COMMERCIAL LIGHTING CONTROLS

ANSI/ASHRAE/IES 90.1 2016

Design to meet code compliance with Lutron

USD List prices effective July 10, 2022

LUTRON

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ASHRAE 90.1-2016

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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.

Energy-saving lighting control strategies

Strategy		Potential savings
Max: 100% / Max: 80%	**High-end trim/tuning** sets the maximum light level based on customer requirements in each space.*	10–30% Lighting
Auto On / Auto Off	**Occupancy/vacancy sensing** turns lights on when occupants are in a space and off when they vacate the space.*	20–60% Lighting
Full On / Dim	**Daylight harvesting** dims electric lights when daylight is available to light the space.*	25–60% Lighting
Full On / Dim	**Personal dimming control** gives occupants the ability to set the light level.*	10–20% Lighting
Shade Open / Shade Closed	**Controllable window shading** moves shades to reduce glare and solar heat gain.*	10–20% Cooling
7am: Dim / 7pm: Off	**Scheduling** provides scheduled changes in light levels based on the time of day.*	10–20% Lighting
Full On / Dim	**Demand response** automatically reduces lighting loads during peak electricity usage times.*	30–50% During peak period
Appliance On / Appliance Off	**Plug load control** automatically turns off loads after occupants leave a space.*	15–50% of Controlled loads
Heating / Cooling	**HVAC integration** controls heating, ventilation, and air conditioning systems through a contact closure.*	5–15% HVAC

*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

Strategies for code/standards compliance

	Local Solutions			Panel Solutions	
	Wallbox	Vive	Vive with wireless hub*	Energi Savr Node	Quantum
Occupancy sensing	◉	◉	◉	◉	◉
Multi-level lighting control	◉	◉	◉	◉	◉
Daylight harvesting		◉	◉	◉	◉
Receptacle control		◉	◉	◉	◉
Timeclock			◉	◉ **	◉
Demand response			◉ †	◉ †	◉
Energy monitoring			◉		◉
BACnet integration			◉		◉

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.

Summary of Requirements for Lighting and Receptacle Controls

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The requirements listed below are summarized for simplicity and may have other exceptions that were omitted.

	Minimum control type	Description	Code provision
Local Control	Switching	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.	9.4.1.1 (a)
Local Control	Multi-level or dimming[1]	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.	9.4.1.1 (a) 9.4.1.1 (d)
Automatic Control[3]	Timeclock[2]	**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 & parking garages:** Scheduled control, based on time-of-day and sunrise/sunset, turns lighting ON or OFF based on typical occupancy and daylight (requires astronomical timeclock).	9.4.1.1 (i) 9.4.1.2 (a) & (c) 9.4.1.4 (a), (b), & (c)
Automatic Control[3]	Occupancy sensor	Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less (15 minutes for exterior).	9.4.1.1 9.4.1.2 (b) 9.4.1.4 (d)
Automatic Control[3]	Full ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.	9.4.1.1 (h)
Automatic Control[3]	Partial ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% or less of maximum lighting power.	9.4.1.1 (c)
Automatic Control[3]	Full OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.	9.4.1.1 (h)
Automatic Control[3]	Partial OFF	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.	9.4.1.1 (g) 9.4.1.2 (b) & (c) 9.4.1.4 (c) & (d)
Other	Daylight responsive control[1]	**Interior:** A sensor which adjusts lighting in response to available daylight is required for sidelight 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) 9.4.1.1 (f) 9.4.1.2 (d) 9.4.1.4 (a)
Other	Receptacle control	At least 50% of the receptacles shall automatically turn OFF based on typical occupancy or after a vacancy of 20 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.
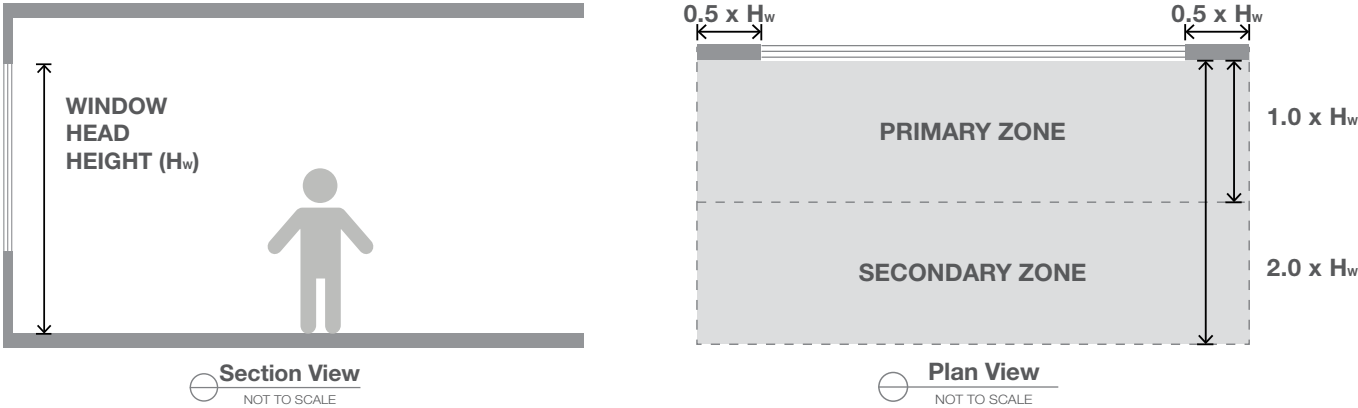
Daylight Zone Requirements

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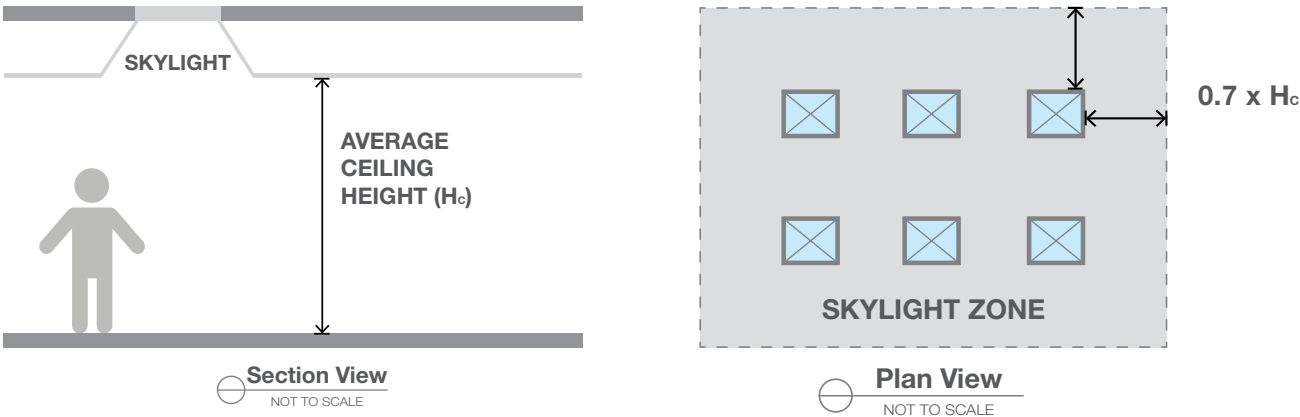
Daylight Exceptions:
Daylight control is not required when the total lighting power of a daylight zone is less than 150 W or when the total glazing area is less than 20 sq. ft.

Sidelighting (Window)

WINDOW HEAD HEIGHT (H_W)

Section View
NOT TO SCALE

$0.5 \times H_W$ $0.5 \times H_W$

PRIMARY ZONE — $1.0 \times H_W$

SECONDARY ZONE — $2.0 \times H_W$

Plan View
NOT TO SCALE

Toplighting (Skylight)

SKYLIGHT

AVERAGE CEILING HEIGHT (H_C)

Section View
NOT TO SCALE

$0.7 \times H_C$

SKYLIGHT ZONE

Plan View
NOT TO SCALE

Suggested Code Compliant Solutions

ASHRAE 90.1-2016

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.

Diagram key:
- ◉ = New construction
- ✹ = Lighting retrofit[1]
- ✹ = New construction and retrofit[1]

		Atrium	Break Room	Classroom, Lecture Hall, Training Room	Conference, Multi-purpose Room	Egress Corridor[4]	Lobby
Local Control	Switching						
	Multi-level or dimming	✹	✹	✹	✹	✹	✹
Automatic Control[2]	Timeclock	✹					✹
	Occupancy sensor		✹	✹	✹	✹	◉
	Full ON					✹	✹
	Partial ON	✹					
	Full OFF	✹	✹	✹	✹		✹
	Partial OFF					✹	◉
Other	Daylight responsive control	◉	◉	◉	◉	◉	◉
	Receptacle control		◉	◉	◉		

		Open Office (>250 sq. ft.)	Private Office (<250 sq. ft)	Restroom	Egress Stairwell[4]	Storage Room	Facade/ Landscape	Parking Garage (Not Roof)[3]	Other Exterior[5]
Local Control	Switching					✹			
	Multi-level or dimming	✹	✹						
Automatic Control[2]	Timeclock						✹	✹	✹
	Occupancy sensor	✹	✹	✹	✹	✹		✹	✹
	Full ON				✹	✹	✹	✹	✹
	Partial ON	✹							
	Full OFF	✹	✹	✹		✹	✹	✹	✹
	Partial OFF				✹			✹	✹
Other	Daylight responsive control	◉	◉	◉	◉	◉		◉	
	Receptacle control	◉	◉						

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.

