Commercial Application Guide

Code Compliance | Lighting Controls

ANSI/ASHRAE/IES 90.1–2016
This document summarizes the lighting and receptacle control requirements for commercial buildings. It is for information purposes only. It is not meant to replace your state’s or local jurisdiction’s official energy code. The recommendations presented in this guide are based on the originally published code prior to addenda. Please refer to your local building energy code or authority having jurisdiction for your precise requirements. Only the authority having jurisdiction can guarantee code compliance.

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<th>New Construction (Fixture Control)</th>
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<tr>
<td>Break Room</td>
<td>16</td>
<td>18</td>
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<tr>
<td>Classroom</td>
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<td>Conference Room</td>
<td>26</td>
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<td>Egress Corridor</td>
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<tr>
<td>Egress Stairwell</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>Restroom (Multi-Stall)</td>
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<td>Daylight harvesting</td>
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<td>Personal dimming control</td>
<td>10–20% Lighting</td>
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<tr>
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</tr>
<tr>
<td>Scheduling</td>
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</tr>
<tr>
<td>Demand response</td>
<td>30–50% During peak period</td>
</tr>
<tr>
<td>Plug load control</td>
<td>15–50% of Controlled loads</td>
</tr>
<tr>
<td>HVAC integration</td>
<td>5–15% HVAC</td>
</tr>
</tbody>
</table>

*Go to lutron.com/references for more information.

Codes can sometimes be complicated and difficult to navigate. This commercial application guide provides examples of how Lutron products can be used to meet or exceed code requirements. This guide focuses on Vive and Vive compatible solutions, but our other control systems offer similar features.

Lutron Product Capabilities: Commercial Applications

### Local Solutions

<table>
<thead>
<tr>
<th></th>
<th>Wallbox</th>
<th>Vive</th>
<th>Vive with wireless hub*</th>
<th>Energi Savr Node</th>
<th>Quantum</th>
</tr>
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<tbody>
<tr>
<td>Occupancy sensing</td>
<td>⋄</td>
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<tr>
<td>Multi-level lighting control</td>
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<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Daylight harvesting</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Receptacle control</td>
<td>⋄</td>
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<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Timed Clock</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Demand Response</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
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<td>⋄</td>
</tr>
<tr>
<td>Energy Monitoring</td>
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<td>⋄</td>
<td>⋄</td>
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<td>⋄</td>
</tr>
<tr>
<td>BACnet Integration</td>
<td>⋄</td>
<td></td>
<td>⋄</td>
<td>⋄</td>
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</tr>
</tbody>
</table>

### Panel Solutions

<table>
<thead>
<tr>
<th></th>
<th>Wallbox</th>
<th>Vive</th>
<th>Vive with wireless hub*</th>
<th>Energi Savr Node</th>
<th>Quantum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy sensing</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Multi-level lighting control</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Daylight harvesting</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>Receptacle control</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
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<tr>
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<td>⋄</td>
<td>⋄</td>
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</tr>
<tr>
<td>Demand Response</td>
<td>⋄</td>
<td>⋄</td>
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<tr>
<td>Energy Monitoring</td>
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<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
<tr>
<td>BACnet Integration</td>
<td>⋄</td>
<td></td>
<td>⋄</td>
<td>⋄</td>
<td>⋄</td>
</tr>
</tbody>
</table>

To learn more about these products and their specifications, go to lutron.com/catalogs.

* For the latest information on products compatible with the Vive wireless hub, go to lutron.com/vive.

**,†** Requires QS timeclock.

† Automated Demand Response capability requires signal from a third-party device.
Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.

Lutron recommends using occupancy sensors to achieve automatic on/off requirements in place of a timeclock to maximize energy savings and light level adjustment.

When multi-level lighting control and/or daylight responsive control is required, Lutron recommends using continuous dimming to allow for smooth programmed and functioning properly (Code provision 9.4.3).

Acceptance (functional) testing is required for all new construction applications to ensure that control hardware and software are calibrated, programmed and functioning properly (Code provision 9.4.1).

Daylight Zone Requirements:
Fixtures in the primary and secondary daylight zones must be independently controlled by zone. Sidelighted zones must be controlled separately from toplighted zones.

Daylight Exceptions:
Daylight control is not required when the total lighting power of a daylight zone is less than 150 W or when the total glazing area is less than 20 sq. ft.

