Vive Solutions Title 24-2019

Commercial Application Guide







Table of Contents

Title 24-2019

Introduction

Solutions Overview
Applications
Atrium Retrofit (Switching)
Break Room Retrofit (Switching)
ClassroomRetrofit (Switching)
Conference RoomRetrofit (Switching)
Egress Corridor Retrofit (Switching)
Open OfficeRetrofit (Switching)

Private Office

Retrofit (Switching) 42
New Construction (Dimming 0-10V) 44
Restroom (Multi-Stall)
Retrofit (Switching)
New Construction (Dimming 0-10 V) 48
Egress Stairwell
New Construction (Fixture Control) 50

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

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

			'		'	•
			Local Solution		Panel Sol	utions
		Wallbox	Vive	Vive with wireless hub*	Energi Savr Node	Quantum
	Occupancy sensing	•			•	•
Strate	Multi-level lighting control					
Strategies for code/standards compliance	Daylight harvesting				•	
code/st	Receptacle control					
andards	Timeclock				**	
compli	Demand response			• †	• †	
ance	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

Title 24-2019

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

	Minimum control type	Description	Code provision
ntrol	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.	130.1 (a)
Local Control	Multi-level or dimming ¹	Lighting shall be capable of multiple control steps in enclosed spaces 100 sq. ft. or larger. Light level requirements are defined in Table 130.1-A. 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.	130.1 (b)
	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: Scheduled control, based on time-of-day and sunrise/sunset (requires astronomical timeclock), turns lighting ON or OFF based on typical occupancy and daylight.	130.1 (c) 1 130.2 (c) 1, 2
ntrol ³	Occupancy sensor	Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less. When manual ON is used, provide a vacancy sensor which does not allow for automatic ON.	130.1 (c)
tic Col	Full ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.	130.1 (c) 1
Automatic Control ³	Partial ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% to 70% of maximum lighting power.	130.1 (c) 5
V	Full OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.	130.1 (c) 5 130.2 (a)
	Partial OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power for interior spaces, 20% to 50% for parking garages. Exterior: Parking lot pulls and wall-mounted luminaires 24 ft. or less in height must be controlled with motion sensors that reduce the lighting power by 50% to 90% or OFF, when the zone is vacant by more than 15 minutes. Automatic full OFF also complies.	130.1 (c) 6 & 7 130.2 (c) 3
her	Daylight responsive control ¹	Interior & Parking Garages: A sensor which adjusts lighting in response to available daylight is required for sidelight and skylight zones (see the "Daylight zone requirements" diagrams). Exterior: A photosensor can be used as an alternate to the dawn/dusk operation of an astronomical timeclock.	130.1 (d) 130.2 (c) 1
Oth	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. Each uncontrolled receptacle must have at least one controlled receptacle within 6 feet. Open offices with receptacles in modular furniture must include one controlled receptacle per workstation. Plug-in devices do not comply.	130.5 (d)
	Demand response	Buildings larger than 10,000 sq. ft. shall have demand responsive lighting controls that reduce lighting power in response to an OpenAPR signal.	130.1 (e) 110.12 (c)

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).

- 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

Title 24-2019

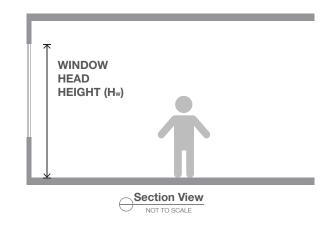
Daylight Zone Requirements:

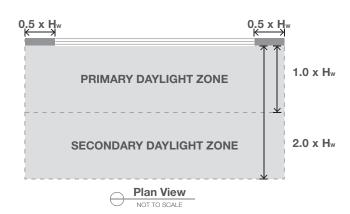
Sidelighted daylight zones must be controlled separately from toplighted zones.

Daylight Exceptions:

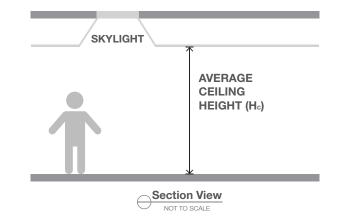
Daylight control is not required when the total lighting power of a daylight zone is 120 W or less (60 W for parking garages), or when the total glazing/opening area is 24 sq. ft. or less (36 sq. ft. for parking garages). Other exceptions exist, based on space type, window area, neighboring obstructions, and glass transmittance.