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

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

Understand how the products are laid out in the space

Learn more about the products used in the space

Classroom | New Construction
ASHRAE 90.1-2016

Visible System Components

Control Functionality

Control Strategies

Lighting Energy Savings*

65%

22   23

Vive Local Solutions Layout

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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.
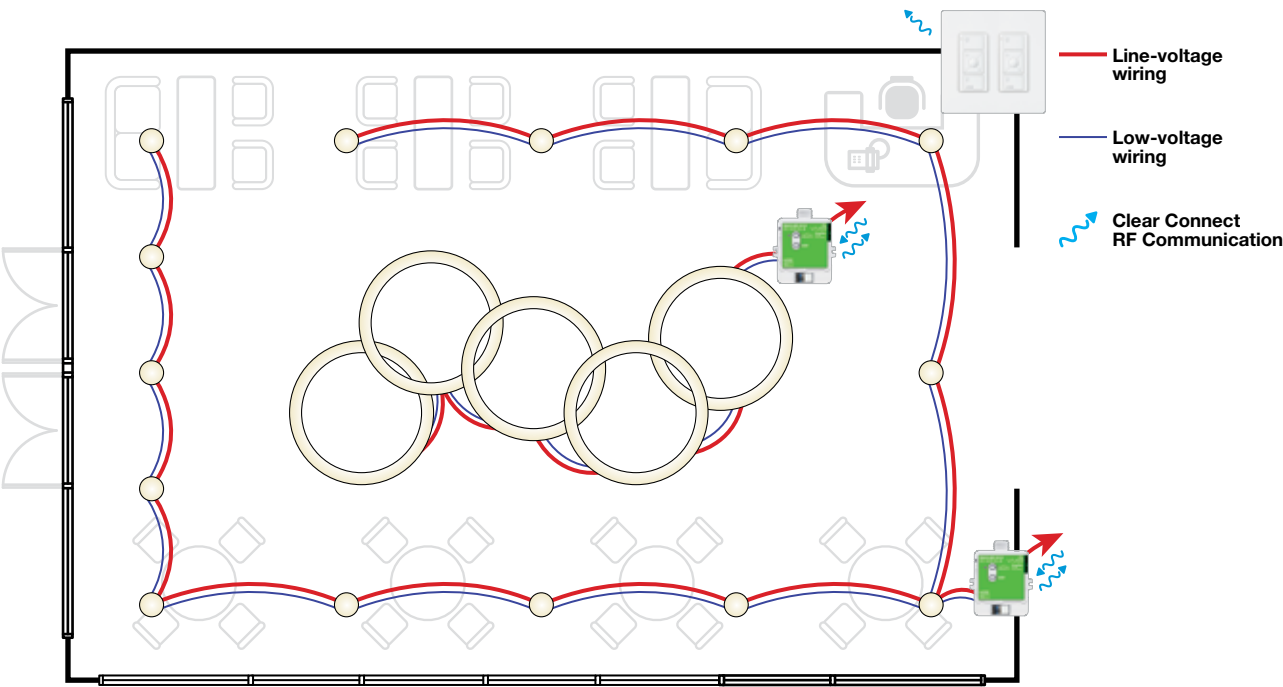
Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	2	$ 180.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	2	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	2	$ 9.50
	HJS-1-FM	Vive wireless hub	120V/ 277V	Shared	Consult your local rep for hub pricing and service options.

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.

Visible System Components
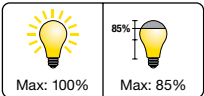

Pico
wireless control

Control Functionality

When Occupied:
Manual: Occupant 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: 85%
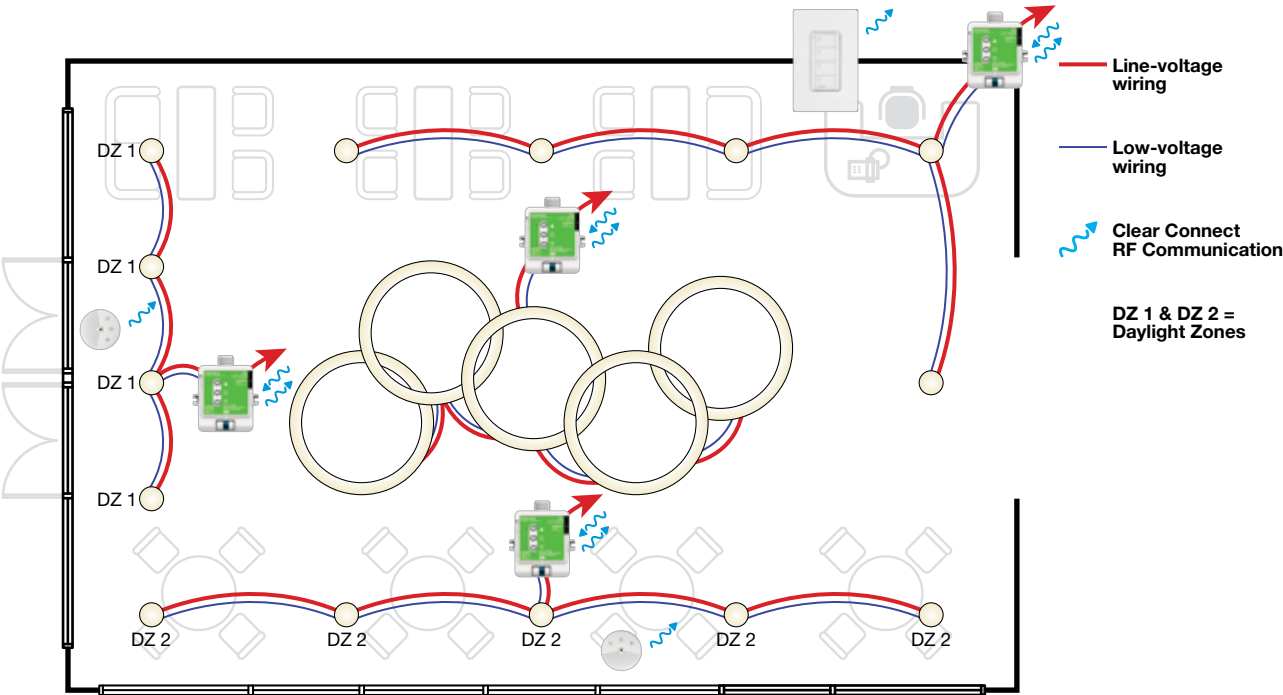
High-end Trim/Tuning

7am: Dim   7pm: Off

Scheduling

Lighting Energy Savings*

30%

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

Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

DZ 1 & DZ 2 = Daylight Zones

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/277V	4	$ 180.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	N/A	2	$ 150.00
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	N/A	1	$ 45.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50
	HJS-1-FM	Vive wireless hub	120V/277V	Shared	Consult your local rep for hub pricing and service options.

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.

Visible System Components

Pico wireless 4-button scene control
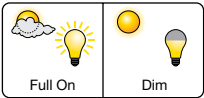
Radio Powr Savr wireless daylight sensor

Control Functionality

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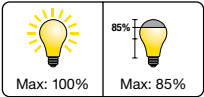
Manual: Occupant selects scenes to set desired light levels for all lights. Maximum light level is set to 80%.

Timeclock:
Timeclock turns lights on to 50% during normally occupied hours.

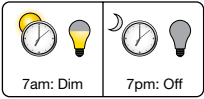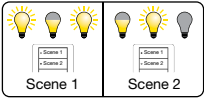Timeclock turns lights off during normally unoccupied hours.

Control Strategies

Full On   Dim

Daylight Harvesting

Max: 100%   Max: 85%

High-end Trim/Tuning

7am: Dim   7pm: Off

Scheduling

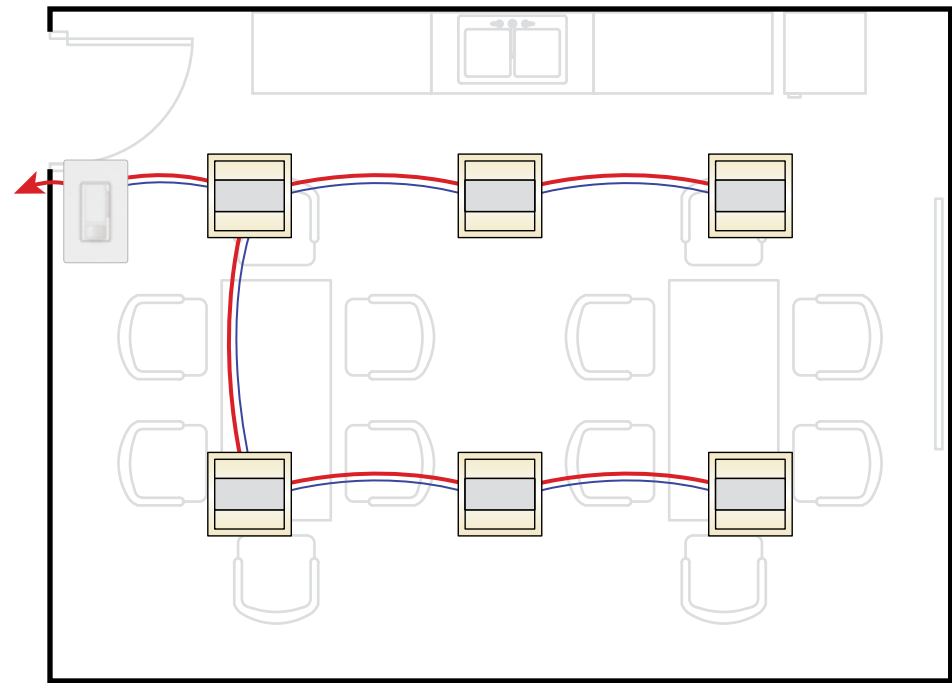Scene 1   Scene 2

Scene Control

Lighting Energy Savings*

60%

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

- ▬▬ Line-voltage wiring
- ▬▬ Low-voltage wiring

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	MS-Z101-V-WH	Maestro vacancy sensing 0-10V dimmer*	120V/ 277V	1	$120.00

