

# ASHRAE 90.1 2022 Design Guide

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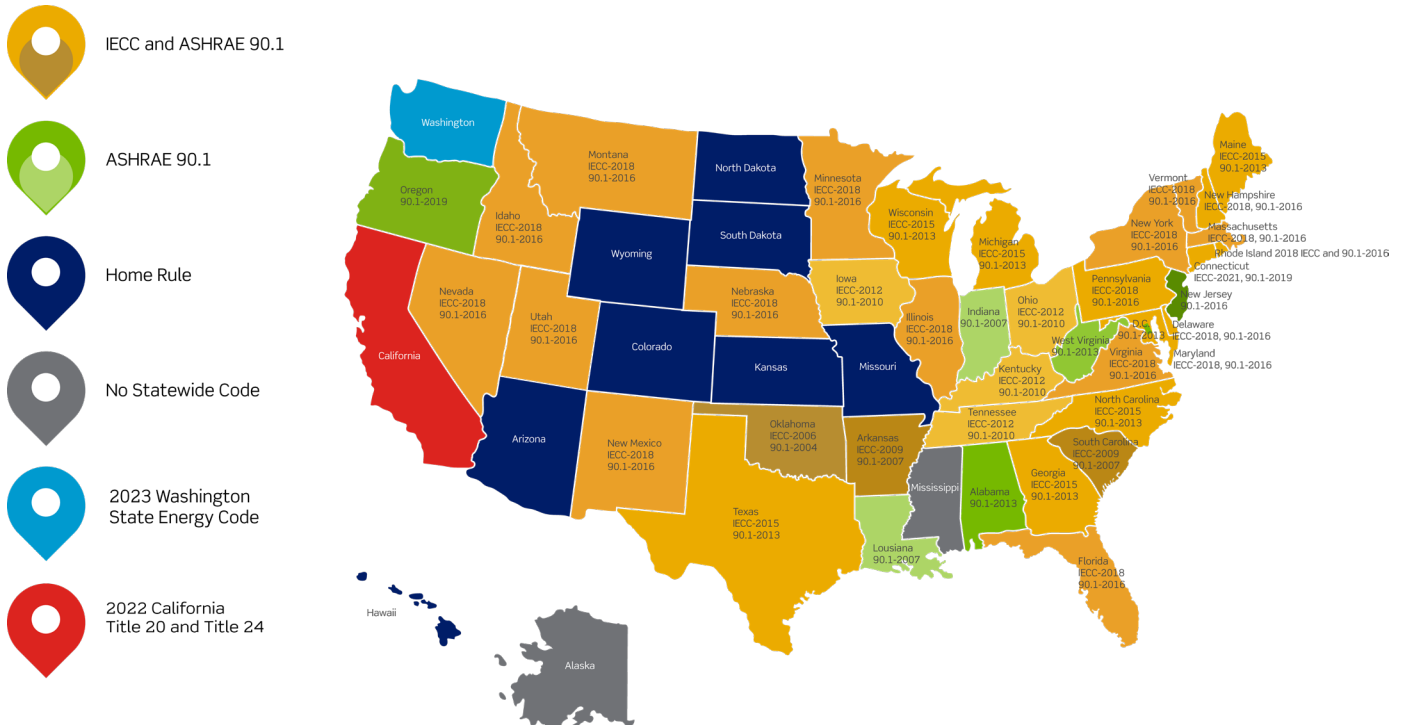
# ASHRAE 90.1 2022 Design Guide

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## Energy Standards By State

Commercial State Energy Code Status as of June 5, 2023

Note: For Canadian code compliance, refer to your provincial code



Source: <https://www.energycodes.gov/status/commercial>

### Disclaimer:

This document is for informational purposes only. Each project will have its own specific requirements for satisfying ASHRAE 90.1 standard compliance based on a variety of factors. Other exceptions or details may apply. Review the standard for specific requirements and/or consult with a professional advisor. Leviton Mfg. Co., Inc. is not responsible for any loss resulting from the use of any information found in this document.

**Solutions are subject to change without notice. For additional assistance, contact your local Leviton representative.**



# ASHRAE 90.1 2022 Requirements

ASHRAE 90.1 2022 has three different paths for compliance: Simplified Building Method, Prescriptive Compliance Path, and Building Area Method. Each path has its own requirements for compliance based around the calculation of available with square feet of lighting allowance. See the ASHRAE 90.1 2022 Mandatory Provisions Supplemental on page 38 for more details.

- **9.3.1 Simplified Building Method** - contains the requirements for interior lighting in Section 9.3.1 and exterior lighting in Section 9.3.2
  - Allowed to be used when 80% of the floor area supports either:
    - Office Buildings
    - Retail Buildings
    - School Buildings
  - Control requirements for the following applications outlined in tables:
    - 9.3.1-1 - Office Buildings
    - 9.3.1-2 - Retail Buildings
    - 9.3.1-3 - School Buildings
    - 9.3.2 - Exterior controls
  - Used for new buildings and tenant improvements of less than 25,000 sq.ft.
- **9.5 Prescriptive Compliance Path** - Interior lighting power shall comply with either Section 9.5.1 or 9.5.2. Lighting control requirements shall comply with Section 9.4.1 and Tables 9.5.2.1-1 and 9.5.2.1-2
  - **9.5.1 Building Area Method**
    - Use table 9.5.1 to determine space type (used to determine lighting power density)
    - Apply Control Requirements of table 9.5.2.1-1 (Common Space Types) and 9.5.2.1-2 (Building Specific Space Types).
  - **9.5.1 Space by Space Method**
    - Use tables 9.5.2.1-1 and 9.5.2.1-2 to determine space type (used to determine lighting power density)
    - Apply Control Requirements of table 9.5.2.1-1 (Common Space Types) and 9.5.2.1-2 (Building Specific Space Types).
  - **9.5.1 Building Area Method** - Interior power allowance
    - Determine the appropriate building area type from Table 9.5.1 and the corresponding LPD allowance. For building area types not listed, selection of a reasonably equivalent type shall be permitted.
    - Determine the gross lighted floor area in sq. ft. of the building area type
    - Multiply the gross lighted floor areas of the building area types times the LPD





# ASHRAE 90.1 2022 Requirements Summary

Note that updates for ASHRAE 90.1 2022 are highlighted

Control Type	Summary	Quick Take
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**8.4.2**  
Automatic Receptacle Control

The following shall be automatically controlled: at least 50% of all private offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, classrooms, and individual work stations.

This control shall function on:

- Time of day
  - Independent schedule for each portion of the building
    - Not more than 5000 sq ft and not more than 1 floor
    - Manual override of not more than 2 hours
- Occupancy sensor after 20 minutes
- Signal from another control or alarm system after 20 minutes

All receptacles to be identified and be uniformly distributed within the space  
Plug in devices shall not be used to comply with the requirement

**Exceptions:**

- Receptacles for equipment requiring continuous operation
- Spaces where automatic control would endanger building occupants

50% of all receptacles in private offices, open offices and computer classrooms must be controlled by an occupancy sensor or other controls

**Leviton Product Solutions**

- Occupancy sensors
- Vacancy sensors
- Smart Wallbox Sensors
- Receptacle controls
- Sapphire™
- Lumina™ RF Standalone Wireless Room Control System
- Provolt™ Room Controller
- IRC
- GreenMAX®
- GreenMAX® DRC

All interior spaces to be controlled by one or more of the following as listed in 9.5.2.1-1 and 9.5.2.1-2:

• **Local Control**

- There shall be one or more manual lighting control devices that provides on/off control of all lighting in the space
- Each control device shall:
  - Control an area no larger than 2500 sq. ft. if the space is less than 10,000 sq. ft. Control an area no larger than 10,000 sq. ft. otherwise
  - Device to be readily accessible and located so that occupant can see controlled lighting
    - Remote location of device is permitted for reasons of safety and security
      - Must have a pilot light and be labeled to indicate zones of control.
      - Definition: Readily Accessible
    - Installed in a manner that allows it to be reached quickly for operation, renewal, or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc. In public facilities accessibility may be limited to certain personnel through locking covers or in locked rooms.

All interior spaces to be controlled by local control, restricted Manual-ON, Partial-ON, Multi-Level Lighting Control, Automatic daylighting for sidelit and top lit areas, automatic reduction control, Automatic Full OFF, Scheduled Shutoff, and Scheduled OFF



**9.4.1.1**  
Interior Lighting Control

• **Restricted to Manual-ON**

- None of the lighting shall be automatically turned on.
- **Exception:** Not required where manual on operation of the general lighting would endanger safety and security of building occupant.

• **Restricted to Partial Automatic-ON**

- No more than 50% of the lighting power for the general lighting shall be allowed to automatically turned ON
- None of the remaining lighting shall be automatically turned ON
- Offices greater than 300 sq. ft. shall have the following requirements:
  - Control zones for general lighting shall be limited to 600 sq.ft. control zones for general lighting shall be permitted to automatically turn on, up to full power upon occupancy
  - General lighting in other unoccupied zones shall be permitted to turn on to no more than 20% of full power

• **Multi-level Lighting Control**

- The general lighting in the space shall be controlled with continuous dimming to 10% of full lighting power in addition to full on and full off.



**Leviton Product Solutions**

- Occupancy sensors
- Vacancy sensors
- Smart Wallbox Sensors
- Wall box dimmers
- Photocells
- Sapphire
- Lumina RF Standalone Wireless Room Control System
- Provolt Room Controller
- IRC
- GreenMAX
- GreenMAX DRC

Continued on next page

# ASHRAE 90.1 2022 Requirements Summary

Note that updates for ASHRAE 90.1 2022 are highlighted.