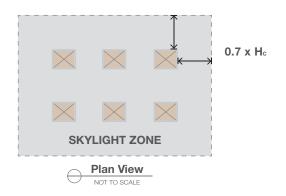
Sidelighting (Window)





Toplighting (Skylight)





Suggested Code Compliant Solutions

Title 24-2019

Suggested Code Compliant Solutions

Title 24-2019

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 alternate solutions for advanced functionality.

		Atrium	Break Room	Classroom, Lecture Hall, Training Room	Conference, Multi-purpose Room	Egress Corridor ⁴	Lobby
ontrol	Switching	\$	\$	\$	\$	\$	\$
Local Control	Multi-level or dimming	•	•	•	•	•	•
	Timeclock	*					
81_	Occupancy sensor			*	*	\overline{\overline{\phi}}	\$
Automatic Control ²	Full ON					*	*
utomatic	Partial ON	\overline{\overline{\psi}}		\overline{\overline{\phi}}			
A	Full OFF	\overline{\overline{\psi}}	\overline{\overline{\phi}}	*	*		*
	Partial OFF					Ø	
	Daylight responsive control	•	•	•	•	•	•
Other	Receptacle control		•		•		•
	Demand response	•		•	•	•	

¹ Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

Diagram key:

New construction

= Lighting retrofit¹

= New construction and retrofit¹

Open Office (>250 sq. ft.)	Private Office (<250 sq. ft)	Restroom ⁵	Egress Stairwell ^{4,5}	Storage Room	Facade/ Landscape	Parking Garage ⁵ (Not Roof)	Other Exterior ³
*	\$	*	\$	\$		\$	
				•		•	
					*		*
\$	*	\overline{\overline{\phi}}	Ø	\overline{\overline{\phi}}		\overline{\overline{\phi}}	*
\$		Ø	Ø	Ø	\$	Ø	*
\$	\$	Ø		Ø	\$		*
			Ø			Ø	*
•		•	•	•	•	•	•
•	•						
•	•	•		•	•	•	•

² Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.

³ Astronomical timeclock shall ensure the lights are off during daylight hours. Occupancy sensor shall provide Full ON and Partial OFF control. Occupancy sensing not required for lighting mounted higher than 24 feet.

⁴ Up to 0.2 W may be continuously illuminated for means of egress illumination.

⁵ Local control may be not accessible to unauthorized personnel.

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.

Understand how the products are laid out in the space



 $8 \,$

Vive Local Solutions Layout

Title 24-2019

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 receptacle

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.



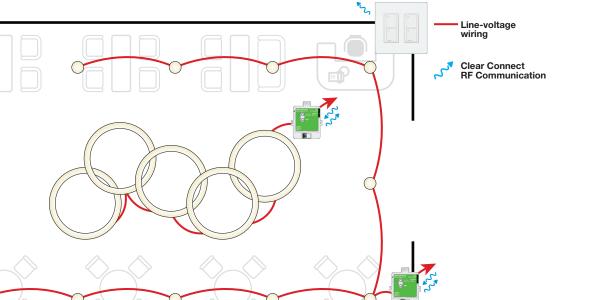
Atrium | Retrofit

Title 24-2019

Visible System Components







Symbol	Model Number	Description	Qty	List Price Each
A CONTRACTOR OF THE PARTY OF TH	RMJS-16R-DV-B	PowPak switching module	2	\$ 131.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	\$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.



Pico wireless control

Control Functionality

When Occupied:

Manual: Occupant uses wall switch to turn all lights off.

Timeclock:

Timeclock turns perimeter lights on during normally occupied hours.

Timeclock turns lights off during normally unoccupied hours.

Control Strategies



Scheduling

Code Notes: Requirements specified for atriums 20-40 ft. in height.

Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

Go to lutron.com/vive for complete compatibility and design details.