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

Manual On | Auto Off
Occupancy/Vacancy

Max: 100% | Max: 85%
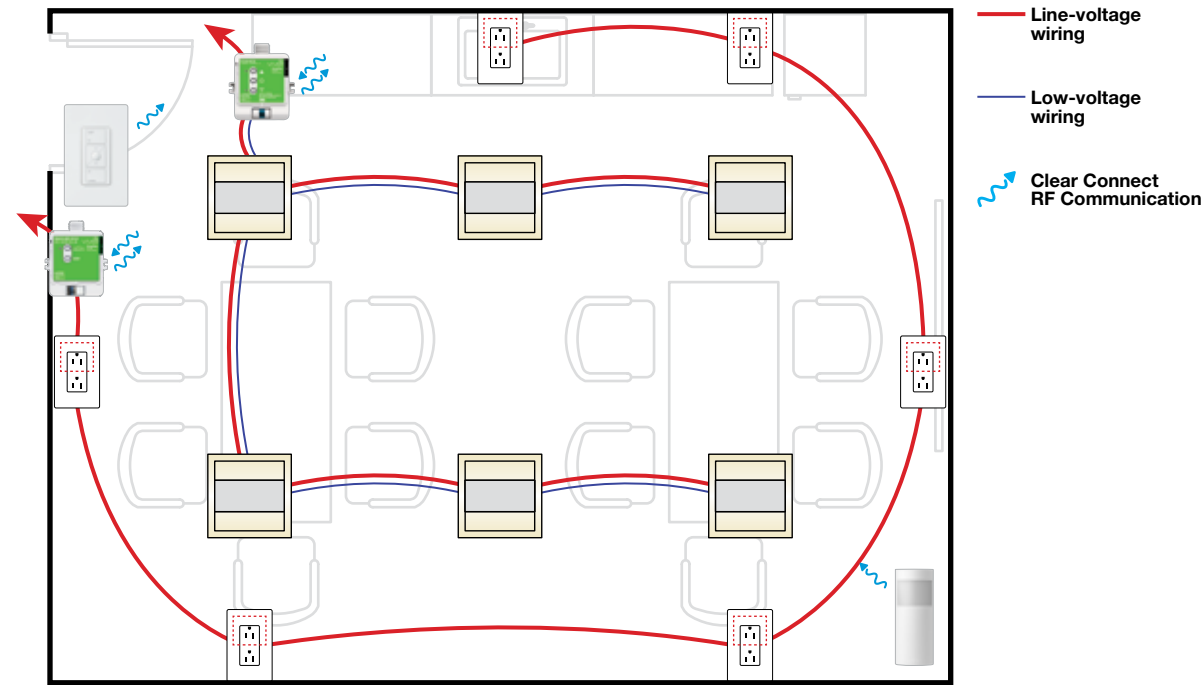**High-end Trim/Tuning**

Lighting Energy Savings*

40%

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

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

	Line-voltage wiring
	Low-voltage wiring
	Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	1	$ 180.00
	RMJS-20R-DV-B	20A PowPak relay module	120V/ 277V	1	$ 170.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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.

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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%.

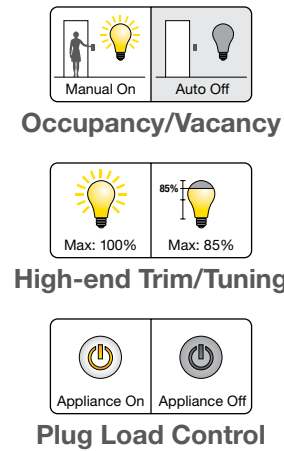Controlled receptacles automatically regain power when occupant enters

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 rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

Manual On	Auto Off

Occupancy/Vacancy

Max: 100%	Max: 85%

High-end Trim/Tuning

Appliance On	Appliance Off

Plug Load Control

Lighting Energy Savings*

45%

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

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	Line-voltage wiring
	Low-voltage wiring
	Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	2	$ 180.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button control with raise/lower	N/A	2	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	2	$ 9.50

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.
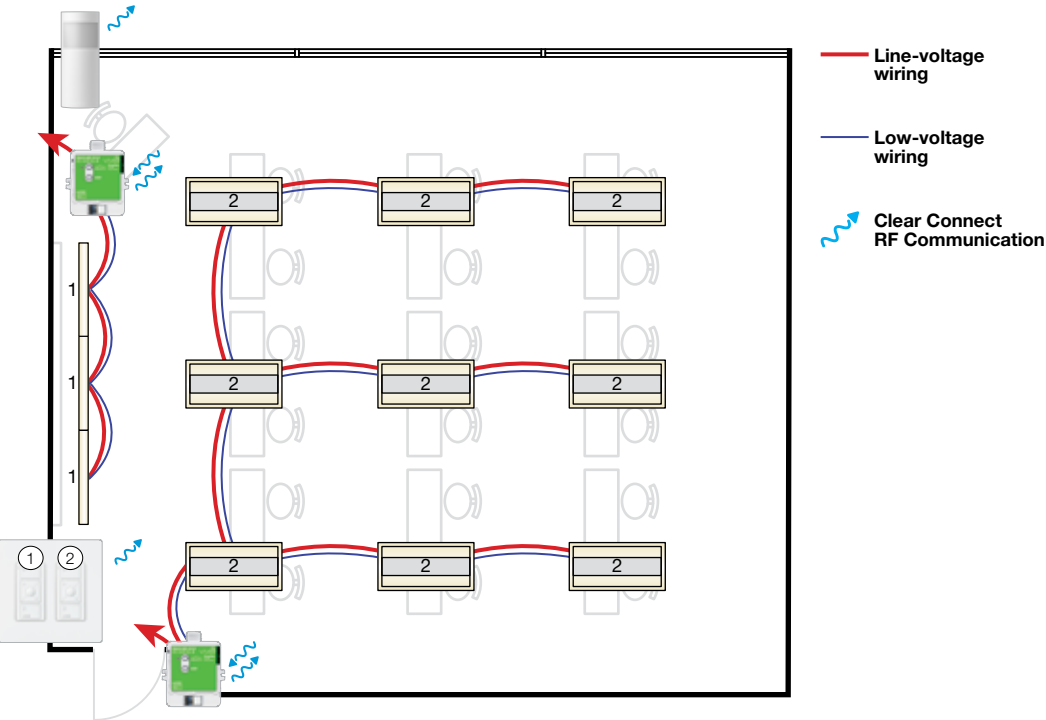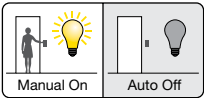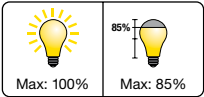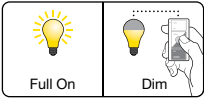
Control Strategies

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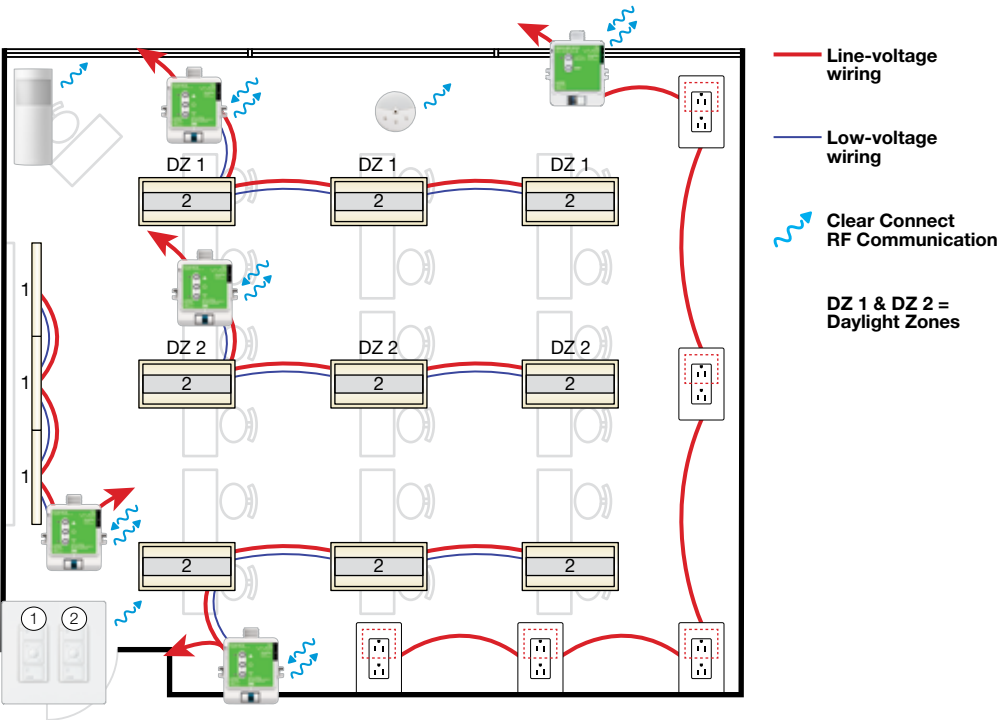
Max: 100% / Max: 85%
High-end Trim/Tuning

Full On / Dim
Personal Dimming

Lighting Energy Savings*

45%

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

	Line-voltage wiring
	Low-voltage wiring
	Clear Connect RF Communication
	DZ 1 & DZ 2 = Daylight Zones

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	4	$ 180.00
	RMJS-20R-DV-B	20A PowPak relay module	120V/ 277V	1	$ 170.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	N/A	1	$ 150.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	2	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	2	$ 9.50

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

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%.

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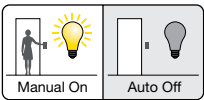
Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights.

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 rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

| Manual On | Auto Off |
Occupancy/Vacancy

| Full On | Dim |
Daylight Harvesting

| Full On | Dim |
Personal Dimming

| Max: 100% | Max: 85% |
High-end Trim/Tuning

| Appliance On | Appliance Off |
Plug Load Control

Lighting Energy Savings*

65%

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

Classroom | Recommended

ASHRAE 90.1-2016

Line-voltage wiring

Clear Connect RF Communication

1 integrated into each light fixture

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	Integral to fixture[1]	Integral fixture control with sensor	Low Voltage	12	$ 78.00[2]
	RMJS-20R-DV-B	20A PowPak relay module	120V/ 277V	1	$ 170.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	2	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	3	$ 9.50

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.

Clear Connect Wireless

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.

Classroom | Recommended

ASHRAE 90.1-2016

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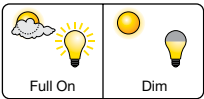
50% of all receptacles automatically turn off 15 minutes after all occupants exit.