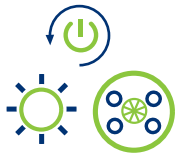
Control Type	Summary	Quick Take
 <p><b>9.4.1.1</b> Interior Lighting Control</p>	<ul style="list-style-type: none"> <li>• <b>Automatic Daylighting for Sidelit Areas</b> <ul style="list-style-type: none"> <li>• In any space where the combined power input power of general lighting completely or partially within the primary sidelighted area is 75W or greater, the general lighting in the primary sidelighted shall be controlled by photocontrols.</li> <li>• In any space where the combined power input power of general lighting completely or partially within the primary sidelighted area and secondary sidelighted area is 150w or greater, the general lighting in the primary sidelighted shall be controlled by photocontrols.</li> <li>• Primary and secondary zones to be controlled separately.</li> <li>• Control system to have the following characteristics:                             <ul style="list-style-type: none"> <li>• Calibration adjustment shall be located no more than 11' aff and shall not require the physical presence of a person at the sensor while it is processing.</li> <li>• Photocontrol shall reduce electric lighting power in response to daylight using continuous dimming to 20% or less and off</li> <li>• When an automatic reduction control has reduced the lighting power to the unoccupied set point in 9.4.1.1(g) the daylight responsive control shall adjust the electric light in response to daylight, but not allow the lighting power to be above the unoccupied setpoint.</li> </ul> </li> </ul> </li> <li>• <b>Automatic Reduction Control</b> <ul style="list-style-type: none"> <li>• General lighting power in the space to be automatically reduced by at least 50% within 20 min of occupants leaving the space.</li> <li>• For open offices greater than 300sf, general lighting zones shall                             <ul style="list-style-type: none"> <li>• Be limited to 600sf and</li> <li>• Automatically reduce general lighting power by at least 80% within 20 min of occupants leaving a control zone, .</li> </ul> </li> <li>• Primary and secondary zones to be controlled separately</li> </ul> </li> <li>• <b>Automatic Full OFF</b> <ul style="list-style-type: none"> <li>• All lighting in the space, including lighting connected to emergency circuits, shall be automatically shut off within 20 minutes of all occupants leaving the space</li> <li>• A control device shall control no more than 5000sq.ft</li> </ul> </li> <li>• <b>Scheduled Shutoff</b> <ul style="list-style-type: none"> <li>• All lighting in the space, including lighting connected to emergency circuits, shall be automatically turned off during periods when the space is scheduled to be unoccupied.                             <ul style="list-style-type: none"> <li>• Time of day</li> <li>• Signal from another control device or alarm system</li> </ul> </li> </ul> </li> <li>• Control device or system shall provide independent control sequences that:                             <ul style="list-style-type: none"> <li>• Control area of no more than 25,000 sq.ft. Include no more than one floor</li> <li>• Lighting required for 24/7 operation</li> <li>• Include programming for weekends and holidays</li> </ul> </li> <li>• Any manual control installed for override shall not turn the lights on for more than 2 hours per activation during scheduled shutoff periods and shall not control more than 5000 sq. ft.</li> <li>• <b>Exceptions:</b> Lighting required for 24/7 operations, lighting in spaces where patient care is rendered, general lighting and task lighting in spaces where automatic shutoff will endanger occupants</li> </ul>	<p>All interior spaces to be controlled by local control, restricted Manual-ON, Partial-ON, Multi-Level Lighting Control, Automatic daylighting for sidelit and top lit areas, automatic reduction control, Automatic Full OFF, Scheduled Shutoff, and Scheduled OFF</p> <p><b>Leviton Product Solutions</b></p> <ul style="list-style-type: none"> <li>• Occupancy sensors</li> <li>• Vacancy sensors</li> <li>• Smart Wallbox Sensors</li> <li>• Wall box dimmers</li> <li>• Photocells</li> <li>• Sapphire</li> <li>• Lumina RF Standalone Wireless Room Control System</li> <li>• Provolt Room Controller</li> <li>• IRC</li> <li>• GreenMAX</li> <li>• GreenMAXDRC</li> </ul>
 <p><b>9.4.1.2</b> Parking Garage Control</p>	<p>Must have automatic lighting shutoff per 9.4.1.1</p> <ul style="list-style-type: none"> <li>• Lighting power of each luminaire to be automatically reduced by a minimum of 50% when there is no activity detected for 10 minutes zones of control to be no more than 3600 sq. ft.</li> <li>• Daylight transition zones shall be separately controlled to automatically reduce the lighting to no more than the general light level from sunset to sunrise</li> <li>• The power to any luminaire within 20' of perimeter wall openings totaling at least 24 sq. ft. shall be automatically controlled through continuous dimming in response to available daylight</li> </ul> <p><b>Exceptions:</b></p> <ul style="list-style-type: none"> <li>• Daylight transition zone lighting</li> <li>• Where permanent screens or architectural elements obstruct more than 50% of the opening</li> <li>• Where the top of any existing adjacent structure or natural object is at least twice as high above the openings as its horizontal distance from the opening</li> </ul>	<p>Parking garage lighting zones must be controlled by a device that reduces power by 50% after 10 minutes of vacancy, and open exterior walls must utilize automatic daylight harvesting.</p> <p><b>Leviton Product Solutions</b></p> <ul style="list-style-type: none"> <li>• Occupancy sensors</li> <li>• Photocells</li> <li>• IRC</li> <li>• GreenMAX</li> <li>• GreenMAXDRC</li> </ul>



# ASHRAE 90.1 2022 Requirements Summary

Note that updates for ASHRAE 90.1 2022 are highlighted

Control Type	Summary	Quick Take
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### 9.4.1.3 Special Applications

- Lighting controls in this section are the only controls required for the equipment in these applications. Any lighting exempt from interior lighting power shall be controlled in accordance with table 9.2.2.1. Lighting using additional power applications shall be controlled in accordance with section 9.5.2.2
- Lighting use for display of accent lighting and/or lighting in display cases must be equipped with a local control independent of the general lighting
- Local control must be readily accessible and located so that occupants can see lighting being controlled
- Must comply with automatic off or scheduled shutoff requirements

#### Guestrooms

- All switched receptacles in guestrooms and suites in shall be automatically controlled to be turned off within 20 minutes after all occupants leave the space.
- Key Card controls shall not be used to comply with this provision.
- Bathrooms shall have a separate controlled device installed to automatically turn off the bathroom lighting within 30 minutes after all occupants have left the bathroom
- 5W of night lighting is exempt

Supplemental task lighting, including permanently installed undershelf or undercabinet lighting shall be controlled from either:

- A control device integral to the luminaire.
- A local control independent of the general lighting.
- Local control must be readily accessible and located so that occupants can see lighting being controlled.
- Must comply with automatic off or scheduled shutoff requirements.

Separate controls are required for specific applications. See ASHRAE 90.1 for more details on each application scenario.

#### Leviton Product Solutions

- Occupancy sensors
- Vacancy sensors
- Smart Wallbox Sensors
- Wall box dimmers
- Receptacle controls
- Sapphire
- Lumina RF Standalone Wireless Room Control System
- Provolt Room Controller
- IRC
- GreenMAX
- GreenMAX DRC
- TLLP



### 9.4.1.4 Exterior Lighting Controls

Lighting for exterior applications not exempted in Section 9.1 shall meet the requirements defined here and listed in Table 9.4.2-2:

- OFF control: There shall be one or more lighting control(s) that turns off all of the lighting in the area or surface
- Daylight OFF control: Lighting shall automatically turn off when sufficient daylight is available or within 30 minutes of sunrise
- Scheduled OFF control: Lighting shall be automatically shut off between midnight or business closing, whichever is later, and 6 a.m. or business opening, whichever comes first, or between times established by the authority having jurisdiction.
- Scheduled light reduction control: Lighting and signage shall be controlled to automatically reduce the connected lighting power by at least 50% from midnight or within one hour of the end of business operations, whichever is later, until 6 a.m. or the beginning of business operations, whichever is earlier
- Occupancy-sensing light reduction control: Lighting shall be controlled to automatically reduce the connected lighting power by a minimum of 50% when no activity has been detected in the area illuminated by the controlled luminaires for a time of no longer than 15 minutes.
- All time switches shall be capable of retaining programming and the time setting during loss of power for a period of at least ten hours

Exterior lighting must be controlled by a photocell to turn lighting OFF when sufficient daylight is available, and reduce advertising/sign lighting power by 50% during closing.

#### Leviton Product Solutions

- Occupancy sensors
- Photocells
- IRC
- GreenMAX
- GreenMAX DRC



### 9.4.3.3 Dwelling Units

Dwelling unit lamps, luminaires, and lighting controls shall be installed to meet the provisions of 9.4.3.1, 9.4.3.2, and 9.4.3.3. No other provisions of section 9 shall apply to dwelling units

- Interior Lighting Controls
  - 50% of permanently installed interior luminaires shall be controlled with dimmers or shall be automatically turned off within 20 min of all occupants leaving the space
- Exterior Lighting Controls
  - Permanently installed exterior luminaires dedicated to a dwell until shall be provided with manual controls and be automatically shutoff through time of day, available daylight, or when no activity has been detected for 15 minutes


A dwelling unit is a single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation

#### Leviton Product Solutions

- Occupancy sensors
- Vacancy sensors
- Smart Wallbox Sensors
- Wallbox dimmers

# ASHRAE 90.1 2022 Requirements Summary

Note that updates for ASHRAE 90.1 2022 are highlighted

Control Type	Summary	Quick Take
 <p><b>9.4.4</b> Horticultural Lighting</p>	<p>Greenhouse horticultural lighting shall follow the requirements of section 9.4.4.1 Indoor grow horticultural lighting shall follow the requirements of section 9.4.4.2</p> <ul style="list-style-type: none"> <li>Horticultural lighting and luminaires in indoor grow spaces and greenhouses shall be controlled by a device that automatically turns lights OFF at specified programmed times</li> <li>Refer to 9.4.4.1 and 9.4.4.2 for specific luminaire requirements that trigger control requirements</li> </ul>	<p>Horticultural lighting must be controlled by a device that automatically turns the lights off at specific times</p> <p>Leviton Product Solutions</p> <ul style="list-style-type: none"> <li>Occupancy sensors</li> <li>Smart Wallbox Sensors</li> <li>Lumina RF Standalone Wireless Room Control System</li> <li>Provolt Room Controller</li> <li>GreenMAX</li> <li>GreenMAX DRC</li> </ul>
 <p><b>9.5.2.2</b> Additional Lighting Power</p>	<ul style="list-style-type: none"> <li>When using the space-by-space method, an increase in additional lighting power also is allowed for specific lighting functions</li> <li>Only allowed when lighting is installed and controlled independently of the general lighting in accordance with table 9.5.2.2</li> <li>Additional lighting power shall be used only for the specified luminaire</li> <li>Controls referenced in 9.5.2.2 are the only control requirements for these applications</li> <li>The increase in the interior lighting power allowance is permitted in the following cases: <ul style="list-style-type: none"> <li>Where lighting is installed in addition to the general lighting for the purpose of decorative appearance or highlighting art or exhibits not exempted in table 9.2.2.1, provided that the additional lighting power does not exceed the value in 9.5.2.2</li> <li>Lighting equipment installed in sales areas and specifically designed and directed to highlight merchandise, provided that additional wattage does not exceed value in table 9.5.2.2</li> <li>Spaces which lighting is installed for the purpose of video conferencing, additional power shall be allowed per table 9.5.2.2</li> </ul> </li> </ul>	<p>Additional lighting power is allowed for specific lighting functions when using the space-by-space method</p> <p>Leviton Product Solutions</p> <ul style="list-style-type: none"> <li>Occupancy sensors</li> <li>Vacancy sensors</li> <li>Smart Wallbox Sensors</li> <li>Wall box dimmers</li> <li>Photocells</li> <li>Sapphire</li> <li>Lumina RF Standalone Wireless Room Control System</li> <li>Provolt Room Controller</li> <li>IRC</li> <li>GreenMAX</li> <li>GreenMAX DRC</li> </ul>
 <p><b>9.9.1</b> Functional Testing</p>	<ul style="list-style-type: none"> <li>Lighting control devices and control systems shall be tested in accordance with this section and Section 4.2.5.1 to verify that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's installation instructions</li> </ul>	<p>All lighting controls must be tested by a party not involved with the design or construction team to ensure that the products are working properly.</p> <ul style="list-style-type: none"> <li><b>All Leviton solutions are manufactured to the highest quality and performance standards, which can easily be demonstrated at the time of installation to fulfill ASHRAE 90.1 Section 9.9.1.</b></li> </ul>



# ASHRAE 90.1 2022 Requirements Summary

Note that updates for ASHRAE 90.1 2022 are highlighted

Control Type	Summary	Quick Take
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**8.4.3.1 & 8.4.3.2**  
Electrical Energy Monitoring

- Energy monitoring required for:
- New buildings 25,000sf and larger
  - Tenant spaces 10,000sf and larger
  - Residential buildings with greater than 10,000sf of common area

- Exceptions:
- Critical equipment and life safety branches of NFPA 17

Measurement devices must be installed to monitor energy use for each of the following separately:

- Total Electrical Energy
- HVAC systems
- Interior Lighting
- Exterior Lighting
- Receptacle Circuits
- Refrigeration Systems

When the design load of any category is less than 10% of the whole building load, these categories can be combined with other categories. For buildings with tenants, systems shall be separately monitored for the total building and (excluding shared systems) for each individual tenant

- Data Acquisition
- Energy use for all loads to be recorded a minimum of every 15 minutes and reported at least hourly, daily, monthly, and annually
  - Data for tenant spaces to be provided to each tenant
  - Data must be kept for a minimum of 36 months

- Graphical Energy Report
- Buildings with a digital control system, energy use shall be transmitted to the system and be graphically displayed

Submetering measurement and verification is now required to separately monitor energy-using facility systems, with separate metering for tenants. This information must be regularly collected and recorded, and made available to tenants.









**Leviton Product Solutions**

- VerifEye™ Submetering Solutions



# Leviton Solutions at a Glance

**Note:** All solutions are represented by a blue block. Solutions may require other products to complete a code compliant energy control solution—consult Leviton for more information.

ASHRAE 90.1 2022 Standards								
	8.4.2 Automatic Receptacle Control 	9.4.1.1 Interior Lighting Control 	9.4.1.2 Parking Garage Control 	9.4.1.3 Special Applications 	9.4.1.4 Exterior Lighting Control 	9.4.3.3 Dwelling Units 	9.4.4 Horticultural Lighting 	8.4.3 Electrical Energy Monitoring 
Product Solutions								
Occupancy Sensors	X	X	X	X	X	X	X	--
Vacancy Sensors	X	X	--	--	--	X	X	--
Smart Wallbox Sensors	X	X	--	--	--	X	X	--
Photocells	--	X	X	X	--	--	X	--
Provolt Room Controller (PRC)	X	X	--	--	--	--	X	--
IRC	X	X	--	--	--	--	X	--
Lumina™ RF Standalone Wireless Room Control System	X	X	--	--	--	--	X	--
Intellect-Enabled Fixtures	X	X	--	--	--	--	X	--
GreenMAX® DRC	X	X	--	--	--	--	X	--
GreenMAX®	X	X	X	X	X	--	X	--
Track Light Limiting Panel (TLLP)	--	--	--	X	--	--	--	--
Sapphire™	--	X	--	--	--	--	X	--
Marked Controlled Receptacles	X	--	--	--	--	--	--	--
VerifEye™ Submetering Solutions	--	--	--	--	--	--	--	X



# Leviton Applications at a Glance

**Note:** All indicated applications represented by a blue or green block can be found in the ASHRAE 90.1 Applications Cookbook. Solutions represented in this Design Guide are represented by a green block.

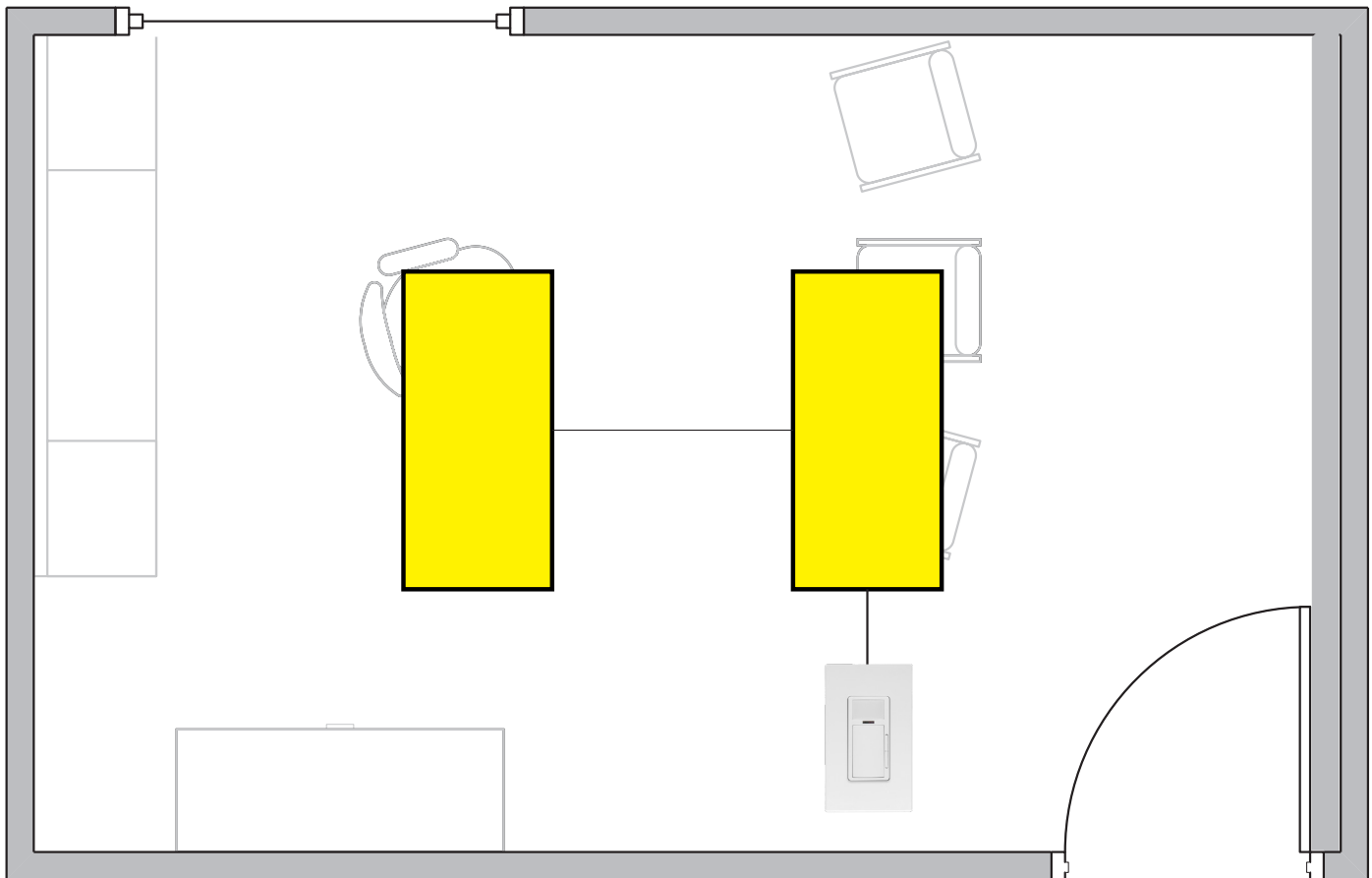
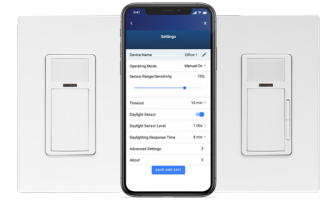
ASHRAE 90.1 2022 Standards									
	Small Office	Open Office	Conference Room	Classroom	Common Area	Library	Restaurant	Warehouse	Energy Monitoring
Product Solutions									
Occupancy Sensors	X	X	X	X	X	X	X	X	--
Vacancy Sensors	X	X	X	X	X	X	X	X	--
Smart Wallbox Sensors	X	--	--	--	X	--	--	--	--
Photocells	X	X	X	X	X	X	X	X	--
Provolt Room Controller (PRC)	X	X	X	X	X	X	X	X	--
IRC	X	X	X	X	X	X	X	X	--
Lumina RF Standalone Wireless Room Control System	X	X	X	X	X	X	X	X	--
Intellect-Enabled Fixtures	X	X	X	X	X	X	X	X	--
GreenMAX DRC	X	X	X	X	X	X	X	X	--
GreenMAX	X	X	X	X	X	X	X	X	--
Track Light Limiting Panel (TLLP)	--	--	--	--	--	--	X	X	--
Sapphire™	X	X	X	X	X	--	X	--	--
Marked Controlled Receptacles	X	X	X	X	X	X	X	X	--
VerifEye™ Submetering Solutions	X	X	X	X	X	X	X	X	X