Code Notes: Requirements specified for atriums 20-40 ft. in height. Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

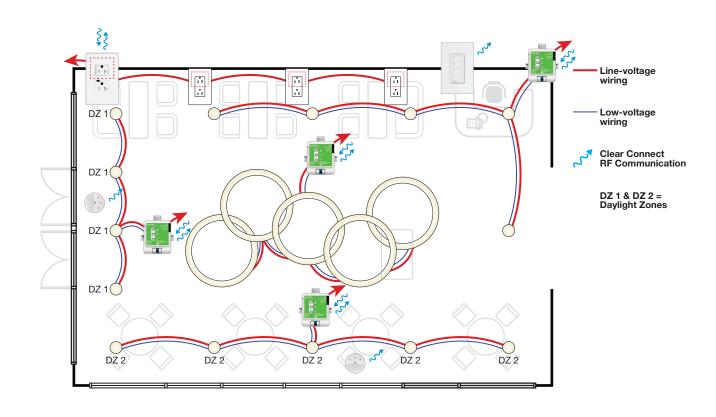
Lighting Energy Savings*

10%

^{*} Go to lutron.com/references for more information.

Atrium | New Construction

Title 24-2019



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	4	\$ 152.00
1 h	CAR2S-20-STR-WH	Vive wireless receptacle	1	\$ 193.00
.:,	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	2	\$ 125.00
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	1	\$ 39.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

Visible System Components







Pico wireless 4-button scene control

Vive wireless receptacle

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.

Timeclock:

Timeclock turns all controlled receptacles on and lights on to 50% light level during normally occupied hours. Maximum light level is set to 80%.

Timeclock turns lights and controlled receptacles off during normally unoccupied hours.

System Events:

Demand Response: All lights automatically dim 20% during demand events.

Control Strategies





Scene Control



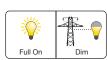
High-end Trim/Tuning



Scheduling



Plug Load Control



Demand Response

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

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.

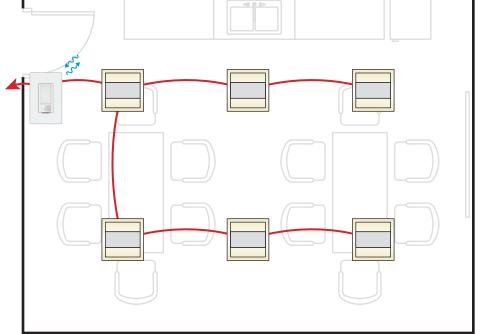
14

Code Notes: Requirements specified for 20-40 ft. atriums.

Break Room | Retrofit

Title 24-2019

Line-voltage wiring



Symbol	Model Number	Description	Qty	List Price Each
	MRF2S-8SSV-WH	Maestro Wireless sensor switch	1	\$ 160.00

Visible System Components



Maestro vacancy sensing switch

Control Functionality

Occupant Enters:

Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually.

When Occupied:

Manual: Occupant uses wall switch to turn all lights off.

Occupant Exits:

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

Control Strategies



Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

Lighting Energy Savings*

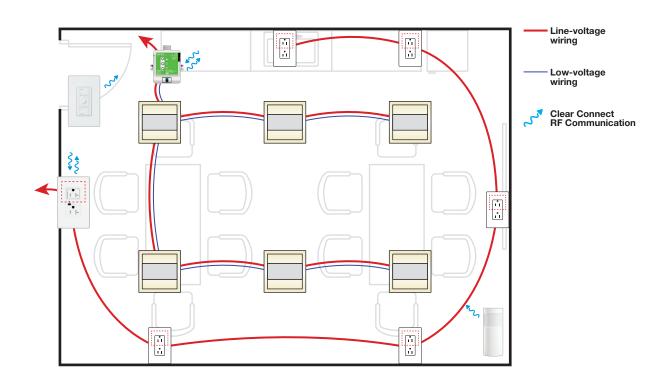


^{*} Go to lutron.com/references for more information.

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

Break Room | New Construction

Title 24-2019



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	1	\$ 152.00
1 h	CAR2S-20-STR-WH	Vive wireless receptacle	1	\$ 193.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 89.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

Visible System Components



wireless control

Pico



Vive wireless

receptacle





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.