Summary of Requirements for Lighting and Receptacle Controls

<table>
<thead>
<tr>
<th>Local Control</th>
<th>Description</th>
<th>Code provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching</td>
<td>Lighting shall be capable of turning ON and OFF. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control.</td>
<td>9.4.1.1 (a)</td>
</tr>
<tr>
<td>Multi-level or dimming</td>
<td>Lighting shall be capable of providing at least one level between 30% and 70% of full power, in addition to ON and OFF. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control.</td>
<td>9.4.1.1 (a) &amp; (d)</td>
</tr>
</tbody>
</table>

Timeclock

<table>
<thead>
<tr>
<th>Control type</th>
<th>Description</th>
<th>Code provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy sensor</td>
<td>Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less (15 minutes for exterior).</td>
<td>9.4.1.1 (a)</td>
</tr>
<tr>
<td>Partial ON</td>
<td>When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.</td>
<td>9.4.1.1 (h)</td>
</tr>
<tr>
<td>Full OFF</td>
<td>When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.</td>
<td>9.4.1.1 (h)</td>
</tr>
<tr>
<td>Partial OFF</td>
<td>When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power (30% for parking garages). Automatic full OFF also complies.</td>
<td>9.4.1.1 (g) &amp; (c)</td>
</tr>
</tbody>
</table>

Other

| Daylight responsive control | Interior: A sensor which adjusts lighting in response to available daylight is required for daylight and skylight zones. There must be at least two light levels between ON and OFF. See the “Daylight Zone Requirements” diagrams for more information. Exterior & parking garages: A photosensor can be used as an alternate to the dawn/dusk operation of an astronomical timeclock. The perimeter 20 ft. of parking garages with access to daylight must automatically reduce lighting power by at least 50% in response to daylight. | 9.4.1.1 (e) & (i) |
| Receptacle control | At least 50% of the receptacles shall automatically turn OFF based on typical occupancy or after a vacancy of 30 minutes or less. Plug-in devices do not comply. | 8.4.2 |

For areas being used as a path of egress or fixtures being used for emergency, verify compliance with your local authority having jurisdiction. Acceptance (functional) testing is required for all new construction applications to ensure that control hardware and software are calibrated, programmed and functioning properly (Code provision 9.4.3).

1. When multi-level lighting control and/or daylight responsive control is required, Lutron recommends using continuous dimming to allow for smooth light level adjustment and maximized energy savings.

2. Lutron recommends using occupancy sensors to achieve automatic on/off requirements in place of a timeclock to maximize energy savings and optimize user experience.

3. Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.
The compliant solutions listed below are suggested based on total installed cost, simplicity of design, and basic functional needs for the space. These solutions do not represent the only compliant options to meet lighting and receptacle control requirements. Applications in this guide will illustrate these solutions and/or alternative solutions for advanced functionality.

<table>
<thead>
<tr>
<th>Local Control</th>
<th>Atrium</th>
<th>Break Room</th>
<th>Classroom, Lecture Hall, Training Room</th>
<th>Conference, Multi-purpose Room</th>
<th>Egress Corridor</th>
<th>Lobby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-level or dimming</td>
<td>🌿</td>
<td>🌿</td>
<td>🌿</td>
<td>🌿</td>
<td>🌿</td>
<td>🌿</td>
</tr>
<tr>
<td>Timeclock</td>
<td>🌿</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Occupancy sensor</td>
<td>🌿</td>
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<tr>
<td>Full ON</td>
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<tr>
<td>Partial ON</td>
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<tr>
<td>Full OFF</td>
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</tr>
<tr>
<td>Partial OFF</td>
<td>🌿</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Automatic Control</th>
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<th>Private Office (&lt;250 sq. ft.)</th>
<th>Restroom</th>
<th>Egress Stairwell</th>
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<th>Facade/Landscape</th>
<th>Parking Garage (Not Roof)</th>
<th>Other Exterior</th>
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</thead>
<tbody>
<tr>
<td>Daylight responsive control</td>
<td>🌿</td>
<td>🌿</td>
<td>🌿</td>
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</tr>
<tr>
<td>Receptacle control</td>
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</tr>
</tbody>
</table>

