Vive Solutions
IECC 2018
Commercial Application Guide
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. 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.
## Energy-saving lighting control strategies

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<thead>
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<th>Strategy</th>
<th>Potential savings</th>
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<tr>
<td><strong>High-end trim/tuning</strong></td>
<td>10–30% Lighting</td>
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<td><strong>Occupancy/vacancy sensing</strong></td>
<td>20–60% Lighting</td>
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<td><strong>Daylight harvesting</strong></td>
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<td><strong>Personal dimming control</strong></td>
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<td><strong>Controllable window shading</strong></td>
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<td><strong>Scheduling</strong></td>
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<td><strong>Demand response</strong></td>
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<td><strong>Plug load control</strong></td>
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<td><strong>HVAC integration</strong></td>
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</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>Occupancy sensing</th>
<th>Vive with wireless hub*</th>
<th>Limestock</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wallbox</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Vive</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Vive with wireless hub</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Limestock</strong></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

*.strategy for code/standards compliance

<table>
<thead>
<tr>
<th>Strategies for code/standards compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy sensing</td>
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<tr>
<td>Multi-level lighting control</td>
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<tr>
<td>Daylight harvesting</td>
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<tr>
<td>Receptacle control</td>
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<tr>
<td>Timeclock</td>
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<tr>
<td>Demand response</td>
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<tr>
<td>Energy monitoring</td>
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<tr>
<td>BACnet integration</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Strategies for code/standards compliance</th>
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</tr>
<tr>
<td>Energy monitoring</td>
</tr>
<tr>
<td>BACnet integration</td>
</tr>
</tbody>
</table>

### Outdoor/Parking Garage solutions

<table>
<thead>
<tr>
<th>Occupancy sensing</th>
<th>Vive with wireless hub*</th>
<th>Limestock</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wallbox</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Vive</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Vive with wireless hub</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Limestock</strong></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

* For the latest information on products compatible with the Vive wireless hub, go to lutron.com/vive.
† Automated Demand Response capability requires signal from a third-party device.

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

<table>
<thead>
<tr>
<th>Minimum control type</th>
<th>Description</th>
<th>Code provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch</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>C405.2.5</td>
</tr>
<tr>
<td>Dimmer or scene control</td>
<td>Lighting shall be capable of being reduced by at least 50% of maximum lighting power. There shall be at least one manual control device for light reduction within a space. See code for spaces that allow remote location of control. Automatic daylight control may be used instead of manual control.</td>
<td>C405.2.2.2</td>
</tr>
</tbody>
</table>
| Timed ON/OFF Controls | **Interior:** Scheduled control, based on time-of-day, turns lighting ON or OFF based on typical occupancy. Occupancy sensors also comply as an alternate to using a timeclock.  
**Exterior:** Scheduled control, based on time-of-day and sunrise/sunset (requires astronomical timeclock), turns lighting ON or OFF based on typical occupancy and daylight. | C405.2.6.2, C405.2.6.3, C405.2.6.4 |
| Occupancy sensor     | Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less. | C405.2.1       |
| Full ON              | When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power. | C405.2.1.1, Exception C405.2.1 |
| Partial ON           | When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% or less of maximum lighting power. | C405.2.1       |
| Manual ON            | Lighting is turned ON manually by an occupant. | C405.2.1.1     |
| Full OFF             | When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF. | C405.2.1       |
| Partial OFF          | When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power (50% for parking garages). Automatic full OFF also complies. | C405.2, Exception C405.2.6.3 |
| Daylight responsive control | **Interior:** A sensor which adjusts lighting in response to available daylight is required for sidelit and skylit zones. Some spaces, including offices and classrooms require dimming. See the “Daylight Zone Requirements” diagrams for more information.  
**Exterior:** A photosensor can be used as an alternate to the dawn/dusk peration of an astronomical timeclock. | C405.2.3, C405.2.6.1 |
| Receptacle control   | Receptacle control is not required by this energy code. | N/A            |
| Demand response      | Demand response is not required by this energy code. | N/A            |

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 C408.3).

Enhanced Digital Lighting Controls is one compliance path of the Additional Efficiency Package requirement (Section C406).

1 Luminaire level lighting controls (L LLC) can be can be used as an alternate compliance path. See Section C405.2 for more information.

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### Daylight Zone Requirements

**Sidelighting (Window)**

![Sidelighting (Window)](image)

**Toplighting (Skylight)**

![Toplighting (Skylight)](image)

**Daylight Zone Requirements:**
Sidelit closed lighting zones must be controlled separately from toplighted zones. North, South, East, and West zones must also be controlled separately.