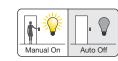
System Events:

Demand Response: All lights automatically dim 20% during demand events.

module per zone and a daylight sensor.

Code Notes: For break rooms with daylight, include a 0-10V dimming

Control Strategies



Occupancy/Vacancy



Personal Dimming



High-end Trim/Tuning



Plug Load Control



Demand Response

Lighting Energy Savings*

19

Code Notes: For break rooms with daylight, include a 0-10V dimming module per zone and a daylight sensor. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

^{*} Go to lutron.com/references for more information.

Classroom | Retrofit

Title 24-2019

Line-voltage **Clear Connect**

Symbol	Model Number	Description		List Price Each
	RMJS-16R-DV-B	PowPak switching module	2	\$ 131.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 89.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	\$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00

Visible System Components





Radio Powr Savr wireless corner-mount

vacancy sensor





Control Functionality

Occupant Enters:

Pico wireless control

Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually.

When Occupied:

Manual: Occupant uses wall switches to turn on and off 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

Control Strategies



functionality, and advanced integration.

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and

use less than 80% of the maximum allowed lighting power. Or one-for-one

luminaire replacements for buildings or tenant spaces less than 5,000 ft²

when new lighting power is 40% lower than previous lighting power.

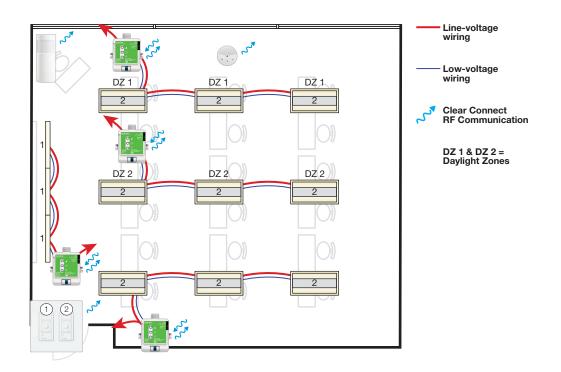
Lighting Energy Savings*

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft2 when new lighting power is 40% lower than previous lighting power.

^{*} Go to lutron.com/references for more information.

Classroom | New Construction

Title 24-2019



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	4	\$ 152.00
.:.	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 125.00
	LRF2-OKLB-P-WH	Radio Powr Savr wireless corner-mount occupancy sensor	1	\$ 89.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

Visible System Components





Pico wireless control

Radio Powr Savr wireless corner-mount occupancy sensor and daylight 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 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.

System Events:

Demand Response: All lights automatically dim 20% during demand events.







Control Strategies



Occupancy/Vacancy



Daylight Harvesting



Personal Dimming



High-end Trim/Tuning



Demand Response

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

Code Notes: For non-daylit classrooms, all general lighting can be connected to a single 0-10V dimming module. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Classroom | Recommended

Title 24-2019

Line-voltage **Clear Connect** 0 0 % 1 integrated into each light fixture

Symbol	Model Number	Description	Qty	List Price Each
O O	Integral to fixture ¹	Integral fixture control with sensor	12	\$ 70.002
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	1	\$ 39.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	3	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

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.





Visible System Components





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.

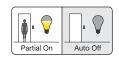
Occupant Exits:

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

System Events:

Demand Response: All lights automatically dim 20% during demand events.

Control Strategies



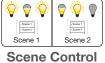
Occupancy/Vacancy



Demand Response



Daylight Harvesting



Full On

Personal Dimming



High-end Trim/Tuning

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

This solution requires digitally enabled ballasts and drivers by others.

Model Number

RMJS-16R-DV-B

LRF2-VKLB-P-WH

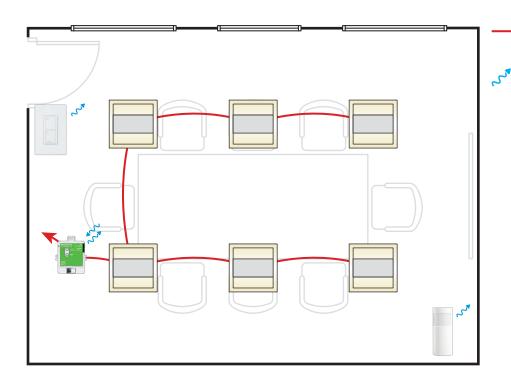
PJ2-2B-GWH-L01

PICO-WBX-ADAPT

Symbol

Conference Room | Retrofit

Title 24-2019



Visible System Components



wireless control

Pico





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.