# Small Office—Single Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Smart Wallbox Sensor

- Simple occupancy/vacancy sensing and dimming solution and fits in a standard wallbox
- Simple pushbutton programming
- Create multi-way capabilities for up to 5 devices on all models with Leviton Push to Pair (P2P) process
- App based configuration and customization make for a convenient, affordable solution that meets a range of needs



### Meets the Following Requirements:

- **Section 9.4.1**
  - Lighting Controls
- **Section 9.4.1.1**
  - Interior Lighting Control
- **Section 9.4.3**
  - Functional Testing
- **Section 9.4.3.3**
  - Dwelling Units
- 

### Features:

- 0-10V Dimming and Partial-ON/OFF and Auto-ON/OFF Control
- Occupancy or Vacancy Sensing
- Sensitivity Timeouts

### What you will need

### Quantity

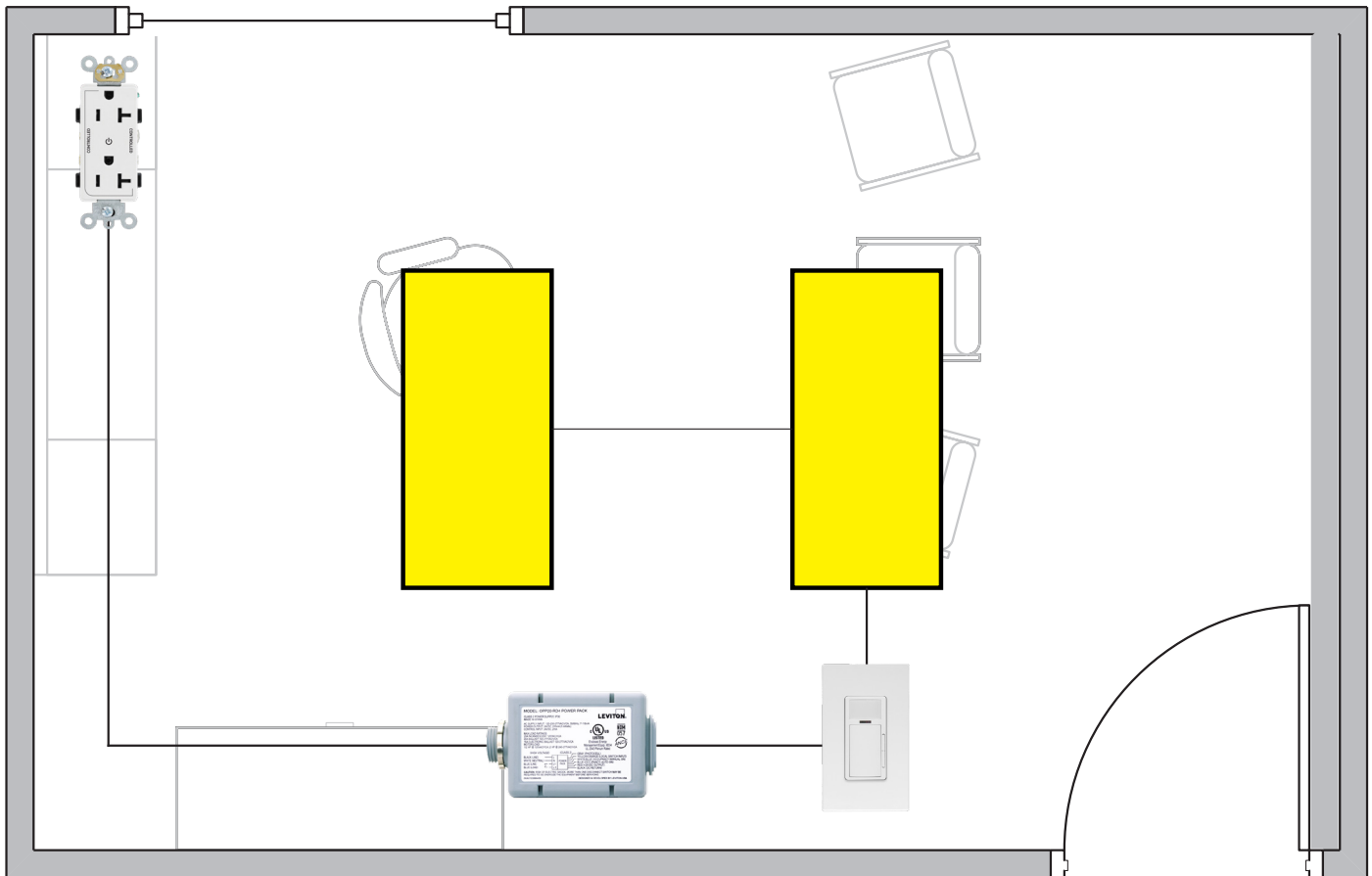
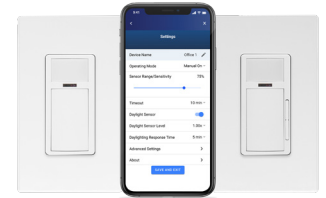
	<b>Smart PIR 0-10V Dimming Wallbox Sensor</b> ODD10-IDW/ODD10-IDI	1
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# Small Office—Single Zone w/Plug Load Control

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Smart Wallbox Sensor

- Simple occupancy/vacancy sensing and dimming solution and fits in a standard wallbox
- Simple pushbutton programming
- Create multi-way capabilities for up to 5 devices on all models with Leviton Push to Pair (P2P) process
- App based configuration and customization make for a convenient, affordable solution that meets a range of needs



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming and Partial-ON/OFF and Auto-ON/OFF Control
- Occupancy or Vacancy Sensing
- Sensitivity Timeouts
- Plug Load Control

### What you will need (sold separately)

### Quantity

	<b>Smart PIR 24V Wallbox Sensor</b> ODD24-IDW	1
	<b>Super Duty Power Pack</b> OPP20-RD4	1
	<b>Marked "Controlled" Receptacles</b> 16352-2PW	1

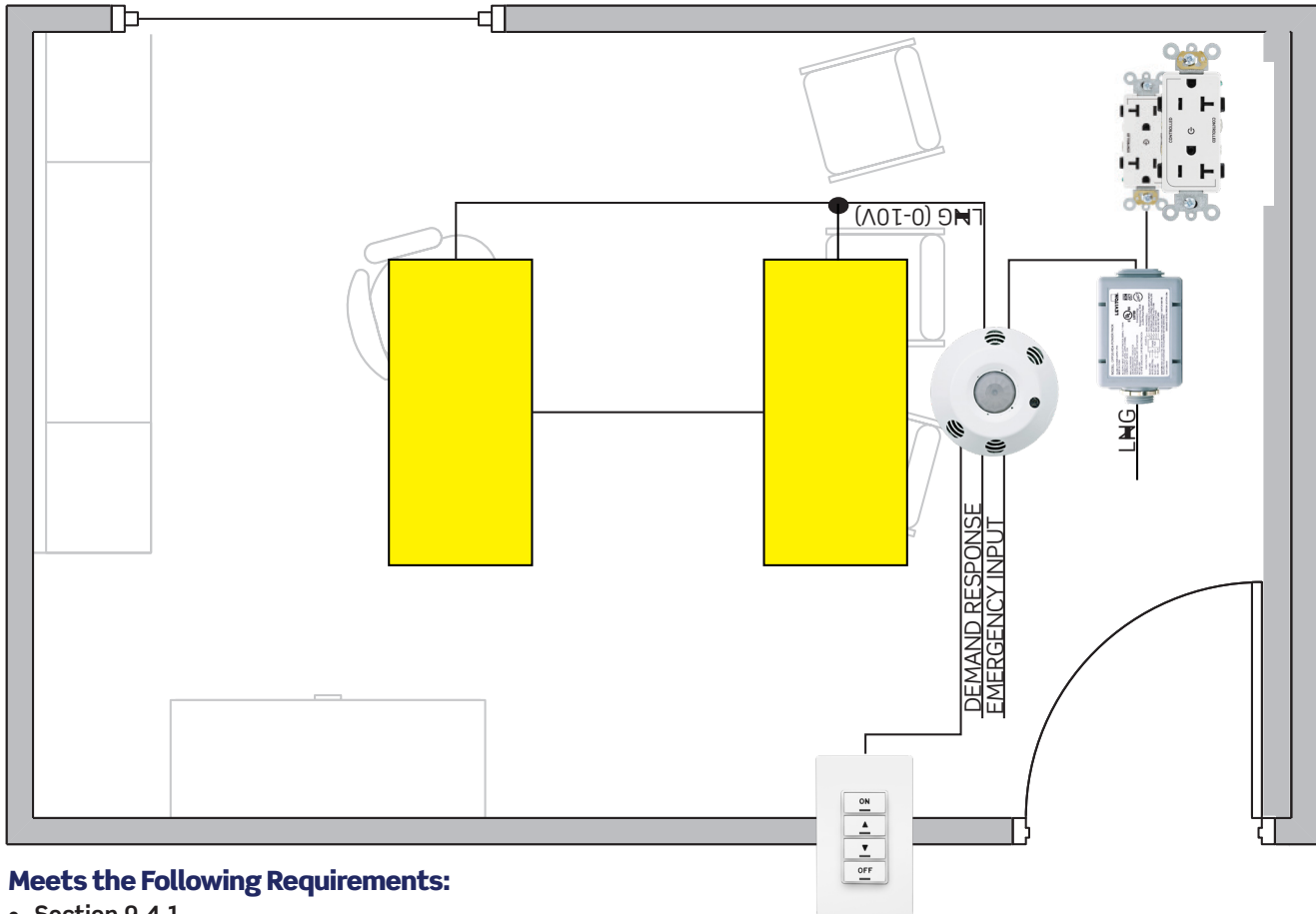


# Small Office—Single Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Provolt™ Room Controller (PRC)

- Comprehensive solution integrates multiple lighting control strategies—occupancy sensing, 0-10V dimming, daylight harvesting, partial-ON, partial-OFF and demand response
- Combined line voltage multi-technology or PIR sensor, power pack and photocell in a self-contained, easy-to-install device
- Configure and test controls from an Android or Apple smart device via the Provolt Bluetooth Mobile App—reduces callbacks