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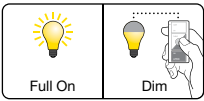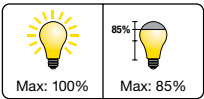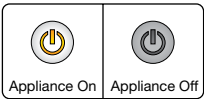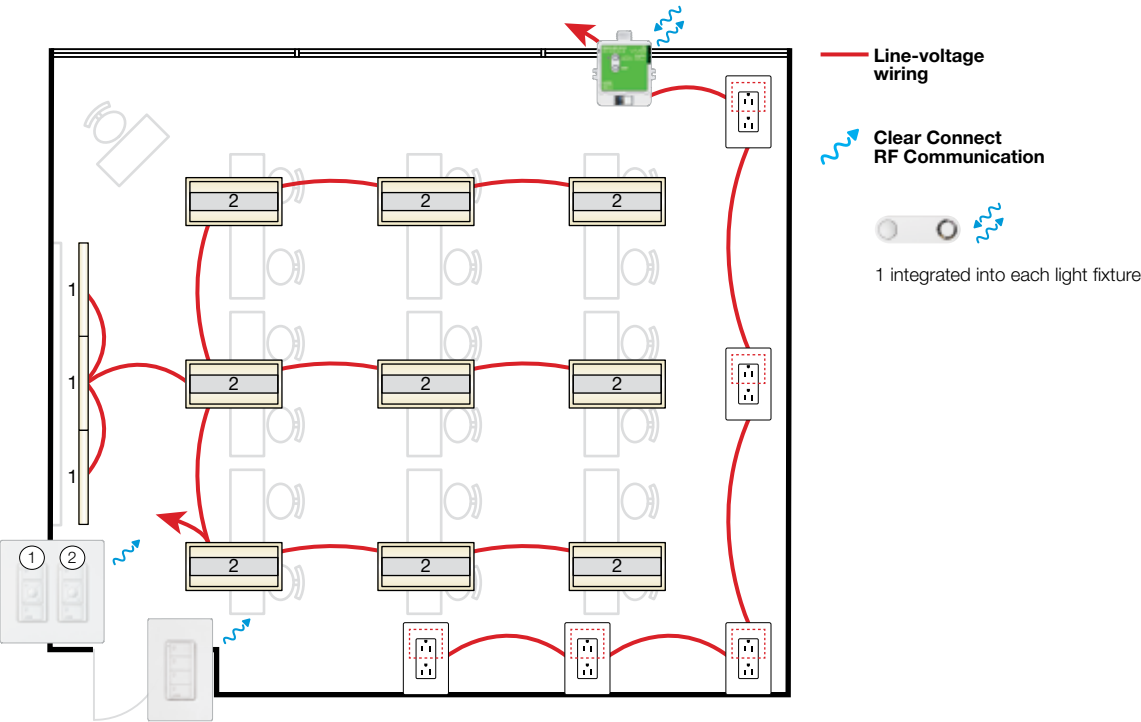
Control Strategies

Occupancy/Vacancy

Scene Control

Daylight Harvesting

Personal Dimming

High-end Trim/Tuning

Plug Load Control

Lighting Energy Savings*

65%

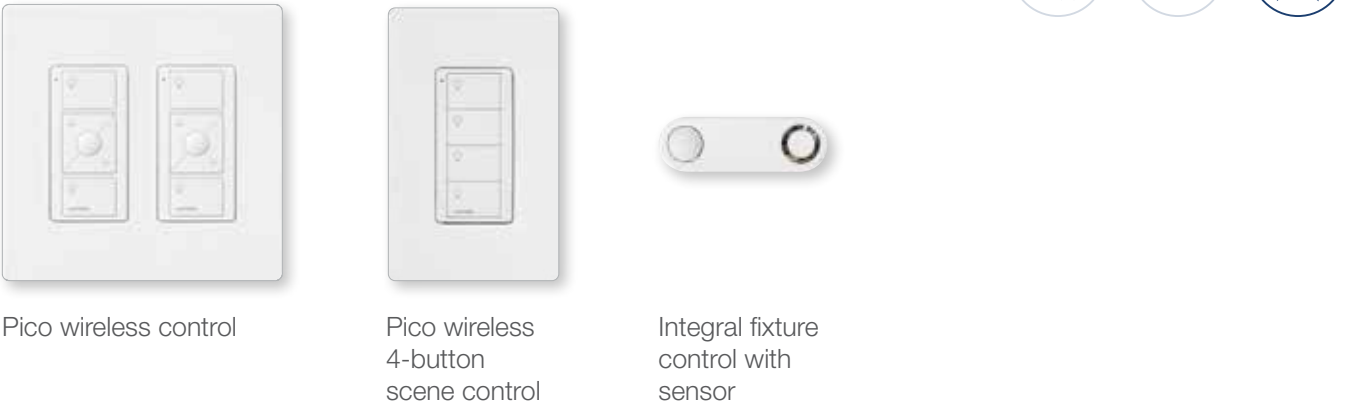* Go to lutron.com/references for more information.

	Line-voltage wiring
	Low-voltage wiring
	Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	1	$ 180.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button control with raise/lower	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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 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.
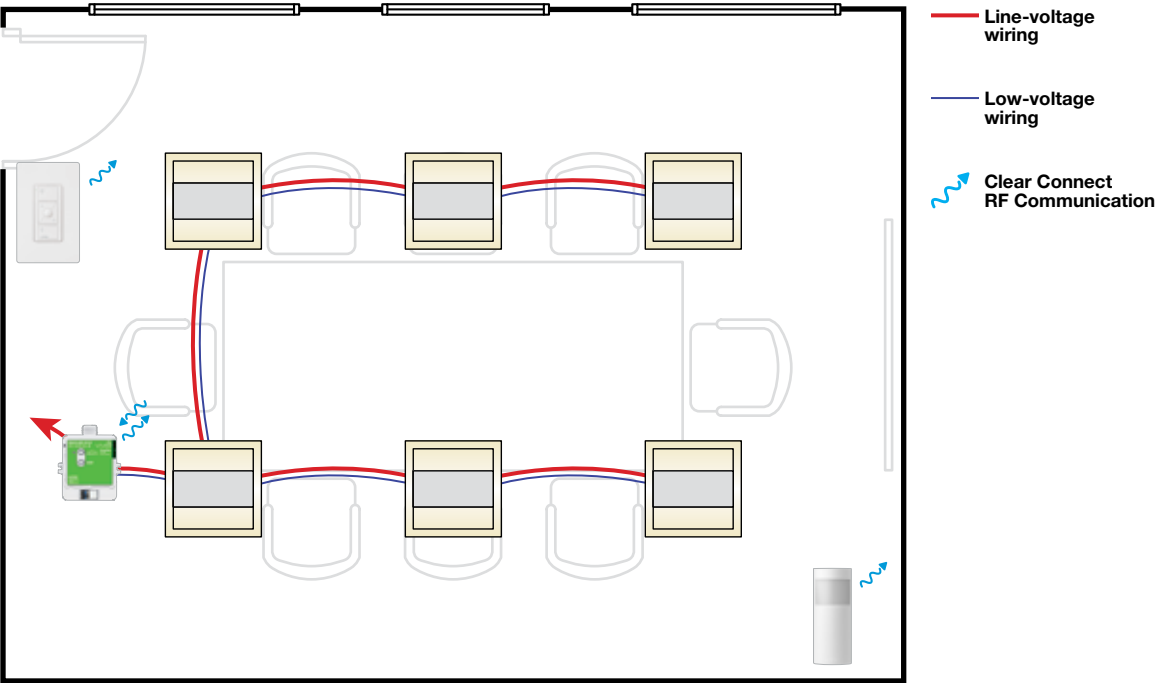
Control Strategies

Occupancy/Vacancy

Personal Dimming

High-end Trim/Tuning

Lighting Energy Savings*

40%

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

Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

DZ 1 & DZ 2 = Daylight Zones

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	2	$ 180.00
	RMJS-20R-DV-B	20A PowPak relay module	120V/ 277V	1	$ 170.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	N/A	1	$ 150.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	2	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	2	$ 9.50

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

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%.
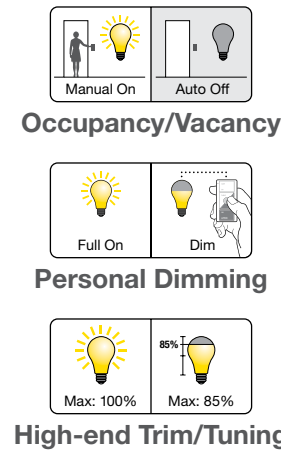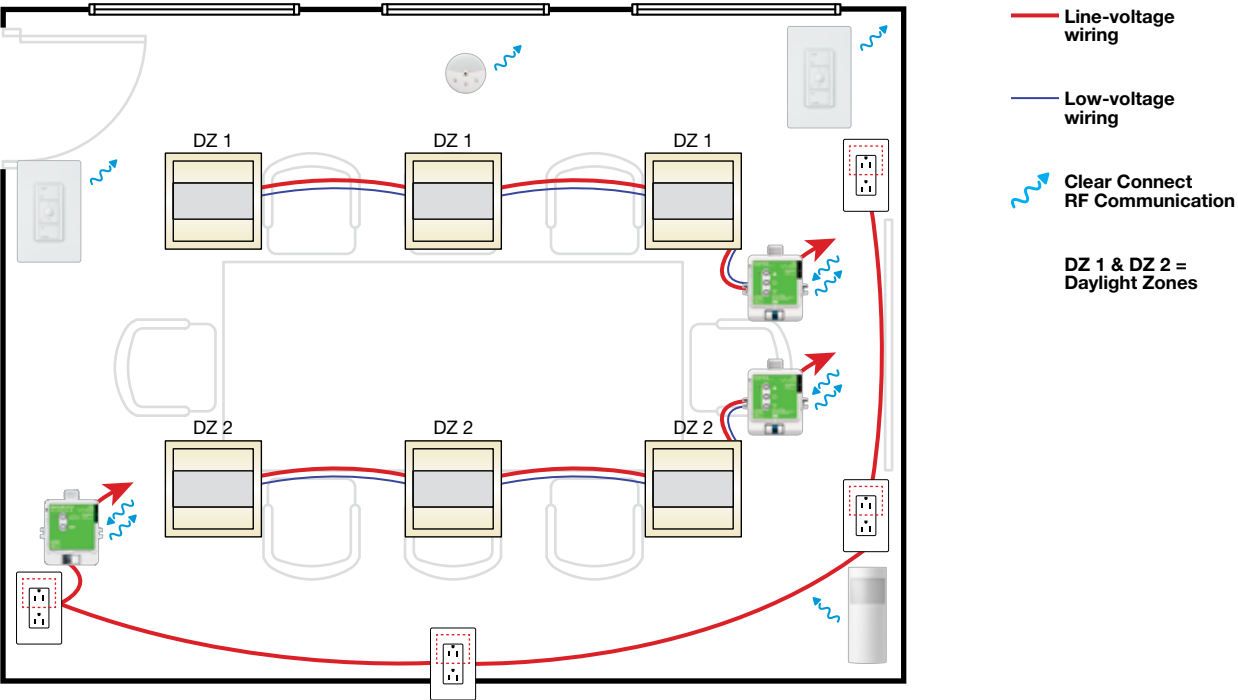
Controlled receptacles automatically regain power when occupant enters.