When Occupied:

Manual: Occupant uses wall switch to turn all lights off.

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



Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

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

Description

Radio Powr Savr wireless corner-mount

PowPak switching module

Pico wireless 2-button control

vacancy sensor

Pico wallbox adapter

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

Lighting Energy Savings*

40%

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

27

26

List Price Each

\$ 131.00

\$89.00

\$ 25.00

\$ 8.00

Line-voltage

Clear Connect

Qty

1

Conference Room | New Construction

Title 24-2019

DZ 1 DZ 1 DZ 2 DZ 2 DZ 2 DZ 2 DZ 2



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	2	\$ 152.00
† <u>+</u>	CAR2S-20-STR-WH	Vive wireless receptacle	1	\$ 193.00
.:-	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 125.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 89.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

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



wireless control

Pico



receptacle



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.

System Events:

Demand Response: All lights automatically dim 20% during demand events.

Code Notes: For non-daylit conference rooms, all general lighting can be connected to a single 0-10V dimming module.

Control Strategies





Daylight Harvesting



Personal Dimming



High-end Trim/Tuning



Plug Load Control

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

Model Number

Multiple

FCJS-ECO

CAR2S-20-STR-WH

LRF2-DCRB-WH

LRF2-VKLB-P-WH

PJ2-4B-GWH-L31

PICO-WBX-ADAPT

HJS-1-FM

Symbol

Conference Room | Recommended

Title 24-2019

DZ 1 DZ 1 DZ 2 DZ 2 DZ 2

Description

EcoSystem-enabled Hi-Lume Soft-on,

Wireless fixture control with EcoSystem

Radio Powr Savr wireless daylight sensor

Radio Powr Savr wireless corner-mount

Pico wireless 4-button scene control

Fade-to-Black series ballasts/drivers

Vive wireless receptacle

vacancy sensor

Pico wallbox adapter

Vive wireless hub

Line-voltage

Clear Connect

DZ 1 & DZ 2 = **Daylight Zones**

1 required for each light fixture

1 required for each light fixture

Qty

10

10

2

Shared

List Price Each

Consult your local rep

for in-fixture pricing.

\$ 79.00

\$ 193.00

\$ 125.00

\$89.00

\$ 39.00

\$ 8.00

Consult your local rep

for hub pricing and

Visible System Components







Vive wireless receptacle



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 is one perimeter daylight zone.

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:

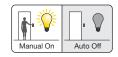
All lights automatically turn off 15 minutes after all occupants exit.

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

System Events:

Demand Response: All lights automatically dim 20% during demand events.

Control Strategies



Occupancy/Vacancy





Daylight Harvesting





Personal Dimming



High-end Trim/Tuning



Plug Load Control

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information

Go to lutron.com/ballasttool or lutron.com/findafixture to identify the correct ballast or LED fixture for your project.

Model Number

RMJS-16R-DV-B

LRF2-OHLB-P-WH

PJ2-2B-GWH-L01

PICO-WBX-ADAPT

Symbol

Egress Corridor | Retrofit

Title 24-2019

Visible System Components







Radio Powr Savr wireless hallway occupancy sensor



Control Functionality

Occupant Enters:

All lights automatically turn on to maximum light level.

When Occupied:

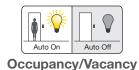
Manual: Occupant uses wall switch to turn all non-emergency lights off.

Occupant Exits:

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

Add a Vive wireless hub to enable simple setup

Control Strategies



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

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-forone luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power. Up to 0.2 W may be continuously illuminated for means of egress illumination. Local control may be not accessible to unauthorized personnel.

Lighting Energy Savings*

* Go to lutron.com/references for more information

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power. Up to 0.2 W may be continuously illuminated for means of egress illumination. Local control may be not accessible to unauthorized personnel.