1. Retrofit requirements indicated are for lighting alterations greater than 20% of the connected load in a space.
2. Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.
3. When typically occupied, the sensor provides Partial OFF functionality. When typically unoccupied, the sensor provides Full OFF functionality. For entrances and exits, daylighting is exempt and the maximum light level is set to 50% at night.
4. For areas not designated as a path of egress, the occupancy sensor must turn lights to Full OFF.
5. Astronomical timeclock shall ensure all lights are off during daylight hours. For lights mounted below 24 ft, provide occupancy sensing to Partial OFF. All other lighting shall be scheduled to Partial OFF. See section 9.4.1.4 for scheduling times.
How to Use this Guide
ASHRAE 90.1-2016

This application guide is designed to help specifiers and contractors understand codes and Lutron controls in a simple manner. Each of the pages will lay out different spaces, the corresponding lighting control products for those spaces, and the way the system is set up in the space.

For Specifiers
Use this application guide for design suggestions, to understand the way the system operates and to specify the relevant products for each space.

For Contractors
Use this application guide to understand how the system is installed, the way the system must operate, and to order the correct products for each application.

Visible System Components

Control Functionality
Occupant Enters:
- Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.
- Controlled receptacles automatically regain power when occupant enters.

When Occupied:
- Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.
- Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights.

Occupant Exits:
- All lights automatically turn off 15 minutes after all occupants exit.
- 50% of all receptacles automatically turn off 15 minutes after all occupants exit.

This solution requires 0-10 V enabled ballasts and drivers by others.

Lighting Energy Savings

65%

* Go to lutron.com/references for more information.

Control Strategies

<table>
<thead>
<tr>
<th>Type of solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual On Auto Off</td>
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<tr>
<td>Occupancy/Vacancy</td>
</tr>
<tr>
<td>Full On Dim</td>
</tr>
<tr>
<td>Daylight Harvesting</td>
</tr>
<tr>
<td>Full On Dim</td>
</tr>
<tr>
<td>Personal Dimming</td>
</tr>
<tr>
<td>Max: 100% Max: 85%</td>
</tr>
<tr>
<td>High-end Trim/Tuning</td>
</tr>
</tbody>
</table>

Add a Vive wireless hub to enable simple setup and re-zoning, system monitoring, timeclock functionality, and advanced integration.

Understand the products visible in the space and the different options available for these.

Learn what strategies are implemented in the space.

Learn what energy savings you achieve over manual shut-off.

Understand how the space functions with the installed system.

Learn more about the products used in the space.

Understand how the products are laid out in the space.

Learn about the products visible in the space and the different options available for these.

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This guide offers up to three solutions per space type.

- The Retrofit Solutions are simple and inexpensive solutions, generally suited for a basic retrofit.
- The New Construction Solutions are value driven, generally best suited for new construction.
- The Recommended Solutions have advanced functionality for greater comfort and energy savings.

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Learn more about the products used in the space.

Understand how the products are laid out in the space.
This is a high-level overview of the local solutions layout. For individual room requirements refer to the detailed room type solutions in this guide. A single PowPak module can control a single or multiple fixtures. The products shown here are representative of local solutions. Multiple product options are available to meet the needs of the space.

**Vive wireless hub**

- Occupancy sensor
- Pico wireless remote control
- Daylight sensor

**Vive wireless hub features:**

- Central control, management, and monitoring of Vive devices via web browser
- Supports astronomic and time-of-day events
- Two contact closure inputs for third-party integration, such as Automatic Demand Response
- Wi-Fi access for easy commissioning
- Control up to 10,000 sq. ft. with a single hub
- Optional BACnet integration

* Go to lutron.com/vive for complete compatibility and design details.
### Visible System Components

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RMJS-8T-DV-B</td>
<td>PowPak dimming module with 0-10V</td>
<td>2</td>
<td>$150.00</td>
</tr>
<tr>
<td></td>
<td>PJ2-3BRL-GWH-L01</td>
<td>Pico wireless 3-button with raise/lower control</td>
<td>2</td>
<td>$21.00</td>
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<tr>
<td></td>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>2</td>
<td>$8.00</td>
</tr>
<tr>
<td></td>
<td>HJS-1-FM</td>
<td>Vive wireless hub</td>
<td>Shared</td>
<td></td>
</tr>
</tbody>
</table>

Consult your local rep for hub pricing and service options.

