This guide is not intended to replace the code itself. It is meant to use as a quick solutions tool when complying with the new California Title 24 lighting requirements, that take effect January 1, 2014.
MULTI-LEVEL LIGHTING CONTROLS

In areas larger than 100 sq. ft., with a connected lighting load that exceeds 0.5W sq. ft. luminaires must have at least four steps of control, or continuous dimming in accordance with Table 130.1-A. Each luminaire shall be controlled by at least one of the following methods:

- **MANUAL DIMMING**
  meeting applicable requirements of Section 130.1(a)
- **LUMEN MAINTENANCE** as defined in Section 100.1
- **TUNING** as defined in Section 100.1
- **AUTOMATIC DAYLIGHTING CONTROLS**
  in accordance with Section 130.1(d)
- **DEMAND RESPONSE LIGHTING CONTROLS**
  in accordance with Section 130.1(e)

Exception: Classrooms are one of the rare exceptions to the multi-level requirements. Instead, if they have a connected general lighting load ≤ 0.7 W / sq. ft., they must have at least one control step between 30%-70% of full-rated power.

Best Solution

Acuity Brands provides the best solution to achieve this for every application. Our LED luminaires are 0-10V dimmable (continuous dimming) and are standard with embedded controls (nLight-Enabled Controls). Acuity Brands offers three different solutions depending on your application and budget: General Purpose Good, Specification Better and Architectural Best.

**GOOD**

- LBL LED Wraparound
- GTL LED Recessed Troffer

**BETTER**

- VT LED
- AC LED
- Whisper LED
- NOL LED

**BEST**

- AL Series
- RT LED
- SBS Series
- Peerless Mino LED
## Table 130.1-A

### MULTI-LEVEL LIGHTING CONTROLS AND UNIFORMITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Luminaire Type</th>
<th>Minimum Required Control Steps (Percent of Full Rated Power)</th>
<th>Uniform Level of Illuminance Shall Be Achieved by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line-voltage sockets except GU-24</td>
<td></td>
<td>Continuous dimming 10–100%</td>
</tr>
<tr>
<td>Low-voltage incandescent systems</td>
<td></td>
<td>Continuous dimming 20–100%</td>
</tr>
<tr>
<td>LED luminaires and LED source systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GU-24 rated for LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GU-24 sockets rated for fluorescent &gt; 20W</td>
<td>Minimum one step between 30–70%</td>
<td>• Stepped dimming or</td>
</tr>
<tr>
<td>Pin-based compact fluorescent &gt; 20W</td>
<td></td>
<td>• Continuous dimming or</td>
</tr>
<tr>
<td></td>
<td>Minimum one step in each range:</td>
<td>• Switching alternate lamps in a luminaire</td>
</tr>
<tr>
<td>Linear fluorescent and U-bent fluorescent ≤ 13W</td>
<td>20–40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50–70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>80–85%</td>
<td></td>
</tr>
<tr>
<td>Linear fluorescent and U-bent fluorescent &gt; 13W</td>
<td>Minimum one step between 30–70%</td>
<td>• Step dimming or</td>
</tr>
<tr>
<td>Track Lighting</td>
<td></td>
<td>• Continuous dimming or</td>
</tr>
<tr>
<td>HID &gt; 20W</td>
<td>Minimum one step between 50–70%</td>
<td>• Separately switching circuits in multi-circuit track with a minimum of two circuits</td>
</tr>
<tr>
<td>Induction &gt; 25W</td>
<td></td>
<td>• Stepped dimming or</td>
</tr>
<tr>
<td>Other light sources</td>
<td></td>
<td>• Continuous dimming or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Switching alternate lamps in each luminaire, having a minimum of 2 lamps per luminaire, illuminating the same area and in the same manner</td>
</tr>
</tbody>
</table>
**REQUIREMENT:**

**TUNING**

Tuning is the ability to set maximum light levels at a lower level than full lighting power.