To emergency power

Description

PowPak switching module

occupancy sensor

Pico wallbox adapter

Radio Powr Savr wireless hallway

Pico wireless 2-button control

Clear Connect RF Communication

Qty

2

2

List Price Each

\$ 131.00

\$89.00

\$ 25.00

\$ 8.00

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

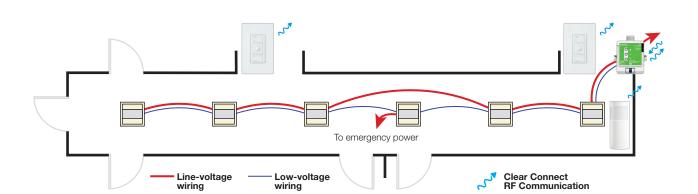
Egress Corridor | New Construction

Title 24-2019

Visible System Components







Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	1	\$ 152.00
	LRF2-OHLB-P-WH	Radio Powr Savr wireless hallway occupancy sensor	1	\$ 89.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.







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.

System Events:

Demand Response: All lights automatically dim 20% during demand response event. Demand response cannot shut off the lights.

Control Strategies



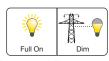
Occupancy/Vacancy



Personal Dimming



High-end Trim/Tuning



Demand Response

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. Up to 0.2 W may be continuously illuminated for means of egress illumination Local control may be not accessible to unauthorized personnel.

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

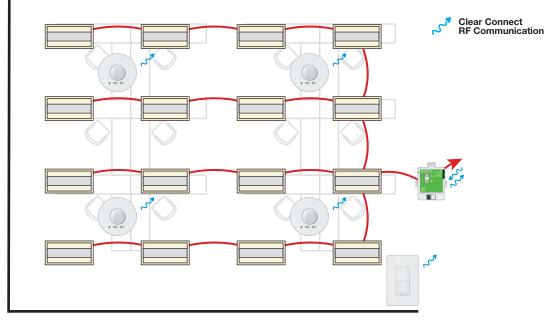
35

Code Notes: For non-egress corridors, set the minimum light level to full off. Up to 0.2 W may be continuously illuminated for means of egress illumination. Local control may be not accessible to unauthorized personnel.

Open Office | Retrofit

Title 24-2019

Line-voltage **Clear Connect**



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	\$ 131.00
.==	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	4	\$ 89.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	\$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00

Visible System Components







Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Strategies



Occupancy/Vacancy

Control Functionality

Occupant Enters:

All lights automatically turn on to maximum light level.

When Occupied:

Manual: Occupant uses wall switch to turn all lights off.

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.

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

Lighting Energy Savings*

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

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Open Office | New Construction

Title 24-2019

Line-voltage wirina Low-voltage Clear Connect DZ 1 & DZ 2 = **Daylight Zones**

Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	3	\$ 152.00
1 h	CAR2S-20-STR-WH	Vive wireless receptacle	1	\$ 193.00
$\overline{\cdot \cdot \cdot \cdot}$	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 125.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	4	\$ 89.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

Code Notes: For non-daylit open offices, all general lighting can be connected to a single 0-10V dimming module. 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

Vive wireless receptacle

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

Control Functionality

Occupant Enters:

All lights automatically turn on to maximum light level. 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.

System Events:

Demand Response: All lights automatically dim 20% during demand response event.

Code Notes: For non-daylit open offices, all general lighting can be connected to a single 0-10V dimming module.

Control Strategies



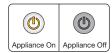
Occupancy/Vacancy



Daylight Harvesting



High-end Trim/Tuning



Plug Load Control



Demand Response

Lighting Energy Savings*

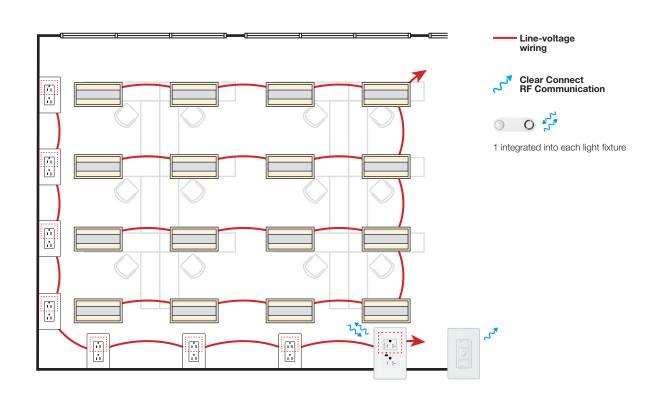


^{*} Go to lutron.com/references for more information.