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 rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

Manual On | Auto Off
Occupancy/Vacancy

Full On | Dim
Daylight Harvesting

Full On | Dim
Personal Dimming

Max: 100% | Max: 85%
High-end Trim/Tuning

Appliance On | Appliance Off
Plug Load Control

Lighting Energy Savings*

60%

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

Line-voltage wiring

Clear Connect RF Communication

DZ 1 & DZ 2 = Daylight Zones

1 required for each light fixture

1 required for each light fixture

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	Multiple	EcoSystem-enabled Hi-Lume Soft-on, Fade-to-Black series ballasts/drivers	120 V/ 277 V	10	Consult your local rep
	FCJS-ECO	Wireless fixture control with EcoSystem	120 V/ 277 V	10	$ 91.00
	RMJS-20R-DV-B	20A PowPak relay module	120 V/ 277 V	1	$ 170.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	N/A	1	$ 150.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	N/A	2	$ 45.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	2	$ 9.50

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.
Go to lutron.com/ballasttool or lutron.com/findafixture to identify the correct ballast or LED fixture for your project.

Visible System Components

Pico wireless 4-button scene 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%.

Controlled receptacles automatically regain power when occupant enters.

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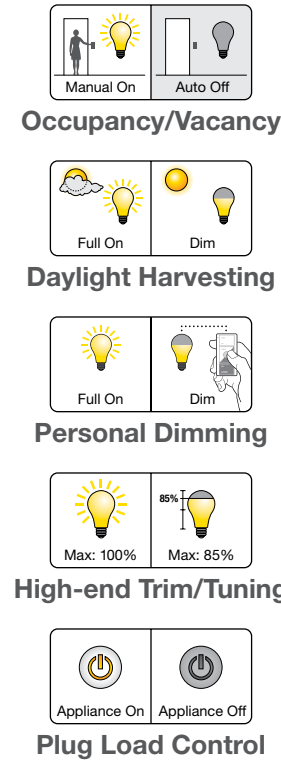Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

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 rezoning, system monitoring, timeclock functionality, and advanced integration.
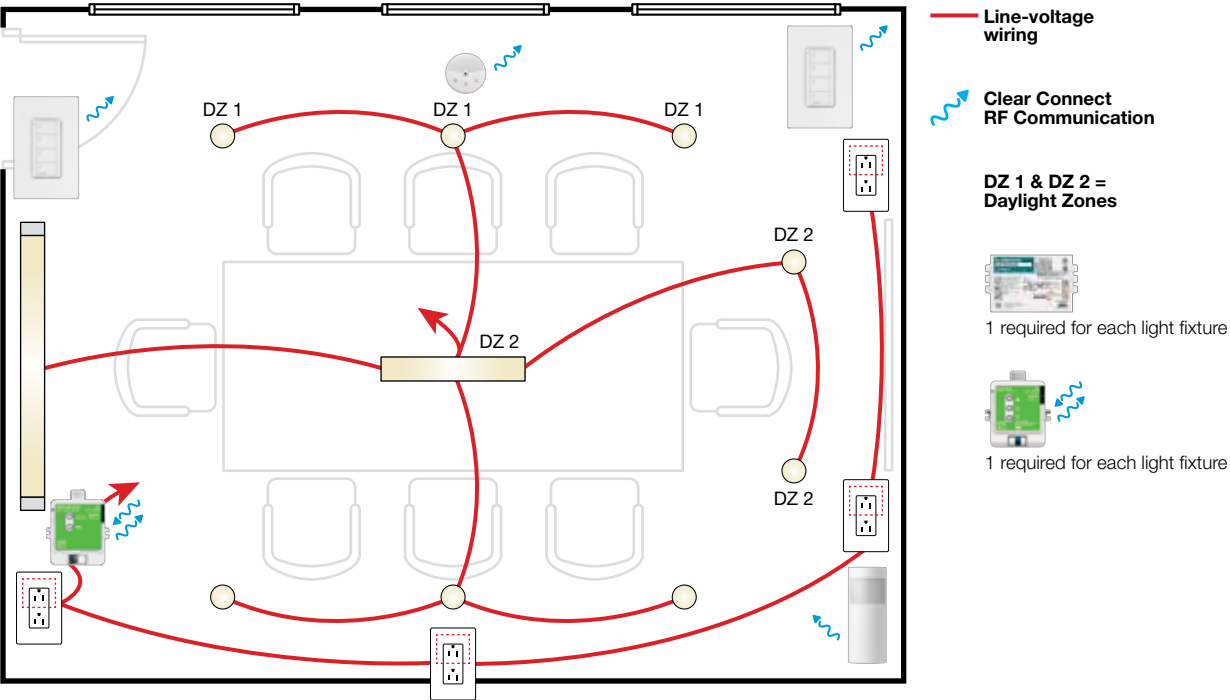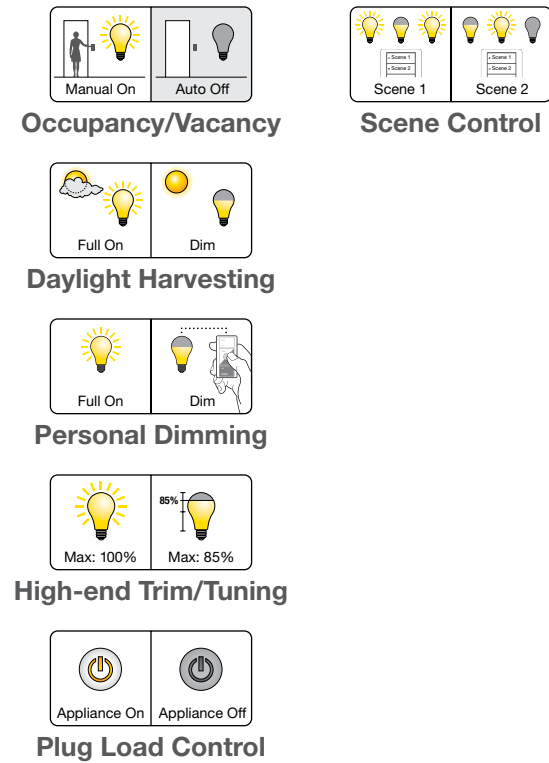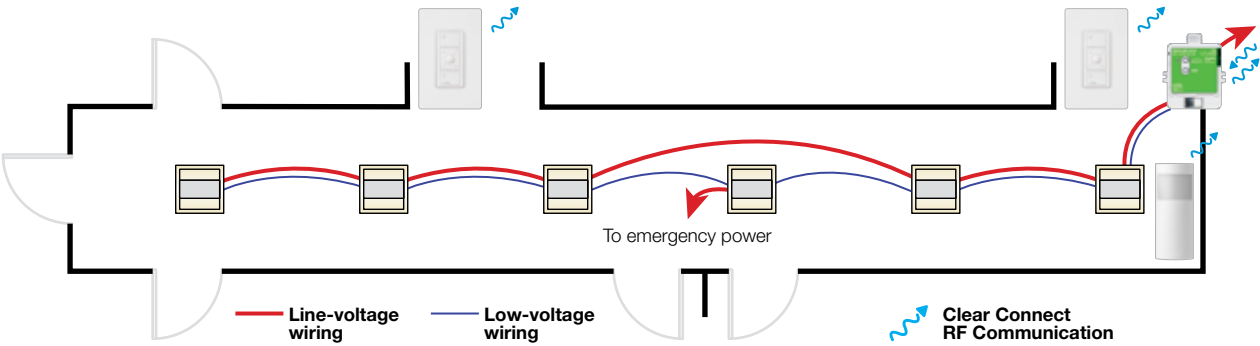
Control Strategies

Occupancy/Vacancy

Scene Control

Daylight Harvesting

Personal Dimming

High-end Trim/Tuning

Plug Load Control

Lighting Energy Savings*

60%

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

Line-voltage wiring (red)
Low-voltage wiring (blue)
Clear Connect RF Communication

To emergency power

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/277V	1	$ 180.00
	LRF2-OHLB-P-WH	Radio Powr Savr wireless hallway occupancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button control with raise/lower	N/A	2	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	2	$ 9.50

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.