### Control Functionality

**When Occupied:**
- **Manual:** Occpant uses wall dimmers to set desired light levels for general lighting. Maximum light level is set to 80%.
- **Timeclock:** Timeclock turns lights on to 50% during normally occupied hours.
  - Timeclock turns lights off during normally unoccupied hours.

### Control Strategies

- **Max:** 100%
- **Max:** 80%
- **7am:** Dim
- **7pm:** Off

### Lighting Energy Savings*

- 30%

*Go to lutron.com/references for more information.

### Code Notes:

- Requirements specified for atriums 20-40 ft. in height.
- Go to lutron.com/vive for complete compatibility and design details.
- This solution requires 0-10V enabled ballasts and drivers by others.
- Go to lutron.com/references for hub pricing and service options.
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<tbody>
<tr>
<td>RMJS-8T-DV-B</td>
<td>PowPak dimming module with 0-10V</td>
<td>4</td>
<td>$150.00</td>
<td></td>
</tr>
<tr>
<td>LRF2-DCRB-WH</td>
<td>Radio Powr Savr wireless daylight sensor</td>
<td>2</td>
<td>$120.00</td>
<td></td>
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<tr>
<td>PJ2-4B-GWH-L31</td>
<td>Pico wireless 4-button scene control</td>
<td>1</td>
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<td></td>
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<tr>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>1</td>
<td>$8.00</td>
<td></td>
</tr>
<tr>
<td>HJS-1-FM</td>
<td>Vive wireless hub</td>
<td>Shared</td>
<td>Consult your local rep for hub pricing and service options.</td>
<td></td>
</tr>
</tbody>
</table>

## Control Strategies

### Control Functionality

**When Occupied:**
- **Automatic:** Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.
- **Manual:** Occupant selects scenes to set desired light levels for all lights. Maximum light level is set to 80%.

**Timeclock:**
- Timeclock turns lights on to 50% during normally occupied hours.
- Timeclock turns lights off during normally unoccupied hours.

### Code Notes:

- Requirements specified for 20-40 ft. atriums.
- Go to lutron.com/vive for complete compatibility and design details.
- This solution requires 0-10V enabled ballasts and drivers by others.

### Lighting Energy Savings*

60%

*Go to lutron.com/references for more information.
Visible System Components

Maestro vacancy sensing dimmer

Control Functionality

**Occupant Enters:**
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

**When Occupied:**
- Manual: Occupant uses wall dimmer to set desired light levels for all lights.

**Occupant Exits:**
All lights automatically turn off 15 minutes after all occupants exit.

Control Strategies

- Occupancy/Vacancy
- High-end Trim/Tuning

### Lighting Energy Savings*

**40%**

* Go to lutron.com/references for more information.

---

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS-Z101-V-WH</td>
<td>Maestro vacancy sensing 0-10V dimmer*</td>
<td>1</td>
<td>$110.00</td>
</tr>
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</table>

* Maestro MS-Z101-V-WH is not compatible with the Vive wireless hub. This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

Control Functionality

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters

When Occupied:
Manual: Occupant uses wall dimmer to set desired light levels for all lights.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezing, system monitoring, timeclock functionality, and advanced integration.

Lighting Energy Savings*

45%

* Go to lutron.com/references for more information.

Control Strategies

Occupancy/Vacancy

High-end Trim/Tuning

Plug Load Control

Symbol | Model Number | Description | Qty | List Price Each
---|---|---|---|---
RMJS-8T-DV-B | PowPak dimming module with 0-10V | 1 | $150.00
RMJS-20R-DV-B | 20A PowPak relay module | 1 | $139.00
LRF2-VKLB-P-WH | Radio Powr Savr wireless corner-mount vacancy sensor | 1 | $85.00
PJ2-3BRL-GWH-L01 | Pico wireless 3-button with raise/lower control | 1 | $21.00
PICO-WBX-ADAPT | Pico wallbox adapter | 1 | $8.00

Code Notes:
For break rooms with daylight, include a 0-10V dimming module per zone and a daylight sensor.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

- **Pico wireless control**
- **Radio Powr Savr wireless corner-mount vacancy sensor**

Control Functionality

**Occupant Enters:**
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

**When Occupied:**
Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lighting.

**Occupant Exits:**
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

- **Occupancy/Vacancy**
- **High-end Trim/Tuning**
- **Personal Dimming**

**Lighting Energy Savings**

45%

*Go to lutron.com/references for more information.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0–10V enabled ballasts and drivers by others.
Visible System Components

Control Functionality

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoneing, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

Occupancy/Vacancy

Daylight Harvesting

Personal Dimming

High-end Trim/Tuning

Plug Load Control

Lighting Energy Savings*

65%

* Go to lutron.com/references for more information.