Title 24-2019

Open Office | Recommended

Title 24-2019



Symbol	Model Number	Description	Qty	List Price Each
O O	Integral to fixture ¹	Integral fixture control with sensor	16	\$ 70.00 ²
1 h	CAR2S-20-STR-WH	Vive wireless receptacle	1	\$ 193.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

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.



Visible System Components







Pico Vive wireless wireless control receptacle

Integral fixture control with sensor





Control Functionality

Occupant Enters:

Each individual light automatically turns on to 50% light level as occupant approaches fixture proximity.

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. Maximum light level is set to 80%.

Occupant Exits:

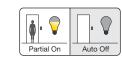
Each individual light automatically turns off 15 minutes after all occupants exit fixture proximity.

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

System Events:

Demand Response: All lights automatically dim 20% during demand events.

Control Strategies



Occupancy/Vacancy



Daylight Harvesting



High-end Trim/Tuning



Plug Load Control



Demand Response

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

41

This solution requires digitally enabled ballasts and drivers by others.

² Fixture adder for the control module may vary.

Private Office | Retrofit

Title 24-2019

Line-voltage wiring Clear Connect RF Communication

Symbol	Model Number	Description	Qty	List Price Each
G and the second	RMJS-16R-DV-B	PowPak dimming module	1	\$ 131.00
	LRF2-VCR2B-P-WH	Radio Powr Savr wireless ceiling-mount vacancy sensor	1	\$ 89.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	\$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00

Visible System Components







Radio Powr Savr wireless ceiling-mount vacancy sensor

Control Strategies



Control Functionality

Occupant Enters:

Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually.

When Occupied:

Manual: Occupant uses wall switch to turn all lights off.

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.

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and

use less than 80% of the maximum allowed lighting power. Or one-for-one

luminaire replacements for buildings or tenant spaces less than 5,000 ft²

when new lighting power is 40% lower than previous lighting power.

Lighting Energy Savings*



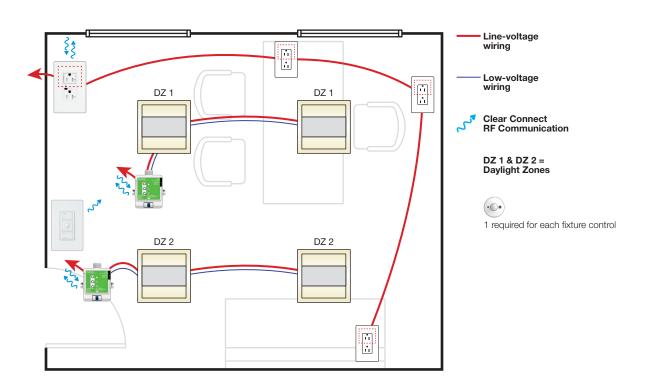
^{*} Go to lutron.com/references for more information.

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power.

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

Private Office | New Construction

Title 24-2019



Symbol	Model Number	Description	Qty	List Price Each
	FCJS-010	Wireless fixture control with 0-10V	2	\$ 79.00
7 F	CAR2S-20-STR-WH	Vive wireless receptacle	1	\$ 193.00
•••	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
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

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





Vive wireless wireless control receptacle

Control Functionality

power when occupant enters.

PowPak fixture sensor

Control Strategies





Controlled receptacles automatically regain

When Occupied:

Occupant Enters:

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

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%.

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.

System Events:

Demand Response: All lights automatically dim 20% during demand events.





Dim **Daylight Harvesting**



Personal Dimming



High-end Trim/Tuning



Plug Load Control

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information

Model Number

RMJS-16R-DV-B

LRF2-OCR2B-P-WH

PJ2-2B-GWH-L01

PICO-WBX-ADAPT

Symbol

Multi-Stall Restroom | Retrofit

Title 24-2019

Visible System Components







List Price Each

\$ 131.00

\$89.00

\$ 25.00

\$ 8.00

Qty

2

1



Pico wireless control

Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Functionality

Occupant Enters:

All lights automatically turn on to maximum light level.