With nLight technology (embedded controls) it allows you the flexibility to set a maximum light level (max. foot-candle requirement) for any application. nLight allows you the flexibility to set the dimming range so it is lower and doesn’t raise to full bright or a higher light level.

Example: In a small office, the light level requirement is 30 FC but when the luminaire is at full bright, the light level raises to 50 FC. We are able to tune its maximum dimming range so it doesn’t exceed 80%; this way, we can maintain 30 FC and not exceed the maximum light level.

![nLight](image1.png)

**REQUIREMENT:**

**AUTOMATIC DAYLIGHTING CONTROLS**

**Minimum Daylighting Requirement**

- Applies to buildings >5,000 sq. ft.
- That are directly under a roof with ceiling heights greater than 15 ft.
- Requires that floor plans have 75% of their total area in daylight zones, per Section 140.3(c)
- All top daylighting and side daylighting zones shall be shown on building plans

**Automatic Daylighting Controls Requirement**

- Where the installed general lighting power is ≥ 120 W and shall provide functional multi-level lighting, per Table 130.1-A
- Daylight zones must show primary and secondary daylight zone, per Section 130.1(d)

Exception: Auditoriums, churches, movie theaters, museums and refrigerated warehouses.

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**Best Solution**

Acuity Brands provides several digital solutions that meet the automatic daylighting requirements. LC&D and nLight photocell sensors provide both ON/OFF and automatic dimming control for daylight harvesting applications. It monitors daylight conditions in a room, then controls the light to ensure that adequate lighting levels (foot-candles) are maintained.

![GR 2400 Plus](image2.png)

**Best Solution**

**Toplighting:**

Daylight entering the space via skylights, using Sunoptics LightFlex units allows us to:

- Capture the light using our patented Signature Series prismatic skylight
- Control the amount of light coming in the space with Light Control Louvers
- Distribute the light 100% using our optically-designed diffusers

![Daylight Control Sensors](image3.png)
REQUIREMENT:
DEMAND RESPONSE CONTROLS

- Applies to all buildings >10,000 sq. ft.
- Lighting power shall be automatically reduced by a minimum of 15% below the maximum total lighting power
- Spaces that are non-habitable shall not be used to comply with this requirement
- Spaces with a lighting power density of less than 0.5 W / sq. ft. shall not be counted toward the building’s total lighting power

Acuity Brands has the ability to comply with demand response by receiving a signal from a Demand Response Automation Server or by connecting to an EMS/BMS System.

REQUIREMENT:
CURRENT LIMITING PANEL

The option of using 45W per linear foot is no longer an option. You must use a current limiting device on track or current limiting panel. Must be certified (also labeling requirements).

Best Solution
- Lighting Control & Design’s (LC&D) SilverBullet Current Limiting Panel
- Current limiting for up to 21 circuits
- Current limiting breakers available from 1-8, 10, 13 & 15 amps
- Compact sizes 12”w x 18”h x 4”d or 12”w x 12”h x 4”d
- AIC rating of 10,000A @ 120VAC
- Factory pre-assembled
- Each load factory-labeled on the door sheet
- No programming required

REQUIREMENT:
HOTEL/MOTEL CAPTIVE KEY CARDS

Hotel/motel guest rooms shall have captive key card controls, occupancy sensing controls, or automatic controls such that, no longer than 30 minutes after the guest room has been vacated, lighting power is switched OFF.

Exception to Section 130.1(c)8: One high-efficacy luminaire as defined in Table 150.0-A or 150.0-B that is switched separately and where the switch is located within 6 ft. of the entry door.

Best Solution
- Lighting Control & Design’s (LC&D) Hotel Pack
- Key card devices connect wirelessly to the panel
- Up to 8 Relay outputs; single- or dual-pole relays available
- Easy-to-set time delay before OFF to allow occupant time to leave the room before power down

More retrofit projects will be required to meet new-construction standards for both lighting power density (LPD) and controls. The only exceptions are buildings with fewer than 40 ballasts being replaced and spaces where less than 10% of the lighting is affected.
OCCUPANCY CONTROLS

Code requires partial ON/OFF (high/low) occupancy controls in addition to shut-off controls, lighting power shall be reduced by at least 50% when unoccupied, and each aisle shall be controlled independently, per Section 130.1(c)6.