Symbol | Model Number | Description | Qty | List Price Each
--- | --- | --- | --- | ---
RMJS-8T-DV-B | PowPak dimming module with 0-10V | 4 | $ 150.00
RMJS-20R-DV-B | 20 A PowPak relay module | 1 | $ 139.00
LRF2-DCRB-WH | Radio Powr Savr wireless daylight sensor | 1 | $ 120.00
LRF2-VKLB-P-WH | Radio Powr Savr wireless corner-mount vacancy sensor | 1 | $ 85.00
PJ2-3BRL-GWH-L01 | Pico wireless 3-button with raise/lower control | 2 | $ 21.00
PICO-WBX-ADAPT | Pico wallbox adapter | 2 | $ 8.00

Code Notes: For non-daylit classrooms, all general lighting can be connected to a single 0-10V dimming module. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

Pico wireless control
Pico wireless 4-button scene control
Integral fixture control with sensor

Control Functionality

**Occupant Enters:**
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters.

**When Occupied:**

**Automatic:** Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

**Manual:** Occupant selects scenes or uses dimmers to set desired light levels for all lights. Entry scene controller has 3 user preferred presets and 1 all off button.

**Occupant Exits:**

All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Control Strategies

- **Occupancy/Vacancy**
- **Scene Control**
- **Daylight Harvesting**
- **Personal Dimming**
- **High-end Trim/Tuning**
- **Plug Load Control**

Lighting Energy Savings*

65%

*Go to lutron.com/references for more information.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
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<tr>
<td><img src="integral-to-fixture.png" alt="Symbol" /></td>
<td>Integral fixture²</td>
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<td><img src="rmjs.png" alt="Symbol" /></td>
<td>RMJS-20R-DV-B</td>
<td>20A PowPak relay module</td>
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<td>$139.00</td>
</tr>
<tr>
<td><img src="pico.png" alt="Symbol" /></td>
<td>PJ2-3BRL-GWH-LD1</td>
<td>Pico wireless 3-button with raise/lower control</td>
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<td>$21.00</td>
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<tr>
<td><img src="pico.png" alt="Symbol" /></td>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>3</td>
<td>$8.00</td>
</tr>
</tbody>
</table>

1. Fixture control comes pre-installed in fixture. Look for the Clear Connect Wireless symbol for fixtures containing this module.
2. Fixture adder for the control module may vary.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.
This solution requires digitally enabled ballasts and drivers by others.

Go to lutron.com/findafixture for a complete list of compatible fixtures and drivers.
Visible System Components

- **Pico wireless control**
- **Radio Powr Savr wireless corner-mount vacancy sensor**

Control Functionality

- **Occupant Enters:**
  Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

- **When Occupied:**
  Manual: Occupant uses wall dimmer to set desired light levels for all lights.

- **Occupant Exits:**
  All lights automatically turn off 15 minutes after all occupants exit.

  Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

- **Occupancy/Vacancy**
- **Personal Dimming**
- **High-end Trim/Tuning**

Lighting Energy Savings*

**40%**

* Go to lutron.com/references for more information.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

Control Functionality

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space. Lights must be turned on manually. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmer to set desired light levels for all lights.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Control Strategies

Occupancy/Vacancy

Daylight Harvesting

Personal Dimming

High-end Trim/Tuning

Plug Load Control

Lighting Energy Savings*

60%

*Go to lutron.com/references for more information.

Symbol | Model Number | Description | Qty | List Price Each
---|---|---|---|---
RMJS-8T-DV-B | PowPak dimming module with 0-10V | 2 | $ 150.00
RMJS-20R-DV-B | 20A PowPak relay module | 1 | $ 139.00
LRF2-DCRB-WH | Radio Powr Savr wireless daylight sensor | 1 | $ 120.00
LRF2-VKLB-P-WH | Radio Powr Savr wireless corner-mount vacancy sensor | 1 | $ 85.00
PJ2-3BPL-GWH-L01 | Pico wireless 3-button with raise/lower control | 2 | $ 21.00
PICO-WBX-ADAPT | Pico wallbox adapter | 2 | $ 8.00

Code Notes:
For non-daylit conference rooms, all general lighting can be connected to a single 0-10V dimming module. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmer to set desired light levels for all lights.