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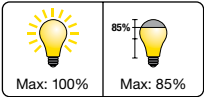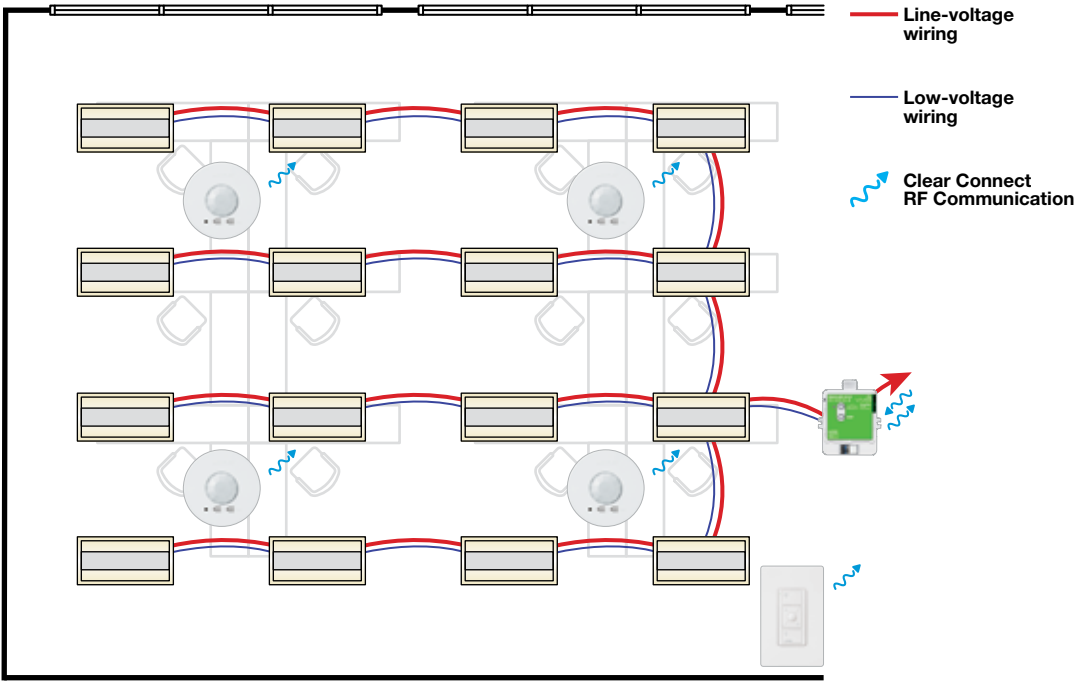
Emergency Mode:
Lighting connected to emergency power turns on to full output.

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

Control Strategies

Auto On | Partial Off

Occupancy/Vacancy

Max: 100% | Max: 85%
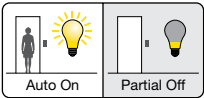
High-end Trim/Tuning

Lighting Energy Savings*

60%

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

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

- Line-voltage wiring
- Low-voltage wiring
- Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/ 277V	1	$ 180.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	N/A	4	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button control with raise/lower	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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
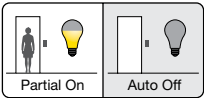occupancy sensor

Control Functionality

Occupant Enters:
All lights automatically turn on to 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
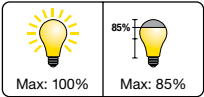to set desired light levels for all lights.

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
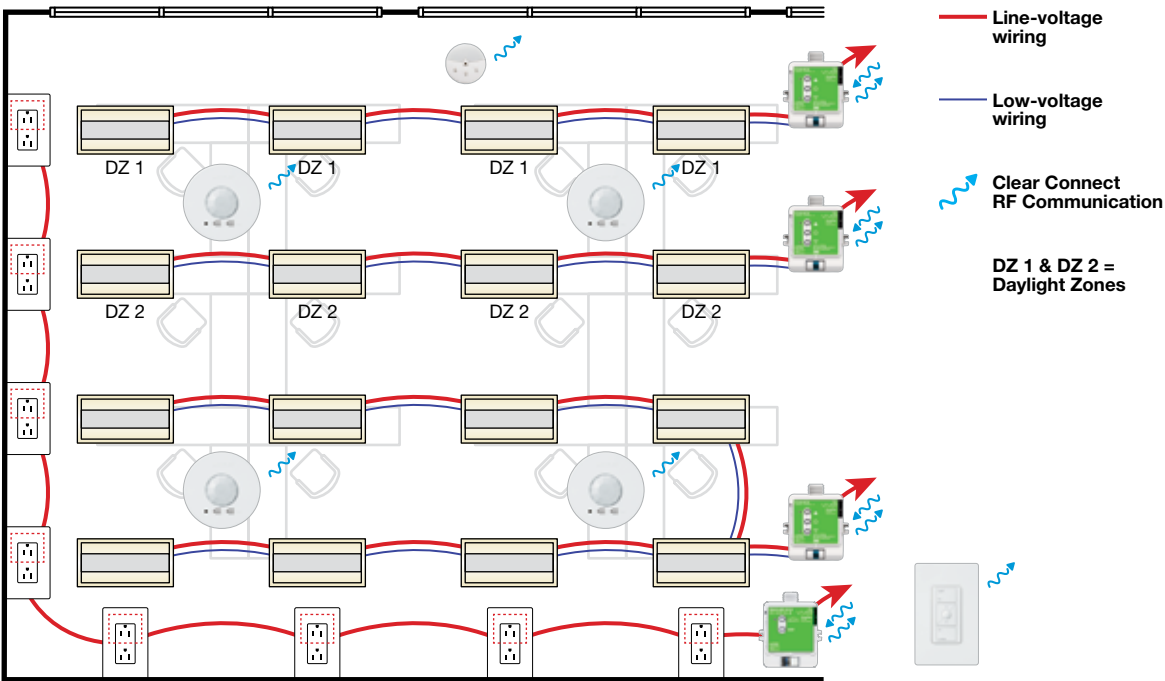
Occupancy/Vacancy

Max: 100% | Max: 85%

High-end Trim/Tuning

Lighting Energy Savings*

45%

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

Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

DZ 1 & DZ 2 = Daylight Zones

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120V/277V	3	$ 180.00
	RMJS-20R-DV-B	20A PowPak relay module	120V/277V	1	$ 170.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	N/A	1	$ 150.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	N/A	4	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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

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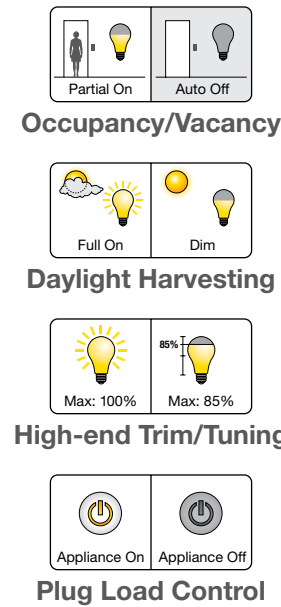
Manual: Occupant uses wall dimmers to set desired light levels for all lights.

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.

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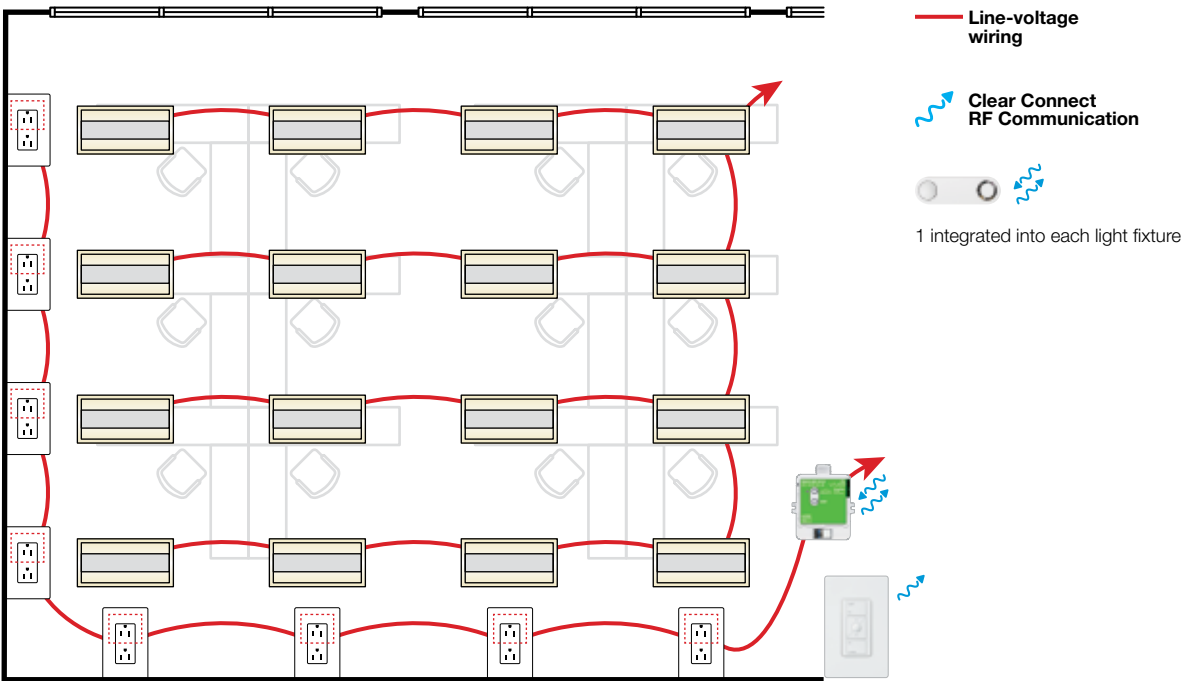
Control Strategies

Partial On | Auto Off
Occupancy/Vacancy

Full On | Dim
Daylight Harvesting

Max: 100% | Max: 85%
High-end Trim/Tuning

Appliance On | Appliance Off
Plug Load Control

Lighting Energy Savings*

55%

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

Line-voltage wiring

Clear Connect RF Communication

1 integrated into each light fixture

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	Integral to fixture[1]	Integral fixture control with sensor	Low Voltage	16	$ 78.00[2]
	RMJS-20R-DV-B	20A PowPak relay module	120 V/ 277 V	1	$ 170.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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.

Clear Connect Wireless

Visible System Components

Pico
wireless control

Integral fixture
control with
sensor

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.

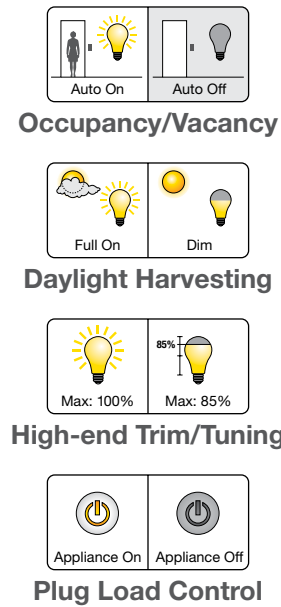Manual: Occupant uses wall dimmer to set desired light levels for all lights.