- Corridors/common areas
- Stairwells
- Library book stack aisles
- Warehouse aisles/open areas in warehouses

Code requires partial ON/OFF (high/low) occupancy controls and are required instead of shut-off and lighting, power shall be reduced by at least 50% when unoccupied; which provide access to guest rooms and dwelling units of high-rise residential buildings and hotel/motels, per Section 130.1(c)7.

- Corridors/common areas
- Stairwells

Exception: In warehouse aisles in which the installed lighting power is < 80% of the value allowed under the Area Category Method, occupant sensing controls shall reduce lighting power by at least 40%.

Best Solution

Acuity Brands provides the best solution to achieve this for every application.

Application: Corridors/Hallways

Acuity Brands offers three different solutions depending on your application and budget:

General Purpose Good, Specification Better, and Architectural Best. With nLight technology (embedded controls) it allows you the flexibility to set minimum dimming level to the required level that will reduce power by 50%.

Application: Stairwells

STL LED

- 2 ft. or 4 ft. surface volumetric LED
- Delivered Lumens 2,200-4,800
- Input Watts 26-50
- 0-10V Dim
- MVOLT
- CCT 3000-5000K

WL Series LED

- 2 ft. or 4 ft. wall mount LED
- Delivered Lumens 1,200-4,100
- Input Watts 13-43
- 0-10V Dim
- MVOLT
- CCT 3000-5000K

Application: Aisle ways and open areas in warehouses

IBH-LED (Low Bay)

- Delivered Lumens 11,200
- Input Watts 150
- 0-10V Dim
- MVOLT
- CCT 4000K

IBL-LED (High Bay)

- Delivered Lumens 9,000-48,000
- Input Watts 98-513
- 0-10V Dim
- MVOLT
- CCT 4000-5000K

Acuity Brands luminaires come standard with a five-year warranty, DLC qualified and are embedded with Acuity Brands controls. With nLight technology (embedded controls) it allows you the flexibility to set minimum dimming level to the required level that will reduce power by 50% when unoccupied. This can be ordered with our pre-wired nLight occupancy sensor.

Example: These occupancy sensors will maintain the luminaires at 100% when there is occupancy; once unoccupied, luminaires will reduce to 50% (can be programmed to a lower level if required).
SECURITY AND EGRESS LIGHTING

Under the 2008 code, most buildings were allowed to keep approximately 15% of their full-lighting capacity on at all times for security and egress purposes. This allowance has been either eliminated entirely or drastically reduced under the new standards:

• Building areas that are not occupied 24/7 will no longer be able to leave lighting on during unoccupied periods
• Modest allowances for egress lighting remain but egress lighting must be shut off outside occupied times along with general lighting
• Only offices will be allowed to maintain 24/7 lighting but only along designated paths of egress and at a reduced maximum of just 0.05 W / sq. ft. (versus 0.3 W / sq. ft. under the previous code)

Best Solution

Acuity Brands provides several solutions that make manual control of emergency lighting safely accomplished.

• LC&D’s SnapLink 30A Normally Closed Latching Relay is UL 924 listed for emergency use; upon loss of normal power the relays will be held in the closed position
• LC&D’s Emergency Shunt Relays which are UL 924 listed; this allows use of standard wall switches/dimmers to control the lights locally and shunts around wall switches, in order to turn on emergency lighting in the event of loss of normal utility power
• nLight offers several Emergency Relays that are UL 924 compliant devices used to switch and dim luminaires powered via an emergency circuit. Ideal for use along side any nLight relay pack that controls a space’s normal powered lighting

PLUG LOAD CONTROLS

In all buildings, both controlled and uncontrolled, 120V receptacles shall be provided in each private office, open office area, reception lobby, conference room, kitchenette in office spaces and copy room (130.5(d)).