Occasional Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

Occupancy/Vacancy

Daylight Harvesting

Personal Dimming

High-end Trim/Tuning

Appliance On

Appliance Off

Plug Load Control

Lighting Energy Savings*

60%

* Go to lutron.com/references for more information.
**Visible System Components**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>RMJS-8T-DV-B</td>
<td>PowPak dimming module with 0-10V</td>
<td>1</td>
<td>$150.00</td>
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<tr>
<td><img src="image" alt="Symbol" /></td>
<td>LRF2-OHLB-P-WH</td>
<td>Radio Powr Savr wireless hallway occupancy sensor</td>
<td>1</td>
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<tr>
<td><img src="image" alt="Symbol" /></td>
<td>PJ2-3BRL-GWH-L01</td>
<td>Pico wireless 3-button control with raise/lower</td>
<td>2</td>
<td>$21.00</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>2</td>
<td>$8.00</td>
</tr>
</tbody>
</table>

**Control Functionality**

- **Occupant Enters:**
  - All lights automatically turn on to maximum light level. Maximum light level is set to 80%.
  - When Occupied:
    - Manual: Occupant uses wall dimmer to set desired light levels for all lights. Manual control cannot fully shut off the lights. Minimum light level is set to 10%.
- **Occupant Exits:**
  - All lights automatically go to minimum light level 15 minutes after all occupants exit.
- **Emergency Mode:**
  - Lighting connected to emergency power turns on to full output.

**Control Strategies**

- **Auto On Partial Off**
  - Occupancy/Vacancy
    - Max: 100%
    - Max: 85% 85%
- **High-end Trim/Tuning**

**Lighting Energy Savings**

60%

**Code Notes:**
- Verify that the egress fixtures go to full output upon loss of control signal. For projects that require UL 924 compliance, provide an automatic load control relay (ALCR) per load controller connected to emergency fixtures. Add a daylight sensor for corridors with daylight zones.
- Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.
- This solution requires 0-10V enabled ballasts and drivers by others.
- For non-egress corridors, set the minimum light level to full off.
Visible System Components

Control Functionality

Occupant Enters:
All lights automatically turn on to 50% light level.
Occupant turns lights on to maximum light level manually. Maximum light level is set to 80%.

When Occupied:
Manual: Occupant uses wall dimmers to set desired light levels for all lights.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

Partial On Auto Off
Occupancy/Vacancy
Max: 100% Max: 85%
High-end Trim/Tuning

Lighting Energy Savings*

45%

* Go to lutron.com/references for more information.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.
This solution requires 0-10V enabled ballasts and drivers by others.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
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<tbody>
<tr>
<td>RMJS-8T-DV-B</td>
<td>PowPak dimming module with 0-10V</td>
<td>1</td>
<td>$150.00</td>
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<tr>
<td>LRF2-OCR2B-P-WH</td>
<td>Radio Powr Savr wireless ceiling-mount occupancy sensor</td>
<td>4</td>
<td>$85.00</td>
<td></td>
</tr>
<tr>
<td>PJ2-3BRL-GWH-L01</td>
<td>Pico wireless 3-button control with raise/lower</td>
<td>1</td>
<td>$21.00</td>
<td></td>
</tr>
<tr>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>1</td>
<td>$8.00</td>
<td></td>
</tr>
</tbody>
</table>
Visible System Components

- Pico wireless control
- Radio Powr Savr wireless ceiling-mount occupancy sensor and daylight sensor

Control Functionality

Occupant Enters:
- All lights automatically turn on to 50% light level. Occupant turns lights on to maximum level manually. Maximum light level is set to 80%.
- Controlled receptacles automatically regain power when occupant enters.

When Occupied:
- Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.
- Manual: Occupant uses wall dimmers to set desired light levels for all lights.

Occupant Exits:
- All lights automatically turn off 15 minutes after all occupants exit.
- 50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Control Strategies

- Partial On Auto Off
- Occupancy/Vacancy
- Full On Dim
- Daylight Harvesting
- High-end Trim/Tuning
- Appliance On Appliance Off
- Plug Load Control

Lighting Energy Savings*

- 55%
- *Go to lutron.com/references for more information.