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.
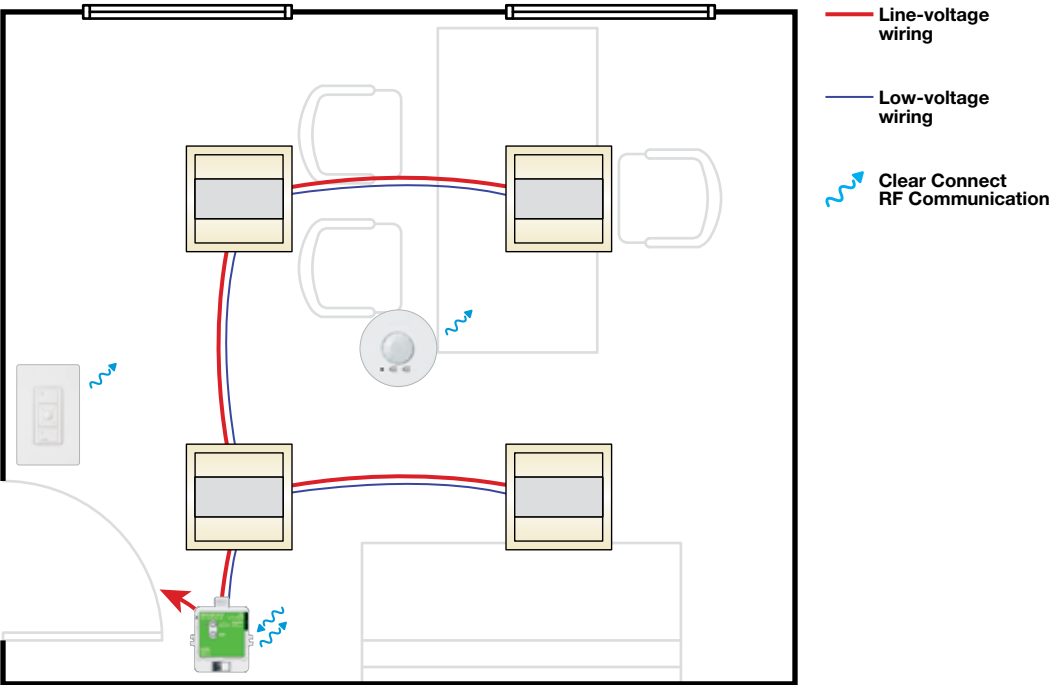
Control Strategies

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

Lighting Energy Savings*

60%

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

- —— Line-voltage wiring
- —— Low-voltage wiring
- ⌇ Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module 0-10V	120V/ 277V	1	$ 180.00
	LRF2-VCR2B-P-WH	Radio Powr Savr wireless ceiling-mount vacancy sensor	N/A	1	$ 105.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button control with raise/lower	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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
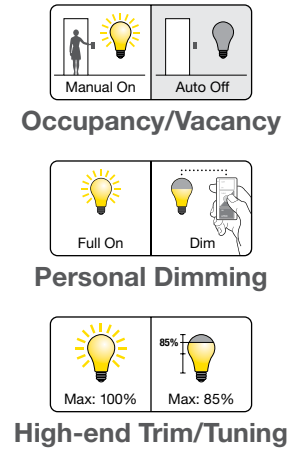vacancy sensor

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.
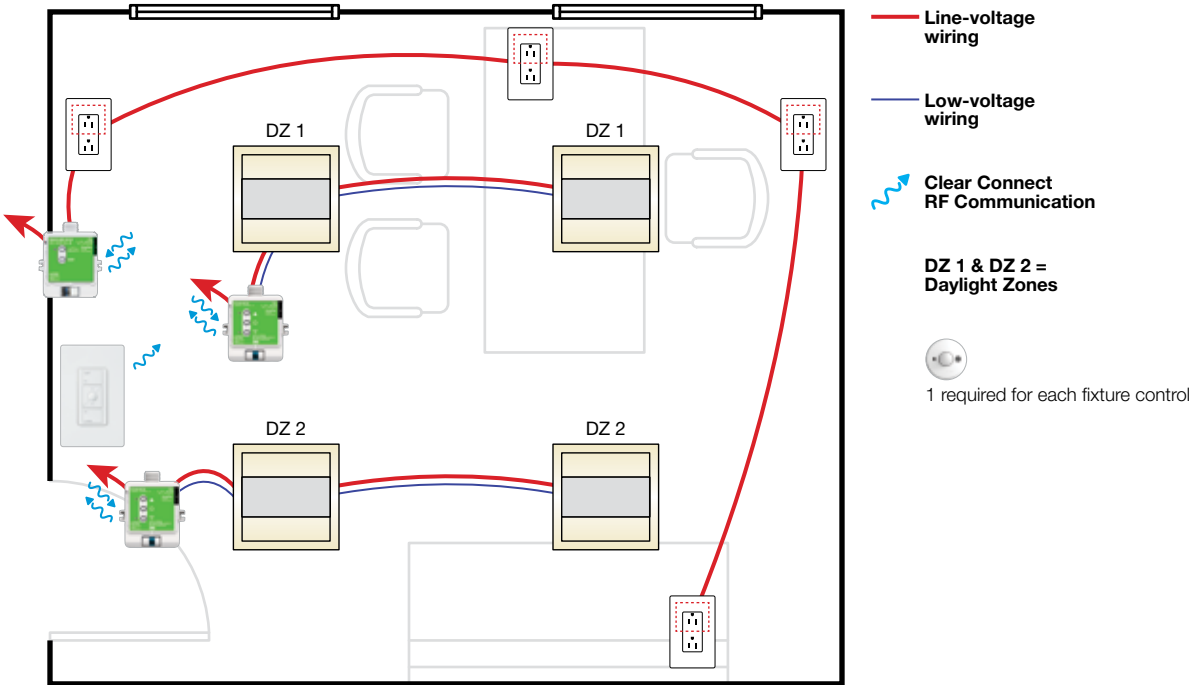
Control Strategies

Manual On	Auto Off

Occupancy/Vacancy

Full On	Dim

Personal Dimming

Max: 100%	Max: 85%

High-end Trim/Tuning

Lighting Energy Savings*

45%

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

Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

DZ 1 & DZ 2 = Daylight Zones

1 required for each fixture control

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	FCJS-010	Wireless fixture control with 0-10V	120 V/ 277 V	2	$ 91.00
	RMJS-20R-DV-B	20A PowPak relay module	120 V/ 277 V	1	$ 170.00
	FC-SENSOR	PowPak fixture sensor	Low Voltage	2	$ 40.50
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	N/A	1	$ 27.00
	PICO-WBX-ADAPT	Pico wallbox adapter	N/A	1	$ 9.50

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.
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

PowPak
fixture 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.

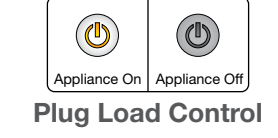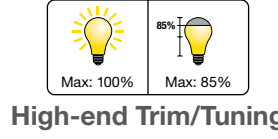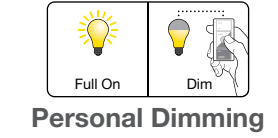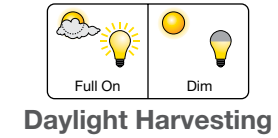Manual: Occupant uses wall dimmer to set desired light levels for all lights.
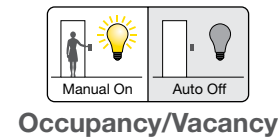
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

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

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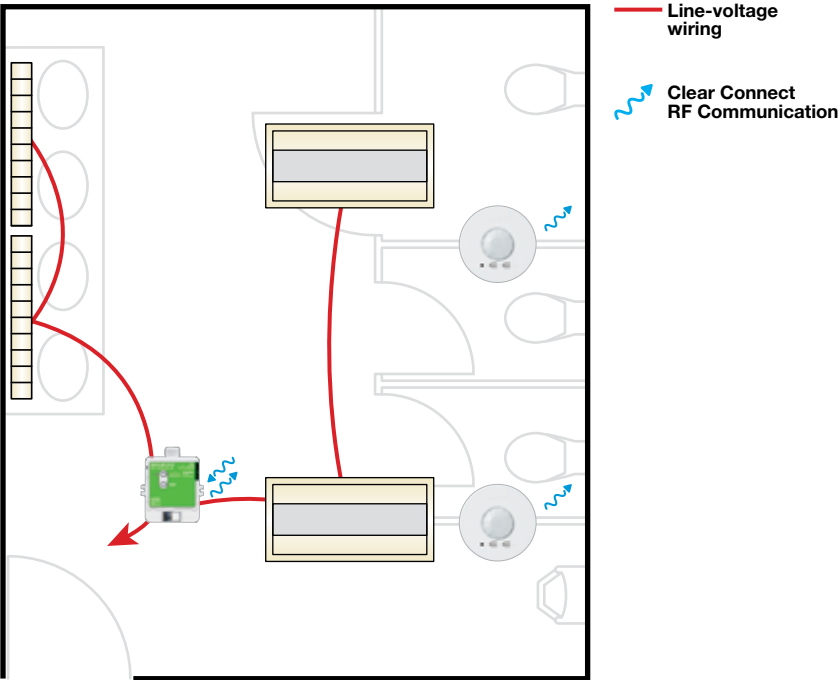
Control Strategies

Manual On | Auto Off
Occupancy/Vacancy

Full On | Dim
Daylight Harvesting

Full On | Dim
Personal Dimming

Max: 100% | Max: 85%
High-end Trim/Tuning

Appliance On | Appliance Off
Plug Load Control

Lighting Energy Savings*

60%

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

Line-voltage wiring

Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	120V/ 277V	1	$ 155.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	N/A	2	$ 105.00

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.