• Controlled receptacles shall follow the automatic shut-off requirements for lighting (130.1(c)(1-5))
• At least one controlled receptacle shall be installed within 6 ft. of each uncontrolled receptacle
• Controlled receptacles shall have a permanent marking to differentiate them from uncontrolled receptacles

Emergency and Egress Control Layers

Example

Best Solution

Acuity Brands provides several solutions that meet the plug load controls requirements.

• LC&D’s SnapLink 30A Normally Closed Latching Relays are UL rated for plug load 20A @ 120VAC. The lighting control panel has inputs for occupancy sensors and makes it easy when controlling plug loads. Perfect for non-networked (stand-alone) and networked lighting controls
• Sensor Switch’s Power Pack PP20 is UL rated for plug load 20A @ 120VAC. The power packs connect to occupancy sensors and make it easy when controlling plug loads. Perfect for non-networked (stand-alone) lighting control solutions
• nLight’s Power Packs (nPP16) are UL rated for plug load 16A @ 120VAC. The power packs connect to occupancy sensors (Cat. 5 cable) and make it easy when controlling plug loads. Perfect for non-networked (stand-alone) and networked lighting control solutions
OUTDOOR LIGHTING

REQUIREMENT:
OUTDOOR PARKING GARAGE AND AREAS

Occupancy controls in parking garages, parking areas, loading and unloading areas, general lighting shall be controlled by:

• One control step between 20% and 50% lighting power shall be reduced when unoccupied
• ≤ 500W of rated lighting shall be controlled together as a single zone

Automatic Daylighting Controls Requirement

• Automatic photocontrols must be multi-level, continuous dimming, or ON/OFF
• Primary and secondary side daylight zones must be controlled independently and shown on the plans
• When daylight area receives illuminance above 150%, controls must turn lighting OFF

Exception to Section 130.1(c)7B: Metal halide luminaires with a lamp plus ballast mean system greater than 75 lumens per watt shall be controlled by occupant sensing controls having at least one control step between 20% and 60% of design lighting power.

Best Solution

This is just a small sample of the Acuity Brands luminaires for parking facilities. Combined with Acuity Brands Integrated Lighting and Controls Solutions, we make it “simple” to use occupancy controls and automatic daylighting controls— you can receive 85% cost reduction.

REQUIREMENT:
OUTDOOR LIGHTING

Luminaire Cutoff Requirements. All outdoor luminaires rated for use with lamps greater than 150 lamp watts, determined in accordance with Section 130.0(c), shall comply with Backlight, Uplight and Glare (collectively referred to as “BUG“ in accordance with IES TM-15-11, Addendum A) requirements as follows:

• There are no Backlight requirements in Section 130.2 of Part 6
• Maximum zonal lumens for Uplight shall be in accordance with Table 130.2-A
• Maximum zonal lumens for Glare shall be in accordance with Table 130.2-B

OUTDOOR LIGHTING ZONE is a geographic area designated by the California Energy Commission in accordance with Part 1, Section 10-114, that determines requirements for outdoor lighting, including lighting power densities and specific control, equipment or performance requirements. Lighting zones are numbered LZ1, LZ2, LZ3, and LZ4.

Outdoor Incandescent Lighting

All permanently-installed, outdoor incandescent luminaires employing lamps rated over 100 watts, determined in accordance with Section 130.0(c)12, shall either: have a lamp efficacy of at least 60 lumens per watt or be controlled by a motion sensor.
Outdoor Lighting

- Shall be controlled by a photocontrol or outdoor astronomical time-switch control that automatically turns OFF the outdoor lighting when daylight is available.
- All installed outdoor lighting shall be circuited and independently controlled from other electrical loads by an automatic scheduling control.