**Daylight Exceptions:**
Daylight control is not required when the total lighting power of a daylight zone is 150 W or less, or when the total glazing area is 24 sq. ft. or less. Other exceptions exist, based on space type, window area, neighboring obstructions, and glass transmittance.
The compliant solutions listed below are suggested based on total installed cost, simplicity of design, and basic functional needs for the space. These solutions represent one of multiple compliant options to meet lighting and receptacle control requirements. ASHRAE 90.1 2016 can also be used as a compliance option in meeting IECC 2018 requirements. Applications in this guide will illustrate these solutions and/or alternate solutions for advanced functionality.

### Suggested Code Compliant Solutions

#### IECC 2018

<table>
<thead>
<tr>
<th>Manual Control</th>
<th>Artrum</th>
<th>Classroom, Lab, Training Room</th>
<th>Conference, Break Room</th>
<th>Corridor</th>
<th>Guestroom</th>
<th>Lobby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
</tr>
<tr>
<td>Dimmer or scene control</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Automatic ON/OFF Control</th>
<th>Artrum</th>
<th>Classroom, Lab, Training Room</th>
<th>Conference, Break Room</th>
<th>Corridor</th>
<th>Guestroom</th>
<th>Lobby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full ON</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
</tr>
<tr>
<td>Partial ON</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
</tr>
<tr>
<td>Manual ON</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
</tr>
<tr>
<td>Full OFF</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
</tr>
<tr>
<td>Partial OFF</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>Artrum</th>
<th>Classroom, Lab, Training Room</th>
<th>Conference, Break Room</th>
<th>Corridor</th>
<th>Guestroom</th>
<th>Lobby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daylight responsive control</td>
<td>⚫</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>
<td></td>
</tr>
<tr>
<td>Demand response</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td>⚫</td>
<td></td>
</tr>
</tbody>
</table>

1. All retrofits altering more than 10% of the luminaires, or retrofits that increase the installed lighting power must comply with all new construction requirements.
2. To comply with some life safety code requirements for egress illumination, automatic full OFF is not suggested. For non-egress areas, the occupancy sensor should turn the lights to full OFF and a switching control may be used.
3. Automatic shutoff is required for all installed luminaires and switched receptacles.
4. Timeclock ensures the lights are on when typically occupied. Occupancy sensor controls lights when typically unoccupied.

#### Diagram key:

- New construction
- Lighting retrofit
- New construction and retrofit

#### Applications

- Open Office (>300 sq. ft.)
- Parking Garage
- Private Office (<300 sq. ft.)
- Restroom
- Stairwell
- Storage Room
- Facade/Landscape
- Parking Lot/Other Exterior

1. Astronomical timeclock shall ensure all lights are off during daylight hours. Lights should be scheduled to Partial OFF during night hours. See section C405.2.6.3 for scheduling times.
2. Control zones are limited to 600 sq. ft. or less. Once a zone is vacant for 20 minutes, the occupancy sensor automatically reduces lighting in the zone by 80% of full light output or turns lighting OFF in the vacant zone.
3. Not a code requirement. Lutron recommends this solution for spaces designated as a path of egress.
4. These spaces require continuous daylight dimming to OFF.
5. Sensor(s) automatically turn lighting OFF in the entire space within 20 minutes of vacancy in the whole space.

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7
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.

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.

#### Room type
- **Type of solution**

<table>
<thead>
<tr>
<th>Room type</th>
<th>Type of solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>New Construction</td>
</tr>
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#### Learn what energy savings you achieve over manual shut-off
---

**Control Functionality**

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

**Add a View wireless hub to enable simple setup and tuning, system monitoring, troubleshooting functionality, and advanced integrations.**

### Visible System Components

- **Visible System Components**
- **Control Strategies**
- **Lighting Energy Savings**

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**Type of solution**

Learn about 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.
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*
- PowPak module
- 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.
Atrium | New Construction
IECC 2018

Visible System Components

Control Strategies

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 5 user preferred presets and 1 all off button.

Timeclock:
Timeclock turns lights on to 50% light level during normally occupied hours. Maximum light level is set to 80%.

Timeclock turns lights off during normally unoccupied hours.

Control Functionality

Lighting Energy Savings*

60%

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

<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>1</td>
<td>$150.00</td>
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<tr>
<td></td>
<td>LRF2-VKLB-P-WH</td>
<td>Radio Powr Savr wireless corner-mount vacancy sensor</td>
<td>1</td>
<td>$85.00</td>
</tr>
<tr>
<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>

Control Strategies

- Manual 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.