When Occupied:

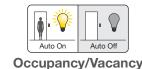
Manual: Occupant uses wall switch to turn all lights off.

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



Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than

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

5,000 ft² when new lighting power is 40% lower than previous lighting power. Local control may be not accessible to unauthorized personnel.

Line-voltage

Clear Connect

Description

Radio Powr Savr wireless ceiling-mount

PowPak switching module

Pico wireless 2-button control

occupancy sensor

Pico wallbox adapter

Code Notes: Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaries in the space, and use less than 80% of the maximum allowed lighting power. Or one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 ft² when new lighting power is 40% lower than previous lighting power. Local control may be not accessible to unauthorized personnel.

Lighting Energy Savings*



* Go to lutron.com/references for more information

Multi-Stall Restroom | New Construction

Title 24-2019

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

Symbol	Model Number	Description	Qty	List Price Each
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	2	\$ 89.00
To the second	PJ2-2B-GWH-L01	Pico wireless 2-button	1	\$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

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%.

When Occupied:

Manual: Occupant uses wall switch to turn all lights off.

Occupant Exits:

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

System Events:

Demand Response: All lights automatically dim 20% during demand events.

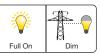
Control Strategies



Occupancy/Vacancy



High-end Trim/Tuning



Demand Response

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information.

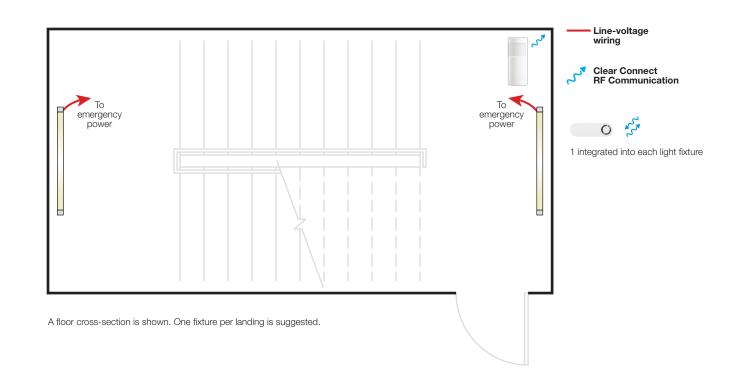
49

Code Notes: Add a daylight sensor for restrooms with daylight zones. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others. Local control may be not accessible to unauthorized personnel.

Code Notes: Add a daylight sensor for restrooms with daylight zones. Local control may be not accessible to unauthorized personnel.

Egress Stairwell | New Construction

Title 24-2019



Symbol	Model Number	Description	Qty	List Price Each
0	Integral to fixture ¹	Integral fixture control	2 (per floor)	\$ 60.002
	LRF2-OKLB-P-WH	Radio Powr Savr wireless corner-mount occupancy sensor	1 (per floor)	\$ 89.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options.

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





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.

System Events:

Demand Response: All lights automatically dim 20% during demand response event. Demand response cannot shut off the lights.

Control Strategies



Occupancy/Vacancy



High-end Trim/Tuning



Demand Response

Lighting Energy Savings*



^{*} Go to lutron.com/references for more information

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 stainwells with daylight zones. This solution requires digitally enabled ballasts and drivers by others. Go to lutron.com/vive for the latest compatibility details. Up to 0.2 W may be continuously illuminated for means of egress illumination. Local control may be not accessible to unauthorized personnel.

Code Notes: For non-egress stairwells, set the minimum light level to full off. Up to 0.2 W may be continuously illuminated for means of egress illumination. Local control may be not accessible to unauthorized personnel.



The Lutron logo, Lutron, Clear Connect, EcoSystem, Energi Savr Node, Hi-Lume, Maestro, Pico, PowPak, Quantum, Radio Powr Savr, and Vive are trademarks or registered trademarks of Lutron Electronics Co., Inc.

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

© 5/2019 Lutron Electronics Co., Inc. P/N 367-2626 REV E



