Best Solution

- LC&D Blue Box
- 100% Digital
- Simple Plug & Play Cat. 5 cable
- Astronomical Time Clock with 10-year battery back-up
- Photocell has 14 trigger points

**Requirement:**

**Outdoor Luminaires Mounted**

All installed outdoor lighting, where the bottom of the luminaire is mounted 24 ft. or less above the ground, shall be controlled with automatic lighting controls that meet all of the following requirements:

- Shall be motion sensors or other lighting control systems that automatically controls lighting in accordance with item B in response to the area being vacated of occupants and to turn OFF independently.
- The motion sensor shall be capable of automatically reducing the lighting power of each luminaire by at least 40% but not exceeding 80%, or provide continuous dimming through a range that includes 40% through 80%.
- Shall employ auto-ON functionality when the area becomes occupied.
- No more than 1,500 watts of lighting power shall be controlled together.

**Exception:**

- Pole-mounted luminaires each with a maximum rated wattage of 75 watts; or
- Non-pole mounted luminaires with a maximum rated wattage of 30 watts each; or
- Linear lighting with a maximum wattage of 4 watts per linear foot of luminaire.

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**D-Series Area Luminaires**

All Lithonia D-Series Area Luminaires have bi-level motion sensor options that meet CA Title 24 requirements.

<table>
<thead>
<tr>
<th>All values based on 400K Type 3 optics</th>
<th>DSX0</th>
<th>DSX1</th>
<th>DSX2</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFLECTED METAL HALIDE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUMBER OF LEDS</td>
<td>20</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>INITIAL LUMENS</td>
<td>6,307</td>
<td>12,358</td>
<td>18,173</td>
</tr>
<tr>
<td>INPUT WATTS</td>
<td>72W</td>
<td>138W</td>
<td>299W</td>
</tr>
<tr>
<td>UNDER 75% ?</td>
<td>Yes!</td>
<td>Yes!</td>
<td>Yes!</td>
</tr>
<tr>
<td>MOTION SENSOR OPTION</td>
<td>Yes!</td>
<td>Yes!</td>
<td>Yes!</td>
</tr>
<tr>
<td>PART NIGHT OPTION</td>
<td>Yes!</td>
<td>Yes!</td>
<td>Yes!</td>
</tr>
<tr>
<td>Under 150W?</td>
<td>Yes!</td>
<td>Yes!</td>
<td>No, must meet cut-off</td>
</tr>
</tbody>
</table>

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(CONTINUED)

OUTDOOR LUMINAIRE MOUNTED

D-Series Wall Luminaires

All D-Series Wall Luminaires have bi-level motion sensor options to meet the requirements of CA Title 24

Performance D-Series Wall Size 1

<table>
<thead>
<tr>
<th></th>
<th>DSXW1</th>
<th>DSXW2</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF ENGINES</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>NUMBER OF LEDS</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>REPLACES METAL HALIDE</td>
<td>35W</td>
<td>175W</td>
</tr>
<tr>
<td>DRIVE CURRENT</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>INITIAL LUMENS</td>
<td>1,243</td>
<td>3,706</td>
</tr>
<tr>
<td>WATTS</td>
<td>13W</td>
<td>36W</td>
</tr>
<tr>
<td>LPW</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>50-150W</td>
<td>530</td>
<td>530</td>
</tr>
<tr>
<td>70-150W</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>150-250W</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

These two solutions provide the most lumens while keeping under the 30W maximum for no motion sensor. Versions over 30W require the motion sensor option.

Performance D-Series Wall Size 2

<table>
<thead>
<tr>
<th></th>
<th>DSXW2</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF ENGINES</td>
<td>3</td>
</tr>
<tr>
<td>NUMBER OF LEDS</td>
<td>30</td>
</tr>
<tr>
<td>REPLACES METAL HALIDE (W)</td>
<td>175W</td>
</tr>
<tr>
<td>DRIVE CURRENT</td>
<td>350</td>
</tr>
<tr>
<td>INITIAL LUMENS</td>
<td>3,706</td>
</tr>
<tr>
<td>WATTS</td>
<td>36W</td>
</tr>
<tr>
<td>LPW</td>
<td>95</td>
</tr>
</tbody>
</table>

Ideal for replacing 250-400W metal halide. Motion sensor option required.

