-type: none"> Library book stack aisles. Single entry >math>10\text{ft}</math> Multiple entry >math>20\text{ft}</math>.
Occupancy sensors-Full ON - Partial OFF 20-50%	<ul style="list-style-type: none"> Parking garages 	<ul style="list-style-type: none"> Residential high-rise stairwells and common area guest room corridors 	
Automatic Time Switch	<ul style="list-style-type: none"> May include manual on mode. Automatic holiday "shut-off" 	<ul style="list-style-type: none"> Required to have manual override Maximum 2-hour after hours override 	<ul style="list-style-type: none"> Malls, auditoriums, single tenant retail, industrial and captive key card areas may exceed 2-hour override requirement.
Countdown Timer Switch	<ul style="list-style-type: none"> 30 minutes off max. 	<ul style="list-style-type: none"> Closets <math><70\text{ ft}^2</math> 	<ul style="list-style-type: none"> Server aisles in server rooms

Section 130.1(d) Daylighting	Automatically adjust the power of the installed lighting up and down as incoming daylighting changes. Daylighting controls shall provide separate control for luminaires in each type of daylit zone. Lighting in skylit zone and sidelit zone is considered skylit zone.		
Exceptions	<ul style="list-style-type: none"> Glazing in room is <math><24\text{ ft}^2</math> Primary/Skylight lighting <math><120\text{W}</math> 	<ul style="list-style-type: none"> Glazing with overhang above may be exempt. Sidelight zones in retail merchandise/wholesale showrooms. 	
Daylighting Requirements	<ul style="list-style-type: none"> Continuous dimming or Multi-level per 130.1(b) Combined illuminance not less than designed illuminance. 	<ul style="list-style-type: none"> Indoor spaces, daylighting is >math>150\%</math> of designed output, lighting shall be reduced by minimum of 65% Parking structures, when daylighting is >math>150\%</math> of designed output at the farthest end of the daylighting zone, lighting shall be zero. 	
Section 130.5(d) Plug Load Control	Plug load control required in office spaces/kitchens, lobbies, conference rooms, copy rooms and Motel/Hotel guest rooms within 30 minutes of vacancy. Plug load can be all split wire controlled or complete receptacle within 6 ft of each uncontrolled receptacle.		
Exceptions	<ul style="list-style-type: none"> Healthcare exempt. Refrigerators/Water Dispensers. Located >math>6\text{ ft}</math> above floor for clocks. 	<ul style="list-style-type: none"> Network copiers, fax, A/V and data equipment other than PC. Remodels required if complete replacement of electrical distribution system. 	
Section 110.12 Demand Response	Nonresidential buildings > 10,000 ft² shall be capable of automatically reducing lighting power, per Table 130.1-A, in response to a Demand Response Signal a minimum of 15% below total lighting power. Shall be Open ADR 2.0 a/b Virtual End Node (VEN) OR capable of responding to a certified Open ADR 2.0b VEN.		
Exceptions	<ul style="list-style-type: none"> Health or life safety statute or regulation. Spaces <math><0.5\text{ W}</math> are not controlled and do not count toward 10,000 ft² 		
Section 130.2 Outdoor Lighting Controls	Shall be independently controlled from other electrical loads. Part night controls must have sunrise/sunset prediction via photocell and time measurement and have the ability to reduce or turn off outdoor luminaires at night.		
	Daylighting controls	Motion sensing controls	Automatic scheduling controls
	<ul style="list-style-type: none"> Photocell Astronomical time-switch control Other control capable of automatically shutting off the lights during daylight. 	<ul style="list-style-type: none"> Reduce lighting by 50-90% and off after vacancy. Reduce lighting to dim/off >math>15\text{min}</math> after vacancy. 1500 W maximum per sensor. Fixtures <math><24\text{ ft}</math> above grade and wall packs 	<ul style="list-style-type: none"> Reduce lighting by 50-90% and off. Two nighttime periods May have override <math><2\text{hr}</math>. Maybe in conjunction w/ motion sensors.
Exceptions	<ul style="list-style-type: none"> Health or life safety statute or regulation - OFF may have a longer time out period or >math>50\%</math> lighting level. 	<ul style="list-style-type: none"> <math><40\text{W}</math> not required to have motion controls. Lighting in tunnels required for 24/365 operation 	
Section 130.4 (a-c) Acceptance Testing	Nonresidential buildings other than healthcare facilities, high-rise residential buildings and hotel/motel building shall comply. Required testing to meet the requirements of Part 6 for Automatic shutoff, Daylighting, Demand Response and Outdoor lighting controls prior to final occupancy permit. Healthcare facilities shall comply with the requirements of California's Office of Statewide Health Planning and Development (OSHPD).		

Lighting Product Lines

Ametrix
AtLite
Corelite
Ephesus
Fail-Safe
Halo
Halo Commercial
Invue
io
Iris
Lumark
Lumière
McGraw-Edison
Metalux
MWS
Neo-Ray
Portfolio
RSA
Shaper
Streetworks
Sure-Lites

Controls Product Lines

Fifth Light Technology
Greengate
iLight (International Only)
iLumin
Zero 88

Connected Lighting Systems

HALO Home
WaveLinX
Trellix

This guide was developed based upon published Building Energy Efficiency Standards for Nonresidential Buildings (CEC-400-2018-020-CMF), and Nonresidential Compliance Manual for Building Energy Efficiency Standards (CEC-400-2018-018-CMF) (collectively, "the code"); it is not intended to replace the code nor be a source of expertise that interpret the code. This training material is based on CEC T24 code as it exists at the time of publication, and may be updated without notice. Cooper Lighting Solutions accepts no liability for the content of this publication, or the consequences of any action taken on the basis of the information provided herein. California Energy Commission Building Energy Efficiency Standards documents can be found at:

www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards

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