**Code Notes:**
For break rooms with daylight, include a 0-10V dimming module per zone and a daylight sensor. 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 and daylight 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:**
- **Automatic:** Overhead lights dim/brighten based on daylight availability. There is one perimeter daylight zone.
- **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.

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

Control Strategies

- **Occupancy/Vacancy**
  - Manual On Auto Off
- **Daylight Harvesting**
  - Full On Dim
  - Max: 100% Max: 85%
- **Personal Dimming**
  - Max: 100% Max: 85%
- **High-end Trim/Tuning**
  - Line-voltage wiring
  - Low-voltage wiring

Code Notes:
For non-daylight classrooms, all general lighting can be connected to a single 0-10 V 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 0-10 V enabled ballasts and drivers by others.

Lighting Energy Savings*

60%

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

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

Control Functionality

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

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.

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
Scene Control

Lighting Energy Savings*

65%

* 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 digitally enabled ballasts and drivers by others.

This solution meets the requirements of the Luminaire Level Lighting Controls (LLLC) prescriptive path specified in section C405.2.2.

This solution meets the requirements of the Enhanced Digital Lighting Controls Additional Efficiency Package (Section C406).

Symbol | Model Number | Description | Qty | List Price Each
--- | --- | --- | --- | ---
| | Integral to fixture | Integral fixture control with sensor | 12 | $70.00² |
| | PU2-4B-GWH-L31 | Pico wireless 4-button scene control | 1 | $39.00 |
| | PU2-3BRL-GWH-L01 | Pico wireless 3-button with raise/lower control | 2 | $21.00 |
| | PICO-WBX-ADAPT | Pico wallbox adapter | 3 | $8.00 |

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.
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:**
- **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.

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**

**Lighting Energy Savings**

60%

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

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**Symbol | Model Number | Description | Qty | List Price Each**

- RMJS-8T-DV-B | PowPak dimming module with 0-10V | 2 | $150.00
- 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 2-button control | 2 | $21.00
- PICO-WBX-ADAPT | Pico wallbox adapter | 2 | $8.00

**Code Notes:**
- For non-daylight conference rooms, the 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:
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:
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. 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.

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

Control Strategies

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

Lighting Energy Savings*

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

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<th>Qty</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Multiple</td>
<td>EcoSystem-enabled Hi-Lume Soft-on, Fade-to-Black series ballasts/drivers</td>
<td>10</td>
<td>$ 67.00 - $ 81.00</td>
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<tr>
<td></td>
<td>FCJS-ECO</td>
<td>Wireless fixture control with EcoSystem</td>
<td>10</td>
<td>$ 75.00</td>
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<tr>
<td></td>
<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></td>
<td>LRF2-VKLB-P-WH</td>
<td>Radio Powr Savr wireless corner-mount vacancy sensor</td>
<td>1</td>
<td>$ 85.00</td>
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<tr>
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<td>PJ2-4B-GWH-L31</td>
<td>Pico wireless 4-button scene control</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>
</tbody>
</table>
**Visible System Components**

- **Pico wireless control**
- **Radio Powr Savr wireless hallway occupancy sensor**

**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%
- **High-end Trim/Tuning**

**Lighting Energy Savings**

60%

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

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**Symbol | Model Number | Description | Qty | List Price Each**
---|---|---|---|---
RMJS-8T-DV-B | PowPak dimming module with 0-10V | 1 | $150.00
LRF2-OHHLB-P-WH | Radio Powr Savr wireless hallway occupancy 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:**
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.

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Visible System Components

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

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There is one perimeter daylight zone.

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

Occupant Exits:
All lights in individual zones turn off 15 minutes after all occupants exit that zone.

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
Full On Dim
Daylight Harvesting
Max: 100% Max: 85%
High-end Trim/Tuning

Lighting Energy Savings*

50%

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

Control Functionality

Code Notes: Control zones are limited to 600 sq. ft.

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>
</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>
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<tr>
<td></td>
<td>LRF2-DORB-WH</td>
<td>Radio Powr Savr wireless daylight sensor</td>
<td>1</td>
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<tr>
<td></td>
<td>LRF2-OCR2B-P-WH</td>
<td>Radio Powr Savr wireless ceiling-mount occupancy sensor</td>
<td>4</td>
<td>$85.00</td>
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<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>
</tr>
<tr>
<td></td>
<td>PICO-WBX-ADAPT</td>
<td>Pico wallbox adapter</td>
<td>2</td>
<td>$8.00</td>
</tr>
</tbody>
</table>
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%.