Section 110.9, Part-Night Outdoor Lighting Controls, as defined in Section 100.1, shall meet all of the following requirements:

- Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within five minutes per year; and
- Have the ability to setback or turn off lighting at night as required in Section 130.2(c), by means of a programmable timeclock or motion sensing device; and
- When controlled with a timeclock, shall be capable of being programmed to allow the setback or turning OFF of the lighting to occur from any time at night until any time in the morning, as determined by the user.

Motion sensor solutions for Luminaires >75W

- Fixture-mounted sensor
- ~300° coverage pattern (pole partially blocks view)
- 15'-30' mounting height provides 15-20' coverage radius
- Factory installed
- Available with DSX0, DSX1 and DSX2

Requirement:

OUTDOOR SALES LIGHTING

For Outdoor Sales Frontage, Outdoor Sales Lots and Outdoor Sales Canopies lighting, an automatic lighting control shall be installed that meets the following requirements:

- A part-night outdoor lighting control as defined in Section 100.1; or
- Motion sensors capable of automatically reducing lighting power by at least 40 percent but not exceeding 80%, and which have auto-ON functionality

Definition for Part-Night, per Section 100.1: Part-Night Outdoor Lighting Control is a time- or occupancy-based lighting control device or system that is programmed to reduce or turn off the lighting power to an outdoor luminaire for a portion of the night.

For networked lighting control solutions, Acuity Brands offers “Smart but Simple” digital solutions to lighting controls, plug & play (Cat. 5) and “Wireless.”
Acuity PMD Parking Lot

Before (250W MH, 295W)

After (144W LED)

144 Input Watts
(50% Savings)

64 Input Watts
(78% Savings)

Before vs. Dimmed LED

295W Input Watts

64 Input Watts
(78% Savings)

Dimming to 45% Power
ADDITIONAL RESOURCES

California Energy Commission
http://www.energy.ca.gov/title24/2013standards/supporting_docs.html#compliance_manu

California Lighting Technology Center

PROPOSED 2013 BUILDING ENERGY EFFICIENCY STANDARDS

Use the following sections as reference

SECTION 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION
SECTION 110.9 – MANDATORY REQUIREMENTS FOR LIGHTING CONTROL DEVICES AND SYSTEMS, BALLASTS AND LUMINAIRES
SECTION 130.0 – LIGHTING CONTROLS AND EQUIPMENT—GENERAL
SECTION 130.1 – INDOOR LIGHTING CONTROLS THAT SHALL BE INSTALLED
SECTION 130.2 – OUTDOOR LIGHTING CONTROLS AND EQUIPMENT
SECTION 130.4 – REQUIRED NONRESIDENTIAL LIGHTING CONTROL ACCEPTANCE AND INSTALLATION CERTIFICATE REQUIREMENTS
SECTION 130.5 – ELECTRICAL POWER DISTRIBUTION SYSTEMS
SECTION 140.3 – PRESCRIPTIVE REQUIREMENTS FOR BUILDING ENVELOPES
SECTION 140.6 – PRESCRIPTIVE REQUIREMENTS FOR INDOOR LIGHTING

ACUITY BRANDS

LIGHTING CONTROLS COMPONENTS DAYLIGHTING

acculamp© AEL American Electric Lighting © ANTIQUE STREET LAMPS DTL eldoLED © SUNOPTICS

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HYDREL LITHONIA LIGHTING®

MARK © ARCHITECTURAL LIGHTING Peerless® lighting to inspire®

tersen® ROAM

WINONA® solutions®light Peerless®

Synergy® LIGHTING CONTROLS

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