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Self-contained occupancy sensor, photocell and power pack
- Occupancy or Vacancy Sensing with Auto-OFF
- Auto Calibration
- Daylighting Set Point Adjustment through Entry Station
- Emergency Input
- Decora® 4-Button Entry Station
- Plug Load Control
- Time Clock Input
- Demand Response

### What you will need (sold separately)

### Quantity

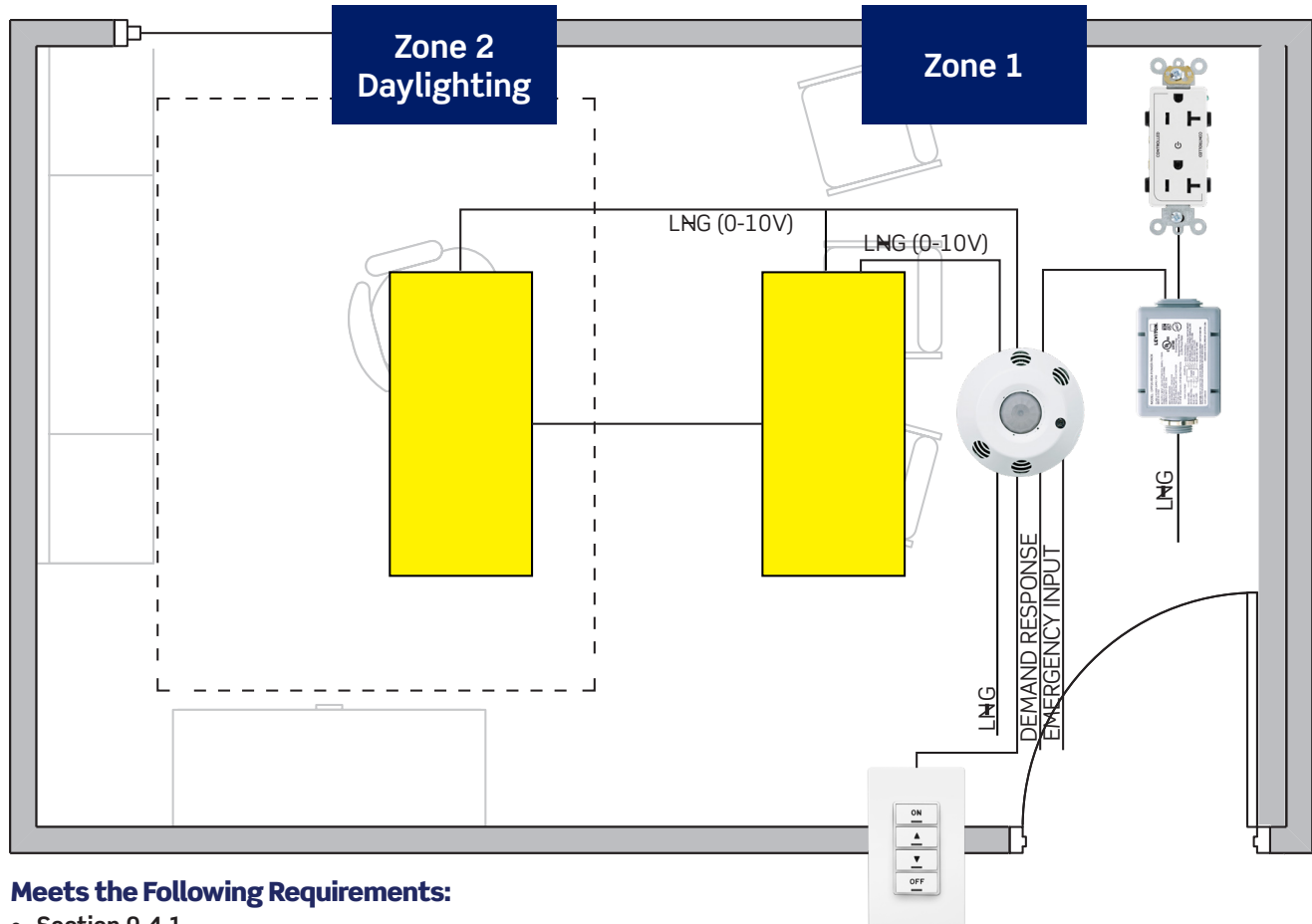
	What you will need (sold separately)	Quantity
	Provolt Room Controller (PRC) O5C04-IDW	1
	Provolt Low-Voltage Keypad, 4-Button PLVSW-4LW	1
	OPP20 Super Duty Power Pack OPP20-0D1	1
	Marked "Controlled" Receptacles 16352-2PW	5

# Small Office—Dual Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Provolt™ Room Controller (PRC)

- Comprehensive solution integrates multiple lighting control strategies—occupancy sensing, 0-10V dimming, daylight harvesting, partial-ON, partial-OFF and demand response
- Combined line voltage multi-technology or PIR sensor, power pack and photocell in a self-contained, easy-to-install device
- Configure and test controls from an Android or Apple smart device via the Provolt Bluetooth Mobile App—reduces callbacks



### Meets the Following Requirements:





- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Self-contained occupancy sensor, photocell and power pack
- Occupancy or Vacancy Sensing with Auto-OFF
- Auto Calibration
- Daylighting Set Point Adjustment through Entry Station
- Emergency Input
- Decora® 4-Button Entry Station
- Plug Load Control
- Time Clock Input
- Demand Response

### What you will need (sold separately)

### Quantity

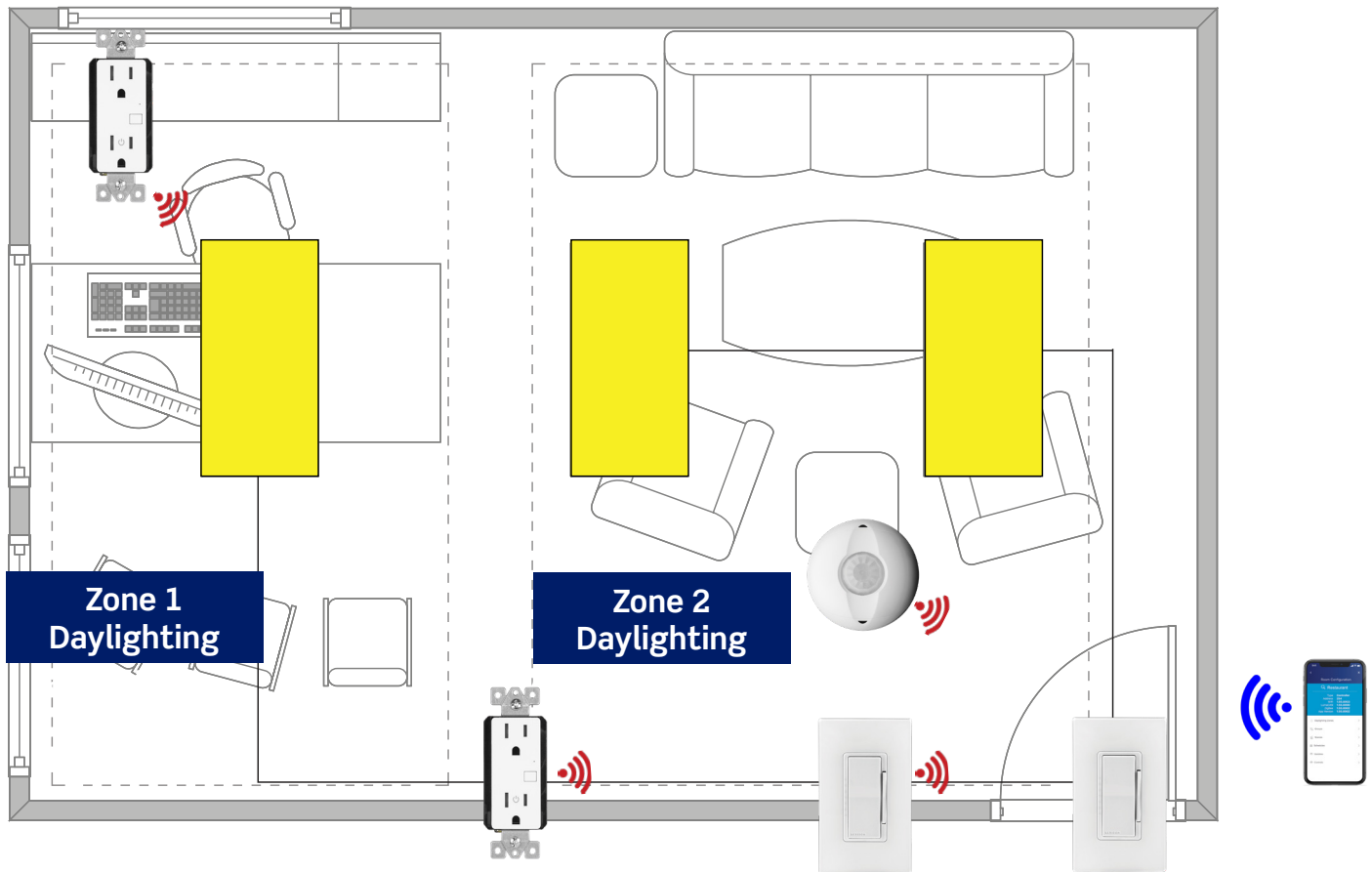
What you will need (sold separately)	Quantity
 Provolt Room Controller (PRC) O5C04-IDW	1
 Provolt Low-Voltage Keypad, 4-Button PLVSW-4LW	1
 OPP20 Super Duty Power Pack OPP20-0D1	1
 Marked "Controlled" Receptacles 16352-2PW	5

# Small Office—Dual Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Lumina™ RF Standalone Wireless Room Control System

- Add wireless control to virtually any ON/OFF or dimming device with Lumina RF devices
- Compatible with virtually all lamp fixtures and load control devices
- Scalable, flexible wireless mesh solution to meet the unique control needs of virtually any space all without having to pull new wires
- Configure, monitor, and control the system with the Lumina RF Standalone App using an Android or iOS smart device for Ladderless Commissioning