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.

Control Strategies

Partial On Auto Off
Occupancy/Vacancy
Full On Dim
Daylight Harvesting
Full On Dim
Personal Dimming
Max: 100% Max: 85%
High-end Trim/Tuning

Lighting Energy Savings*

60%

* 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.

Open Office | Recommended
IECC 2018

Symbol Model Number Description Qty List Price Each

Internal to fixture1 Internal fixture control with sensor 16 $ 70.00
PJ2-3BRL-GWH-L01 Pico wireless 3-button with raise/lower control 1 $ 21.00
PICO-WBX-ADAPT Pico wallbox adapter 1 $ 8.00

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.

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.
This solution meets the requirements of the Luminaires Level Lighting Controls (LLLC) prescriptive path specified in section C405.2.2.
This solution meets the requirements of the Enhanced Digital Lighting Controls Additional Efficiency Package (Section C406).
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:
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.

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

Control Strategies

Occupancy/Vacancy

Daylight Harvesting

Personal Dimming

High-end Trim/Tuning

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
| | 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

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

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 ceiling-mount occupancy sensor

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.

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

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

Control Strategies

Occupancy/Vacancy
High-end Trim/Tuning

Lighting Energy Savings*

50%

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

Radio Power Savr wireless corner-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 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

Occupancy/Vacancy

High-end Trim/Tuning

Lighting Energy Savings*

80%

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

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 (FXSWLX44) is not currently compatible with the 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 recommended 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

Occupancy/Vacancy

High-end Trim/Tuning

Lighting Energy Savings* 80%

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.

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

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

Symbol | Model Number | Description | Qty | List Price Each
---|---|---|---|---
integral to fixture | Integral fixture control | 2 (per floor) | $ 60.00
LRF2-OKLB-P-WH P-WH | Radio Power 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.

To emergency power

A floor cross-section is shown. One fixture per landing is suggested.
Visible System Components

Integral fixture control with sensor

Control Functionality

Occupy/Vehicle Enters:
All lights automatically turn on to high light level. High light level is set to 80%.
Automatic: lights dim/brighten based on local daylight availability.

Occupy/Vehicle Exits:
All lights automatically turn to low light level 15 minutes after all occupants exit.
Low light level is set to 20%.
Automatic: lights dim/brighten based on local daylight availability.

Control Strategies

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

Lighting Energy Savings*

45%

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

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**Symbol | Model Number | Description | Qty | List Price Each**
---|---|---|---|---
| LL-EN-INTMOUNT | Limelight radio module with built-in daylight sensor and PIR occupancy sensor | 1 | Consult your local rep for pricing and service options² |
| LL-PIR¹ | Standalone PIR occupancy sensor | 1 | Consult your local rep for pricing and service options² |
| LL-CELLGATE | The Limelight gateway with cellular connection | 1 | Consult your local rep for pricing and service options² |

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1. Fixture control comes pre-installed in fixture.
2. Fixture adder for the control module may vary.
3. The rooftop parking area of a parking garage should follow the requirements of a parking lot. Both requirements can be met under one system.
Parking Lot | Recommended
IECC 2018

Visible System Components

Limelight radio module with built-in daylight sensor and PIR occupancy sensor

Control Functionality

Occupant/Vehicle Enters:
All lights automatically turn on to high light level. High light level is set to 80%.
Automatic: lights dim/brighten based on local daylight availability.

Occupant/Vehicle Exits:
All lights automatically go to mid level when no motion is detected.
Automatic: lights dim/brighten based on local daylight availability.

Timeclock:
Timeclock turns lights to mid level between midnight and 6:00 AM.

Control Strategies

Occupancy/Vacancy

Daylight Harvesting

Max: 100% Max: 85%

High-end Trim/Tuning

Scheduling

Lighting Energy Savings*

45%

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

Symbol | Model Number | Description | Qty | List Price Each
--- | --- | --- | --- | ---
[Image] | LL-EXTMOUNT | Limelight radio module with built-in daylight sensor and PIR occupancy sensor | 1 (per fixture) | Consult your local rep for pricing and service options

[Image] | LL-CELLGATE | The Limelight gateway with cellular connection | 1 | Consult your local rep for pricing and service options

1. Fixture control can be installed at the manufacturer, or in the field.
2. Fixture adder for the control module may vary.

Consult your local rep for pricing and service options.