Symbol Model Number Description Qty List Price Each

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
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<tbody>
<tr>
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<td>PowPak dimming module with 0-10V</td>
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<td>RMJS-20R-DV-B</td>
<td>20A PowPak relay module</td>
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<td>$139.00</td>
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<tr>
<td>LRF2-DCRB-WH</td>
<td>Radio Powr Savr wireless daylight sensor</td>
<td>1</td>
<td>$120.00</td>
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<tr>
<td>LRF2-OCR2B-P-WH</td>
<td>Radio Powr Savr wireless ceiling-mount occupancy sensor</td>
<td>4</td>
<td>$85.00</td>
<td></td>
</tr>
<tr>
<td>PJ2-3BPL-GWH-L01</td>
<td>Pico wireless 3-button with raise/lower control</td>
<td>1</td>
<td>$21.00</td>
<td></td>
</tr>
<tr>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>1</td>
<td>$8.00</td>
<td></td>
</tr>
</tbody>
</table>

Code Notes: For non-daylit open offices, all general lighting can be connected to a single 0-10V dimming module. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

Control Functionality

Occupant Enters:
Each individual light automatically turns on to 50% light level as occupant approaches fixture proximity. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Each individual overhead light dims/brightens based on local daylight availability. Manual: Occupant uses wall dimmer to set desired light levels for all lights.

Occupant Exits:
Each individual light automatically turns off 15 minutes after all occupants exit fixture proximity.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Lighting Energy Savings*

60%

* Go to lutron.com/references for more information.

---

Control Strategies

- Auto On Auto Off
- Occupancy/Vacancy
- Full On Dim
- Daylight Harvesting
- Max: 100% Max: 85%
- High-end Trim/Tuning
- Appliance On Appliance Off
- Plug Load Control

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<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Integral to fixture</td>
<td>Integral fixture control with sensor</td>
<td>16</td>
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<tr>
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<td>RMJS-20R-DV-B</td>
<td>20A PowPak relay module</td>
<td>1</td>
<td>$139.00</td>
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<td></td>
<td>PJ2-3BRL-GWH-L01</td>
<td>Pico wireless 3-button with raise/lower control</td>
<td>1</td>
<td>$21.00</td>
</tr>
<tr>
<td></td>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>1</td>
<td>$8.00</td>
</tr>
</tbody>
</table>

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

This solution requires digitally enabled ballasts and drivers by others.

---

1 Fixture control comes pre-installed in fixture. Look for the Clear Connect Wireless symbol for fixtures containing this module.
2 Fixture adder for the control module may vary.
3 Go to lutron.com/findafixture for a complete list of compatible fixtures and drivers.

---

Go to lutron.com/references for more information.
Visible System Components

Control Functionality

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

When Occupied:
Manual: Occupant uses wall dimmer to set desired light levels for all lights.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

Occupancy/Vacancy

Personal Dimming

High-end Trim/Tuning

Lighting Energy Savings*

45%

* Go to lutron.com/references for more information.

Symbol | Model Number | Description | Qty | List Price Each
--- | --- | --- | --- | ---
RMJS-8T-DV-B | PowPak dimming module 0-10 V | 1 | $150.00
LRF2-VCR2B-P-WH | Radio Powr Savr wireless ceiling-mount vacancy sensor | 1 | $85.00
PJ2-3BRL-GWH-L01 | Pico wireless 3-button control with raise/lower | 1 | $21.00
PICO-WBX-ADAPT | Pico wallbox adapter | 1 | $8.00

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.
Visible System Components

Control Strategies

Control Functionality

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. Maximum light level is set to 80%.

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmer to set desired light levels for all lights.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and re zoning, system monitoring, time clock functionality, and advanced integration.

Lighting Energy Savings*

60%*

* Go to lutron.com/references for more information.

Symbol | Model Number | Description | Qty | List Price Each
--- | --- | --- | --- | ---
FCJS-010 | Wireless fixture control with 0-10V | 2 | $75.00
RMJS-20R-DV-B | 20A PowPak relay module | 1 | $139.00
FC-SENSOR | PowPak fixture sensor | 2 | $35.00
PJ2-3BRL-GWH-L01 | Pico wireless 3-button with raise/lower control | 1 | $21.00
PICO-WBX-ADAPT | Pico wallbox adapter | 1 | $8.00

Code Notes:
FCJS models are capable of controlling up to 3 ballasts or drivers. Review the “Vive PowPak Fixture Controls” submittal document for more design details.