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Occupancy or Vacancy Sensing
- Multi-Zone Daylight Harvesting
- Plug Load Control
- Wireless Communication via Mesh Network

### What you will need (sold separately)

### Quantity

What you will need (sold separately)	Quantity
 Lumina RF 0-10V Dimmer Room Controller with 5A Relay DL057-D0Z	1
 Wireless 0-10V Wall Dimmer ZS057-D0Z	1
 Wireless PIR Occupancy Sensor & Photocell ZC015-BIW	1
 Zigbee Controlled Receptacle ZSTLR-1HW	2

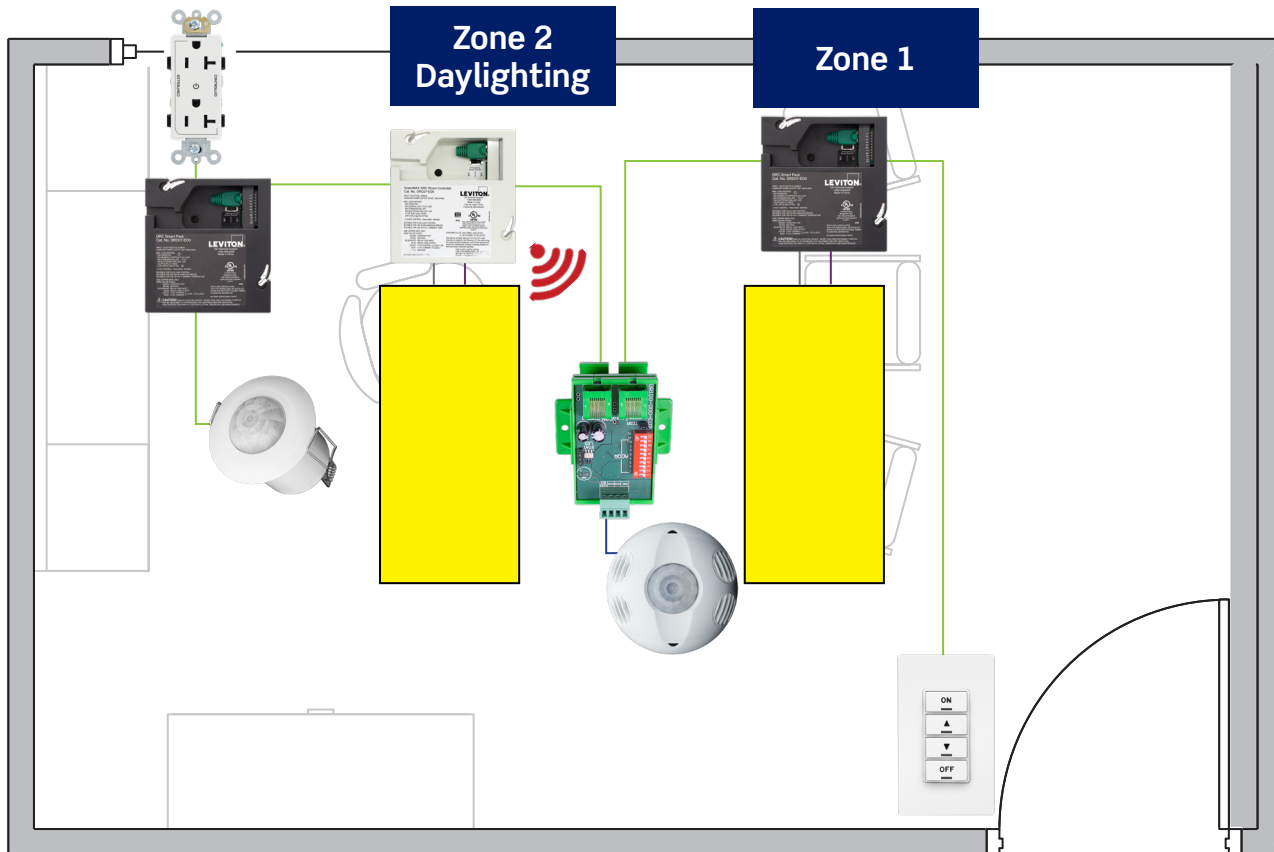
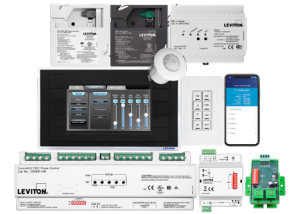


# Small Office—Dual Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wired Room Control System

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



### Meets the Following Requirements:



- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- Occupancy/Vacancy Sensing
- Scene Control
- Daylighting
- Plug Load Control
- Emergency Lighting

### What you will need (sold separately)

### Quantity

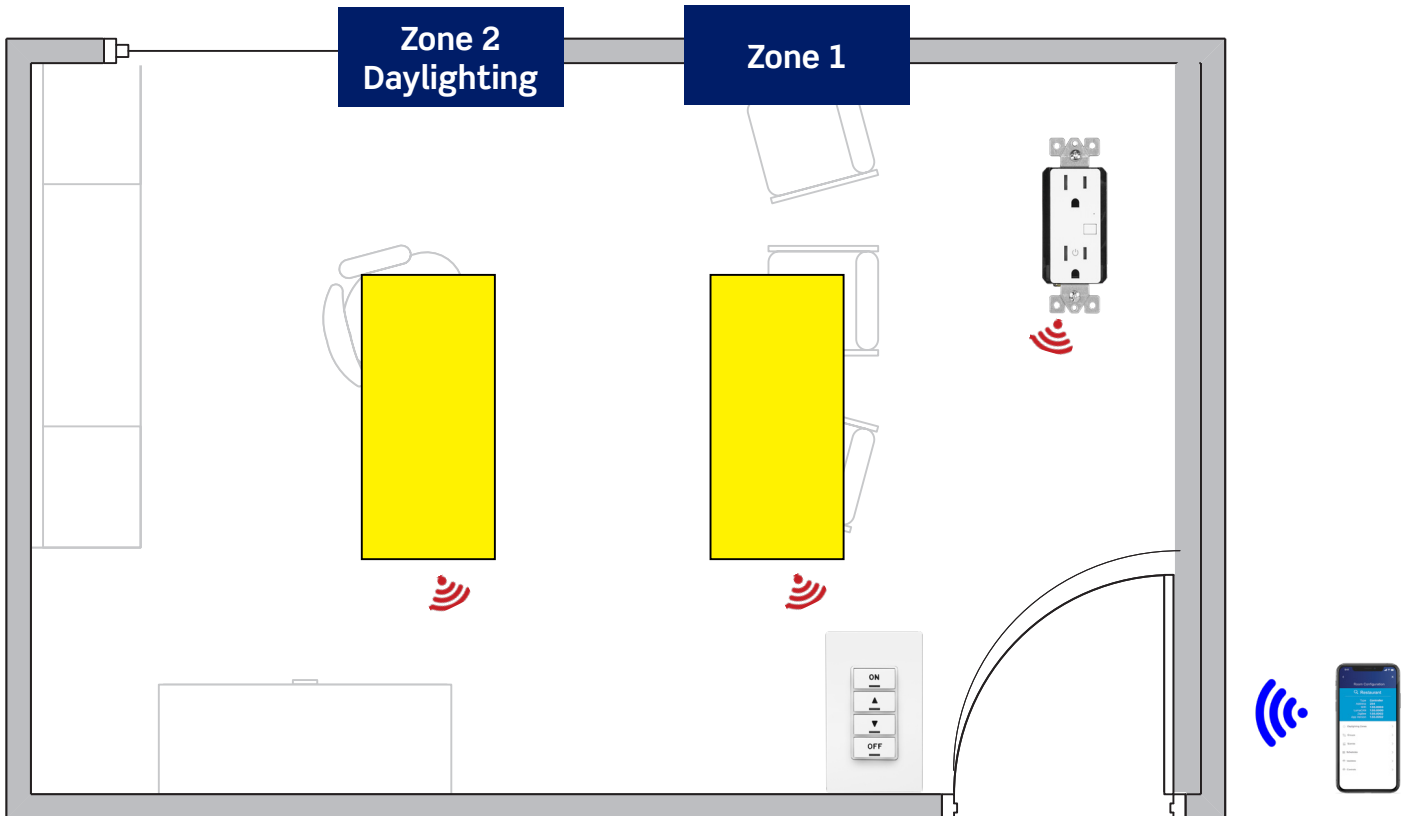
What you will need (sold separately)	Quantity
 GreenMAX DRC Line Voltage Room Controller DRC07-ED0	1
 GreenMAX DRC 0-10V Smart Pack DRD07-ED0	2
 GreenMAX DRC Digital Sensor OSR05-ICW	1
 GreenMAX DRC Analog Interface (AI) DRD0-CO2	1
 Analog Occupancy Sensor OSCxx-MWW	1
 GreenMAX DRC 4-Button Digital Keypad DRKDN-C4W	1
 Marked Controlled Receptacle 16352-2PW	1

# Small Office - Dual Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Room Control System

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- Wi-Fi Networking
- 2 Zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Plug Load Control
- Emergency Lighting