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.
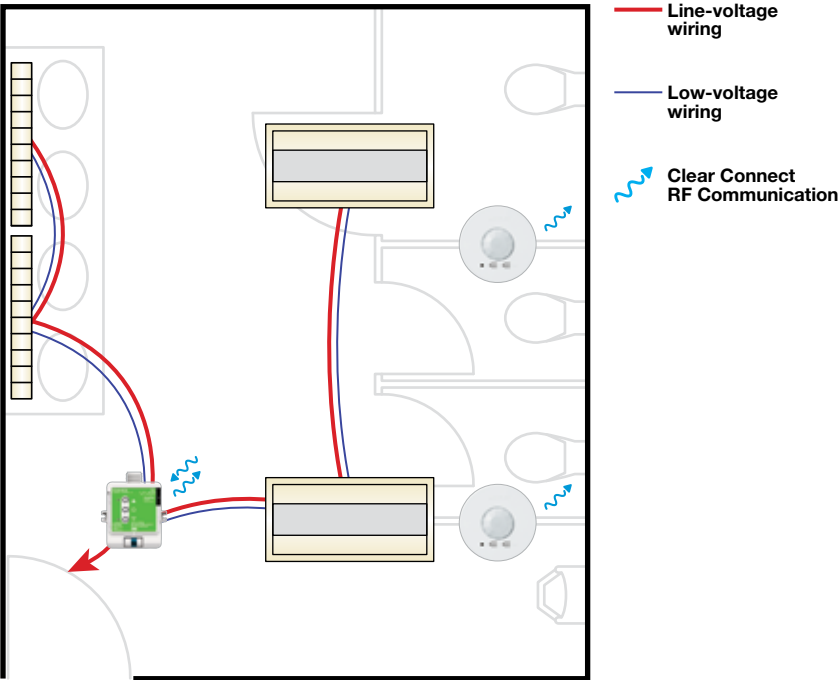
Control Strategies

Auto On   Auto Off
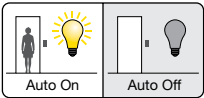
Occupancy/Vacancy

Lighting Energy Savings*

50%

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

- Line-voltage wiring
- Low-voltage wiring
- Clear Connect RF Communication

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	120 V/ 277 V	1	$ 180.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	N/A	2	$ 105.00

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 0-10 V enabled ballasts and drivers by others.

Visible System Components

Radio Powr Savr
wireless ceiling-mount
occupancy sensor
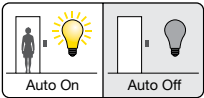
Control Functionality

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

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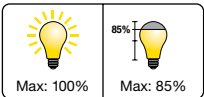All lights automatically turn off 15 minutes after all occupants exit.

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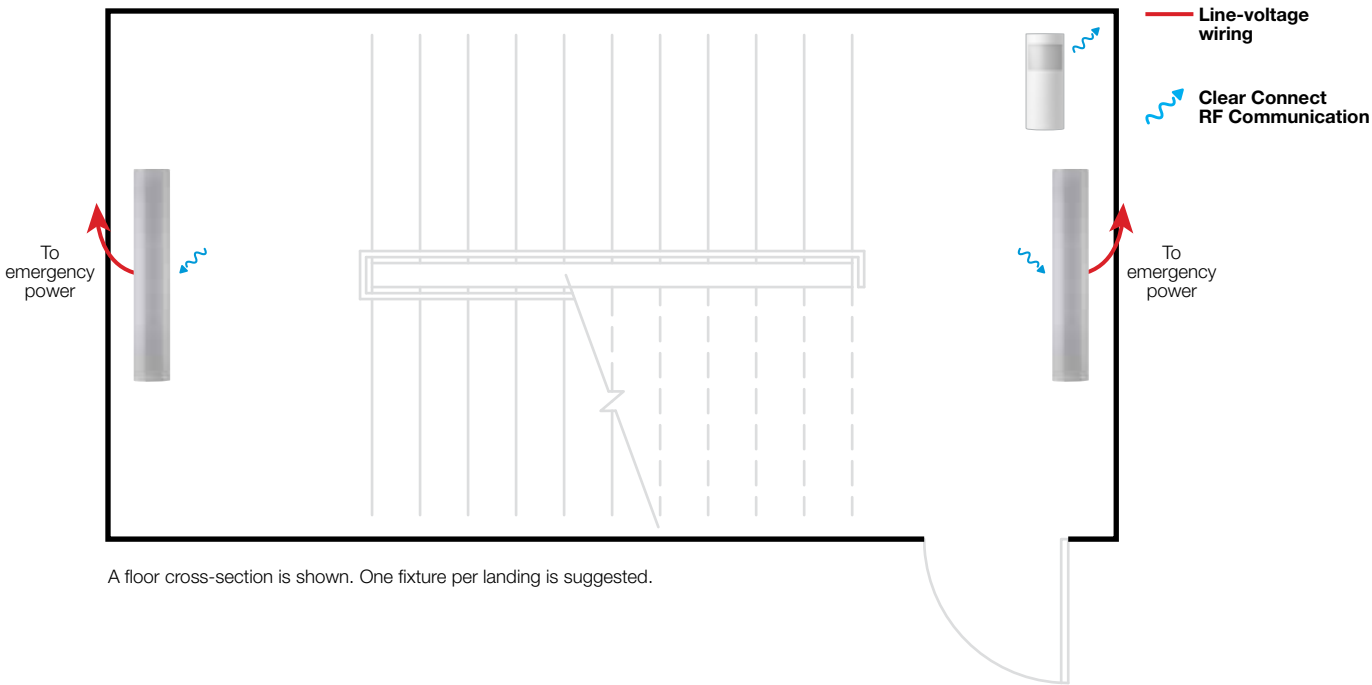
Control Strategies

Auto On	Auto Off

Occupancy/Vacancy

Max: 100%	Max: 85%

High-end Trim/Tuning

Lighting Energy Savings*

60%

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

Line-voltage wiring

Clear Connect RF Communication

To emergency power

To emergency power

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

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	FXSWLX4H	Lutron 4 ft. stairwell LED fixture	120 V/ 277 V	2 (per floor)	$ 720.00
	LRF2-OKLB-P-WH	Radio Powr Savr wireless corner-mount occupancy sensor	N/A	1 (per floor)	$ 105.00

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 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.

Visible System Components

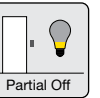Radio Powr Savr wireless corner-mount occupancy sensor

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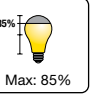Lighting connected to emergency power turns on to full output.

Control Strategies
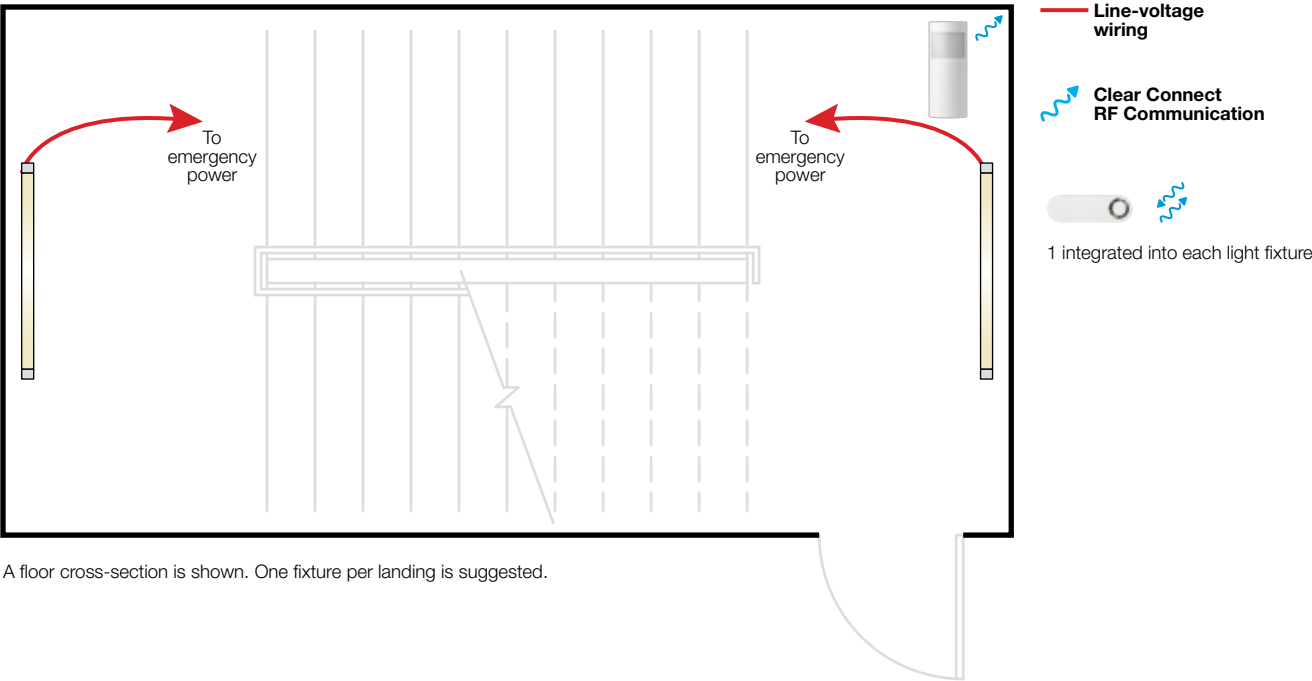

Auto On   Partial Off

Occupancy/Vacancy

Max: 100%   Max: 85%

High-end Trim/Tuning

Lighting Energy Savings*

80%

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

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

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

Line-voltage wiring

Clear Connect RF Communication

1 integrated into each light fixture

Symbol	Model Number	Description	Voltage	Qty	List Price Each
	Integral to fixture[1]	Integral fixture control	Low Voltage	2 (per floor)	$ 67.00[2]
	LRF2-OKLB-P-WH	Radio Powr Savr wireless corner-mount occupancy sensor	N/A	1 (per floor)	$ 105.00

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.

LUTRON Clear Connect Wireless

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.

Visible System Components

Radio Powr Savr wireless corner-mount occupancy sensor

Integral fixture control
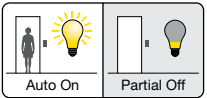
Control Functionality

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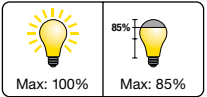
Emergency Mode:
Lighting connected to emergency power turns on to full output.

Control Strategies

Auto On   Partial Off

Occupancy/Vacancy

Max: 100%   Max: 85%

High-end Trim/Tuning

Lighting Energy Savings*

80%

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

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

Notes

Contact Lutron
lutron.com
Lutron Electronics Co., Inc., 7200 Suter Road, Coopersburg, PA 18036-1299

Customer Assistance
Online: lutron.com/help
Email: support@lutron.com
Phone: 1.844.LUTRON1 (588.7661) — includes 24/7 technical support