Clear Connect RF Communication

1 required for each fixture control.
Visible System Components

- **Radio Powr Savr** wireless ceiling-mount occupancy sensor

Control Functionality

**Occupant Enters:**
All lights automatically turn on to maximum light level.

**Occupant Exits:**
All lights automatically turn off 15 minutes after all occupants exit.

Control Strategies

- **Occupancy/Vacancy**

Lighting Energy Savings*

50%

*Go to lutron.com/references for more information.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
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<td>Radio Powr Savr wireless ceiling-mount occupancy sensor</td>
<td>2</td>
<td>$85.00</td>
</tr>
</tbody>
</table>

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.
Visible System Components

Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Functionality

**Occupant Enters:**
All lights automatically turn on to maximum light level. Maximum light level is set to 80%.

**Occupant Exits:**
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezing, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

**Occupancy/Vacancy**

**High-end Trim/Tuning**

Code Notes: Add a daylight sensor for restrooms with daylight zones. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Lighting Energy Savings*

60%

* Go to lutron.com/references for more information.
Egress Stairwell | Retrofit

ASHRAE 90.1-2016

Visible System Components

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FXSWLX4H</td>
<td>Lutron 4 ft. stairwell LED fixture</td>
<td>2 (per floor)</td>
<td>$540.00</td>
</tr>
<tr>
<td></td>
<td>LRF2-OKLB-P-WH</td>
<td>Radio Powr Savr wireless corner-mount occupancy sensor</td>
<td>1 (per floor)</td>
<td>$85.00</td>
</tr>
</tbody>
</table>

Control Functionality

Occupant Enters:
All lights automatically turn on to maximum light level. Maximum light level is set to 80%.

Occupant Exits:
All lights dim to minimum light level 15 minutes after all occupants exit. Minimum light level is set to 10%.

Emergency Mode:
Lighting connected to emergency power turns on to full output.

Lighting Energy Savings* 80%

* Go to lutron.com/references for more information.

Control Strategies

Occupancy/Vacancy

High-end Trim/Tuning

Code Notes:
Verify that the egress fixtures go to full output upon loss of control signal. For projects that require UL 924 compliance, provide an automatic load control relay (ALCR) per load controller connected to emergency fixtures. Add a daylight sensor for stairwells with daylight zones. Lutron Stairwell Fixture (FXSWLX4H) is not currently compatible with Vive wireless hub. A new model number is coming soon that will include Vive compatibility. Go to lutron.com/vive for the latest compatibility details.

Code Notes:
For non-egress stairwells, see the new construction solution and set the minimum light level to full off.
Visible System Components

Control Functionality

Occupant Enters:
All lights automatically turn on to maximum light level. Maximum light level is set to 80%.

Occupant Exits:
All lights dim to minimum light level 15 minutes after all occupants exit. Minimum light level is set to 10%.

Emergency Mode:
Lighting connected to emergency power turns on to full output.

Control Strategies

Lighting Energy Savings*

80%

* Go to lutron.com/references for more information.

* Code Notes: For non-egress stairwells, set the minimum light level to full off.

** Code Notes: Verify that the egress fixtures go to full output upon loss of control signal. For projects that require UL 924 compliance, provide an automatic load control relay (ALCR) per load controller connected to emergency fixtures. Add a daylight sensor for stairwells with daylight zones. This solution requires digitally enabled ballasts and drivers by others.

Symbol | Model Number | Description | Qty | List Price Each
---|---|---|---|---
| Integral to fixture | Integral fixture control | 2 (per floor) | $ 60.00

LRF2-OKLB-P-WH | Radio Powr Savr wireless corner-mount occupancy sensor | 1 (per floor) | $ 85.00

1 Fixture control comes pre-installed in fixture. Look for the Clear Connect Wireless symbol for fixtures containing this module. Go to lutron.com/findafixture for a complete list of compatible fixtures and drivers.

2 Fixture adder for the control module may vary.

Code Notes: For non-egress stairwells, set the minimum light level to full off.