### What you will need (sold separately)

### Quantity

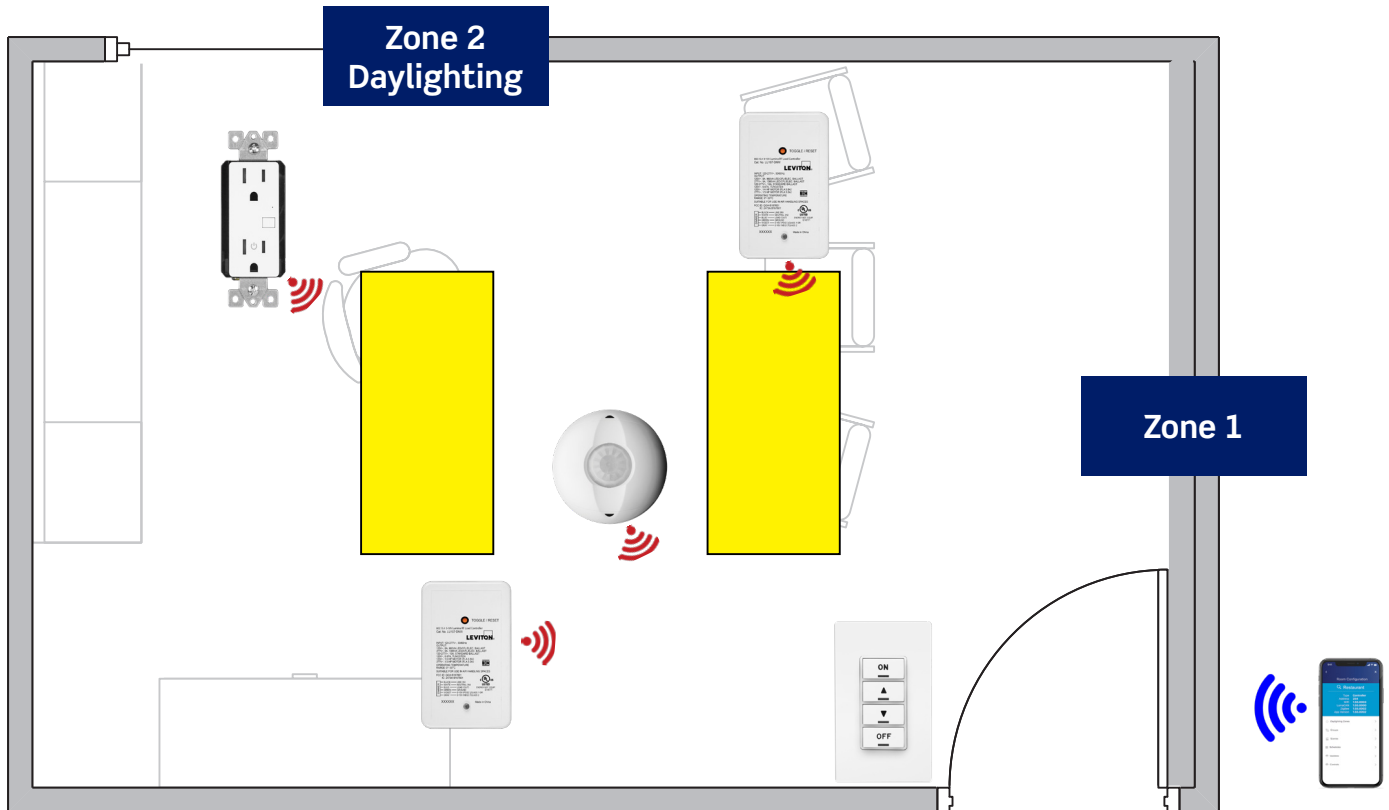
What you will need (sold separately)	Quantity
 <b>GreenMAX DRC 4-Button Wireless Keypad Room Controller</b> DRKDN-U4W	1
 <b>Intellect-enabled Fixture</b> LRTH2x2-LED835UNV-LV01	2
 <b>Zigbee Controlled Receptacle</b> ZSTLR-1HW	1

# Small Office - Dual Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wireless with 0-10V Dimming

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- Wi-Fi Networking
- 2 Zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- 0-10V Dimming
- Plug Load Control

### What you will need (sold separately)

### Quantity

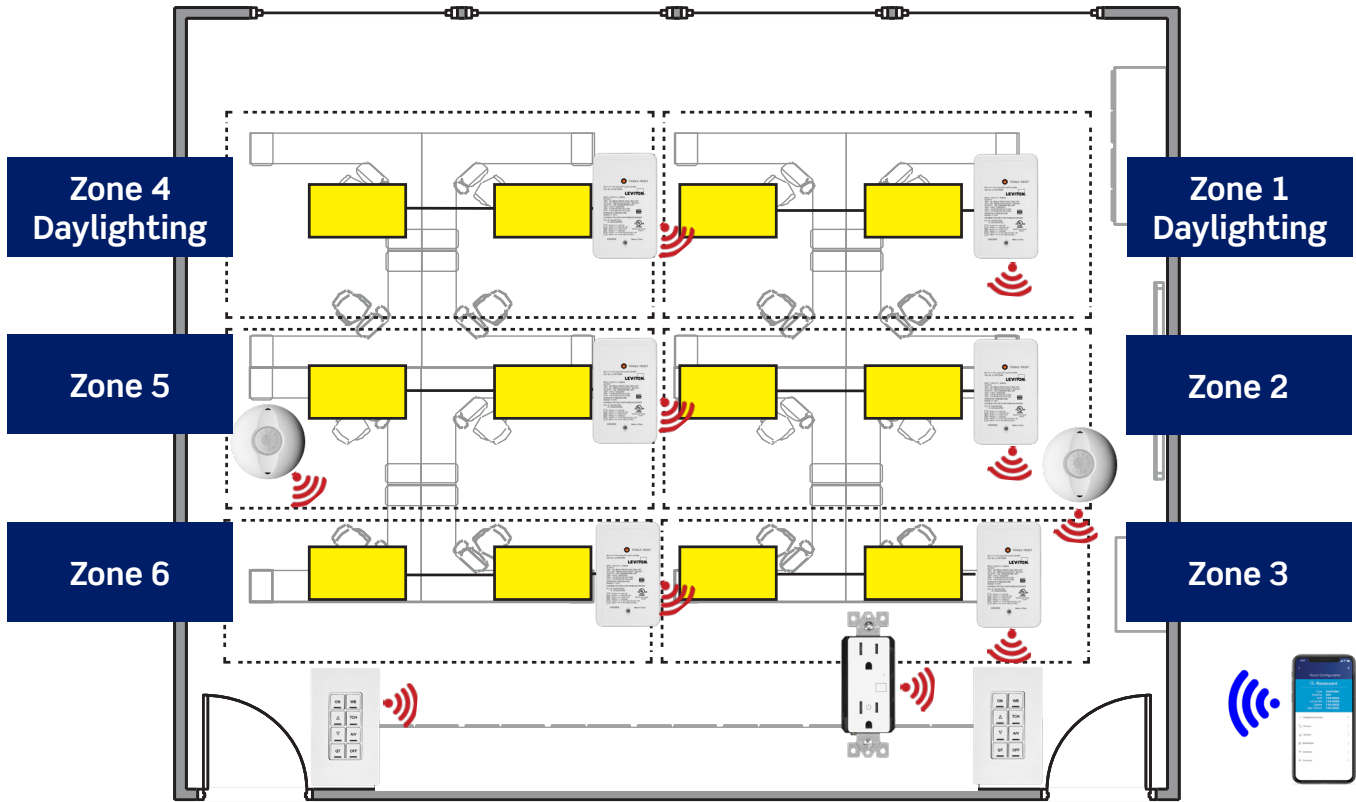
	What you will need (sold separately)	Quantity
	<b>GreenMAX DRC 4-Button Wireless Keypad Room Controller</b> DRKDN-U4W	1
	<b>Wireless 10A, 0-10V Dimming Power Pack</b> LU107-DNW	2
	<b>Wireless PIR Occupancy Sensor &amp; Photocell</b> ZC015-BIW	1
	<b>Zigbee Controlled Receptacle</b> ZSTLR-1HW	Varies



# Open Office

## FEATURED LEVITON ASHRAE 90.1 SOLUTION GreenMAX® DRC Wireless Room Control System

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



### Meets the Following Requirements:






- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- Multiple zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Multi-Way Switching
- Plug Load Control
- Emergency Lighting
- Wi-Fi Networking

### What you will need (sold separately)

### Quantity

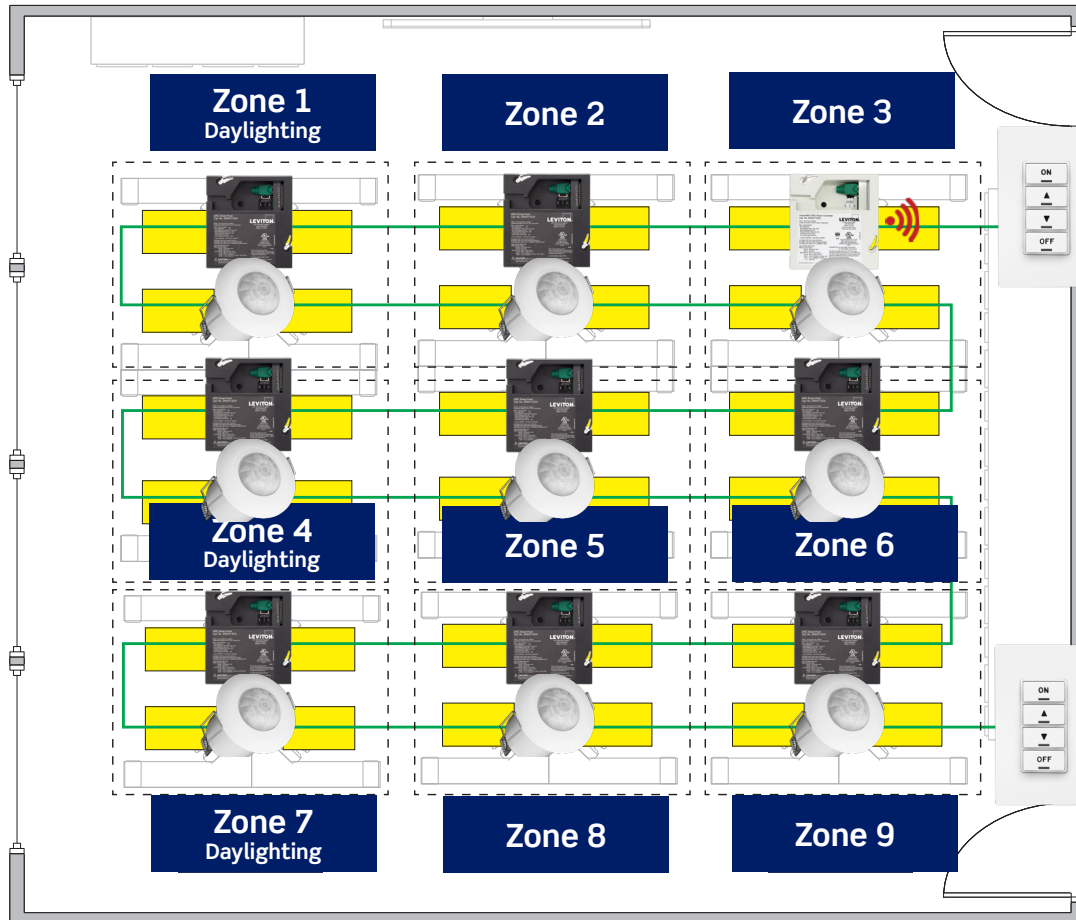
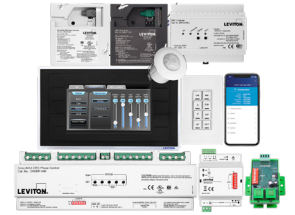
What you will need (sold separately)	Quantity
 <b>GreenMAX DRC 8-Button Wireless Keypad Room Controller</b> DRKDN-U8W	1
 <b>8-Button Wireless Multi-Way Remote</b> DLDNK-08W	1
 <b>Wireless 10A, 0-10V Dimming Power Pack</b> LU107-DNW	6
 <b>Wireless PIR Occupancy Sensor &amp; Photocell</b> ZC015-BIW	2
 <b>Zigbee Controlled Receptacle</b> ZSTLR-1HW	Varies

