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About Title 24-2016

Title 24-2016 is a residential and commercial building energy code that is designed to reduce energy consumption. The goal of this code is to reduce energy consumption by providing design and construction requirements for lighting controls.

Lighting controls such as occupancy status sensors, multi-level controls, and demand response provisions allow you to synchronize indoor light levels with daylight levels in accordance with Title 24-2016.

Design Guide Information

Crestron® offers this Design Guide for Retail - Title 24-2016 solutions to use as a reference for typical layouts. Use it as guidance to make code compliance quick and easy. The Crestron team is also available to support with detailed design, submittal, and installation requirements. For additional information, please contact your Crestron representative at CLCDesign@crestron.com or (888) 330-1502.
# Title 24-2016 Code Standards

## Summary

<table>
<thead>
<tr>
<th>Code Provision</th>
<th>Minimum Control Requirement</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>130.1(a)</td>
<td>Local Manual Switch¹</td>
<td>Luminaires must be controlled with accessible manual on/off local control. Each space and area enclosed by ceiling-height partitions must be independently controlled.</td>
</tr>
<tr>
<td>130.1(b)</td>
<td>Multi-Level Control</td>
<td>Lighting of any enclosed area 100 square feet or larger with more than one luminaire and a load &gt;0.5 watts per square foot should provide multi-level lighting control that meets uniformity requirements in accordance with Title24 Table 130.1-A. Lighting control can not override local on/off or any other control requirements.</td>
</tr>
<tr>
<td>130.1(c)</td>
<td>Shut-Off²</td>
<td>Lighting must be controlled by either 1) an occupant sensing control, 2) automatic time-switch control with 2 hour maximum override and holiday scheduling, or 3) other control capable of automatically shutting off lighting. Indoor shut-off zones must be separated using ceiling high partitions and can be no larger than one floor with a maximum of 5,000 sq. ft.</td>
</tr>
<tr>
<td>130.1(c)5/6/7</td>
<td>Sensor Shut-Off</td>
<td>Outdoor Sensing Controls are required to shut off all lighting. Full or partial off to at least 50% via occupant sensing controls is required.</td>
</tr>
<tr>
<td>130.1(d)</td>
<td>Daylight Zones³</td>
<td>Automatic daylighting controls should be installed and configured in all daylit zones as defined by 130.1(d). Lighting controls should have multilevel functionality to at least the number of control steps defined in Title 24 Table 130.1-A.</td>
</tr>
<tr>
<td>130.1(e)</td>
<td>Demand Response Ready⁴</td>
<td>Buildings &gt;10,000 square feet with a lighting power density ≥0.5 watts per square foot are required to receive a standards-based messaging protocol, which automatically reduces lighting power by at least 15% and remains consistent with uniform illumination requirements defined in Title 24 Table 130.1-A.</td>
</tr>
<tr>
<td>130.5(d)</td>
<td>Controlled Receptacles</td>
<td>50% of receptacles are required to automatically turn off based on occupancy or after a vacancy of 20 minutes or less. Each uncontrolled receptacle must have at least one controlled receptacle within 6 feet.</td>
</tr>
</tbody>
</table>

### Primary Solutions
- Zūm™ Wireless Light Control
- GLPP
- GLPAC

1. General lighting must be separately controlled from all other lighting systems in an area. Floor and wall display, window display, case display, track, ornamental, and special effects lighting should be separately controlled and placed on circuits that are 20 amps or less.
2. Countdown timer switches should not be used to comply with the automatic shut-off control requirements in Section 130.1(c)1, except in single-stall bathrooms and closets that are <70 square feet where the lights must shut off within ten minutes, or in a server aisle/room where the lights must shut off within 30 minutes.
3. The photosensor should be readily accessible to authorized personnel for calibration adjustments. To prevent unauthorized access, the photosensor may be mounted inside a case that is secured with a locking mechanism.
4. Add a networked Crestron control system for demand response (130.5(d)) control. For networked Zūm applications, add a ZUM-FLOOR-HUB and ZUMNET-GATEWAY for demand response.
## Title 24-2016 Code Standards

**Space Type**

<table>
<thead>
<tr>
<th>Small Back of House / Storage ≤250 sq. ft.</th>
<th>Public Restroom</th>
<th>Sales Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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4. Add a networked Crestron control system for demand response (130.5(d)) control. For networked Zūm applications, add a ZUM-FLOOR-HUB and ZUMNET-GATEWAY for demand response.
Sales Floor

Zūm

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Qty.</th>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Junction Box Zone Controller" /></td>
<td>7</td>
<td>ZUMMESH-JBOX-5A-LV</td>
<td>Junction Box Zone Controller, 0-10V Dimming, 5A</td>
</tr>
<tr>
<td><img src="image" alt="Zūm™ Network Bridge" /></td>
<td>1</td>
<td>ZUMMESH-NETBRIDGE</td>
<td>Zūm™ Network Bridge</td>
</tr>
<tr>
<td><img src="image" alt="6-Button Battery Powered Keypad" /></td>
<td>1</td>
<td>ZUMMESH-KP10CBATT</td>
<td>6-Button Battery Powered Keypad</td>
</tr>
</tbody>
</table>

Title 24-2016 Code Compliance:

- Local Manual Switch (130.1(a))
- Multi-Level Control (130.1(b))
- Shut-Off (130.1(c))
- Daylight Zones (130.1(d))
- Demand Response Ready (130.1(e))

Local Control:
Sales Floor

GLPAC

Title 24-2016 Code Compliance:

- Local Manual Switch (130.1(a))
- Multi-Level Control (130.1(b))
- Shut-Off (130.1(c))
- Daylight Zones (130.1(d))
- Demand Response Ready (130.1(e))

Local Control:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Qty.</th>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Symbol" /></td>
<td>1</td>
<td>GLPAC-DIMFLV4</td>
<td>Green Light Integrated Lighting System, 4-Channel</td>
</tr>
<tr>
<td><img src="image.png" alt="Symbol" /></td>
<td>1</td>
<td>C2N-CBD-P</td>
<td>Cameo® Keypad, Standard Mount</td>
</tr>
</tbody>
</table>
Small Back of House / Small Storage

Zūm

Add a networked ZUM-FLOOR-HUB and ZUMNET-GATEWAY for demand response (130.5(d)).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Qty.</th>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="ZUMMESH-JBOX-5A-LV" /></td>
<td>1</td>
<td>ZUMMESH-JBOX-5A-LV</td>
<td>Zūm™ Junction Box Zone Controller, 0-10V Dimming, 5A</td>
</tr>
<tr>
<td><img src="image" alt="ZUMMESH-JBOX-20A-PLUG" /></td>
<td>1</td>
<td>ZUMMESH-JBOX-20A-PLUG</td>
<td>Zūm™ J-Box Load Controller, Plug Load Switch</td>
</tr>
<tr>
<td><img src="image" alt="ZUMMESH-NETBRIDGE" /></td>
<td>1</td>
<td>ZUMMESH-NETBRIDGE</td>
<td>Zūm™ Network Bridge</td>
</tr>
<tr>
<td><img src="image" alt="ZUMMESH-KP10CBATT" /></td>
<td>1</td>
<td>ZUMMESH-KP10CBATT</td>
<td>6-Button Battery Powered Keypad</td>
</tr>
<tr>
<td><img src="image" alt="ZUMMESH-PIR-VACANCY-BATT" /></td>
<td>1</td>
<td>ZUMMESH-PIR-VACANCY-BATT</td>
<td>PIR Vacancy Sensor (AUTO-OFF)</td>
</tr>
</tbody>
</table>

Title 24-2016 Code Compliance:

- Local Manual Switch (130.1(a))
- Multi-Level Control (130.1(b))
- Shut-Off (130.1(c))
- Sensor Shut-Off (130.1(c)5/6/7)
- Demand Response Ready (130.1(e))
- Controlled Receptacle (130.5(d))

Local Control:
Small Back of House / Small Storage

GLPP

Title 24-2016 Code Compliance:

- Local Manual Switch (130.1(a))
- Multi-Level Control (130.1(b))
- Shut-Off (130.1(c))
- Sensor Shut-Off (130.1(c)5/6/7)
- Demand Response Ready (130.1(e))
- Controlled Receptacle (130.5(d))

Local Control:

- Add a networked Crestron control system for demand response (130.5(d)).

Symbol | Qty. | Product | Description
--- | --- | --- | ---
[Dimmer] | 1 | GLPP-DIMFLVCN-PM | 1-Ch 0-10V Dimmer with Cresnet® Control
[Switch] | 1 | GLPP-SWCN | Crestron Green Light® Power Pack, 1-Channel Switch with Cresnet® Control
[In-Wall Keypad] | 1 | GLPPA-KP | In-Wall Keypad for GLPP
Public Restroom

Zūm

Zūm Mesh Wireless | Zūm Net Wireless | Line Voltage | 0-10 V Pwr & Ctrl | 18/3 Control
--- | --- | --- | --- | ---
Public Restroom with two or more stalls may use a manual control not accessible to unauthorized personnel.
Daylight zones (130.1(d)) may be required if windows are present.
Public restrooms should have at least one control step between 30-70 percent of full rated power.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Qty.</th>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>ZUMMESH-JBOX-5A-LV</td>
<td>Junction Box Zone Controller, 0-10V Dimming, 5A</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ZUMMESH-JBOX-SIM</td>
<td>Zūm™ Junction Box Sensor Integration Module</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ZUMMESH-NETBRIDGE</td>
<td>Zūm™ Network Bridge</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ZUMMESH-KP10ABATT</td>
<td>Rocker-Switch Battery Powered Keypad</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GLS-ODT-C-NS</td>
<td>Dual-Technology Ceiling Mount Occupancy Sensor</td>
<td></td>
</tr>
</tbody>
</table>

Title 24-2016 Code Compliance:

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Local Control:
Public Restroom

GLPP

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<tr>
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<th>Product Code</th>
<th>Qty.</th>
<th>Product Code</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Ch 0-10V Dimmer with Cresnet®</td>
<td>GLPP-1DIMFLV2CN-PM</td>
<td>1</td>
<td>GLS-ODT-C-NS</td>
<td>2</td>
</tr>
<tr>
<td>Dual-Technology Ceiling Mount Occupancy Sensor</td>
<td>GLPPA-KP</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-Wall Keypad for GLPP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>