# Open Office - 9 Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wired Room Control System

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



#### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

#### Features:

- Multiple zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Multi-Way Switching
- Plug Load Control
- Emergency Lighting

#### What you will need (sold separately)

#### Quantity

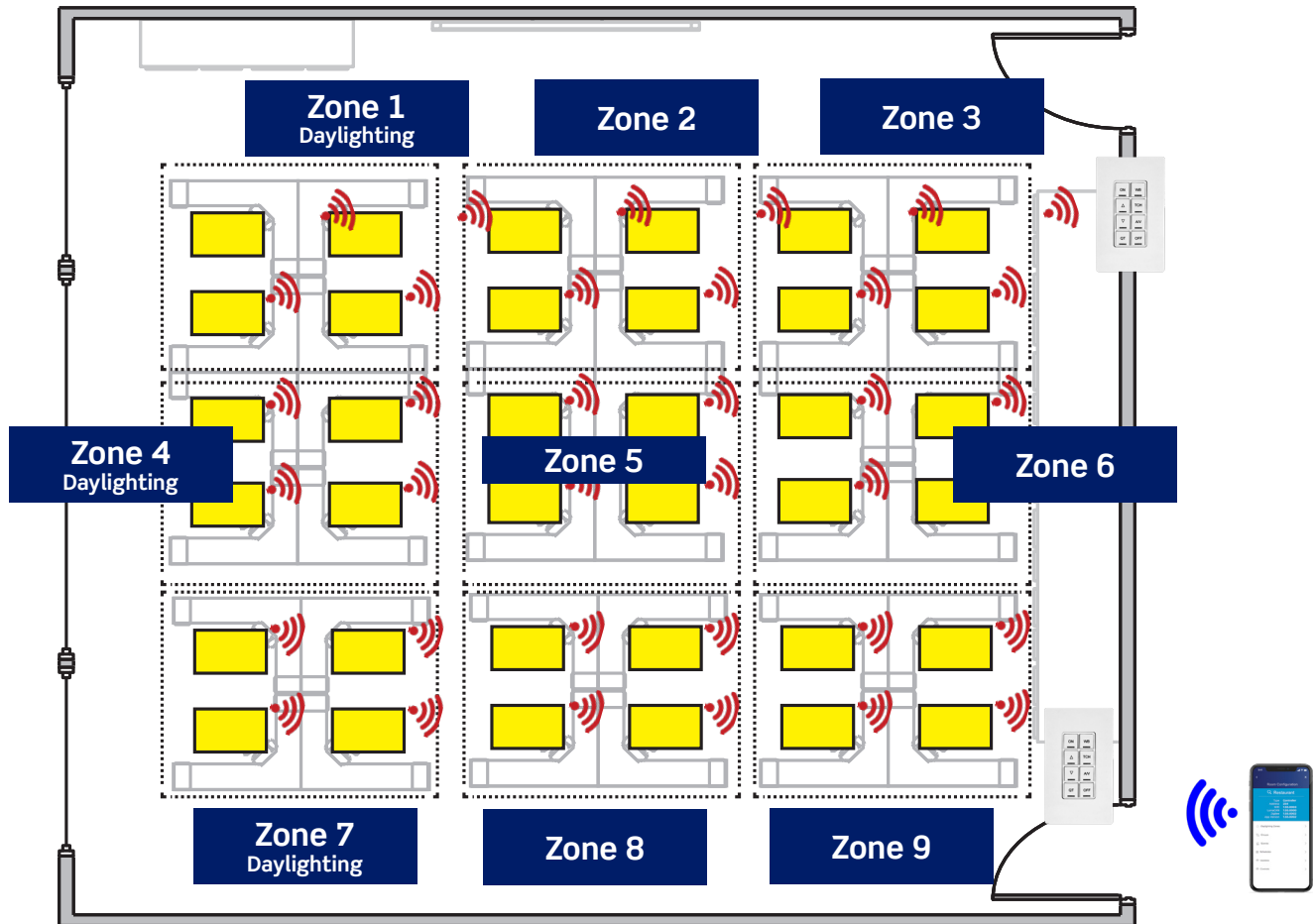
	What you will need (sold separately)	Quantity
	<b>GreenMAX DRC Line Voltage Room Controller</b> DRC07-ED0	1
	<b>GreenMAX DRC 0-10V Smart Pack</b> DRD07-ED0	8
	<b>GreenMAX DRC Digital Sensor</b> OSR05-ICW	9
	<b>Lighting Control Station</b> RLVSW-4LW	2

# Open Office - 9 Zone

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wireless with Intellect-Enabled Fixtures

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



#### Meets the Following Requirements:



- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

#### Features:

- Multiple zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Multi-Way Switching
- Emergency Lighting
- Wi-Fi Networking

#### What you will need (sold separately)

#### Quantity

	<b>GreenMAX DRC 8-Button Wireless Keypad Room Controller</b> DRKDN-U8W	2
	<b>Intellect-enabled Fixture</b> LRTH2x2-LED835UNV-LV01	36

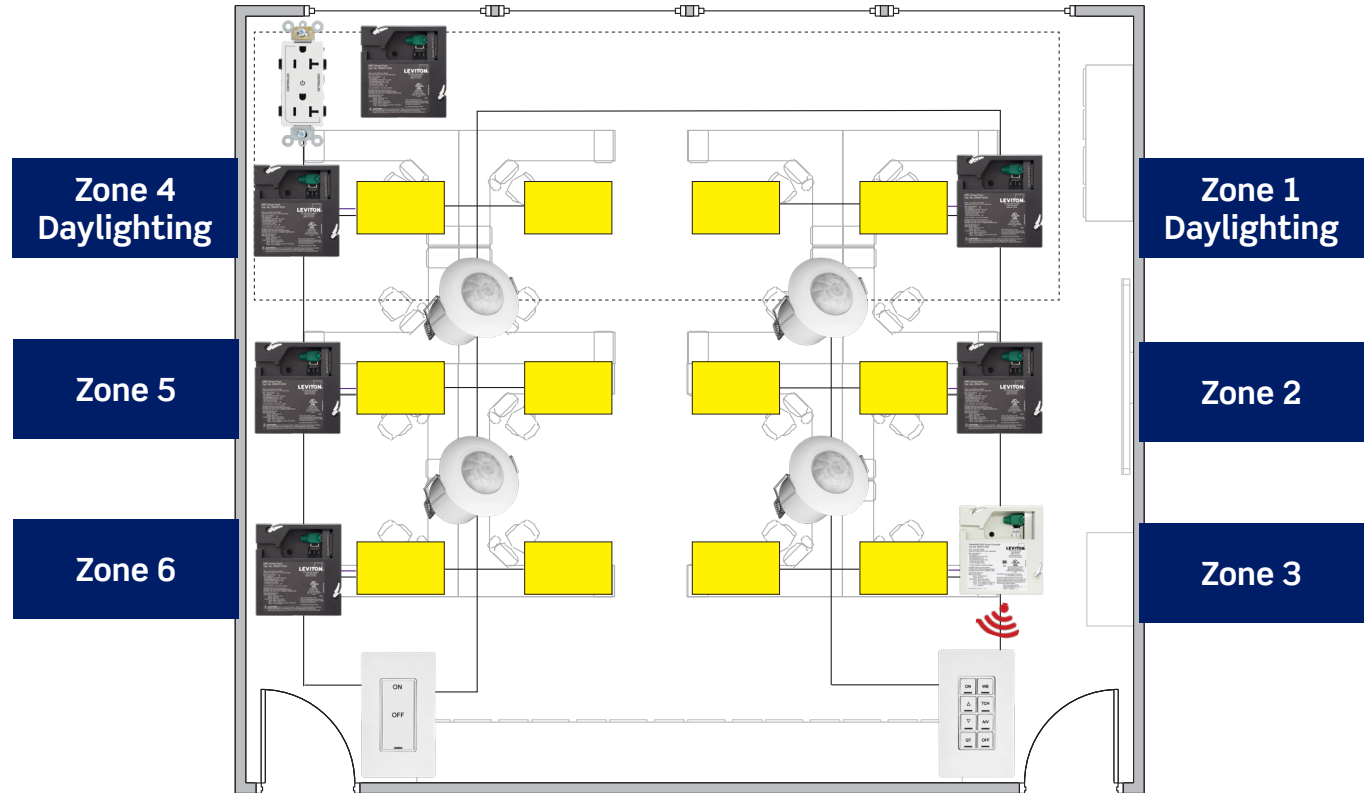
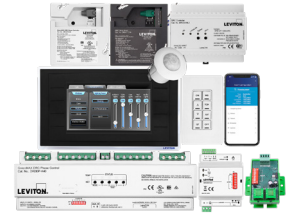


# Open Office

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wired Room Control System

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



### Meets the Following Requirements:







- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- Multiple zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Multi-Way Switching
- Plug Load Control
- Emergency Lighting

### What you will need (sold separately)

### Quantity

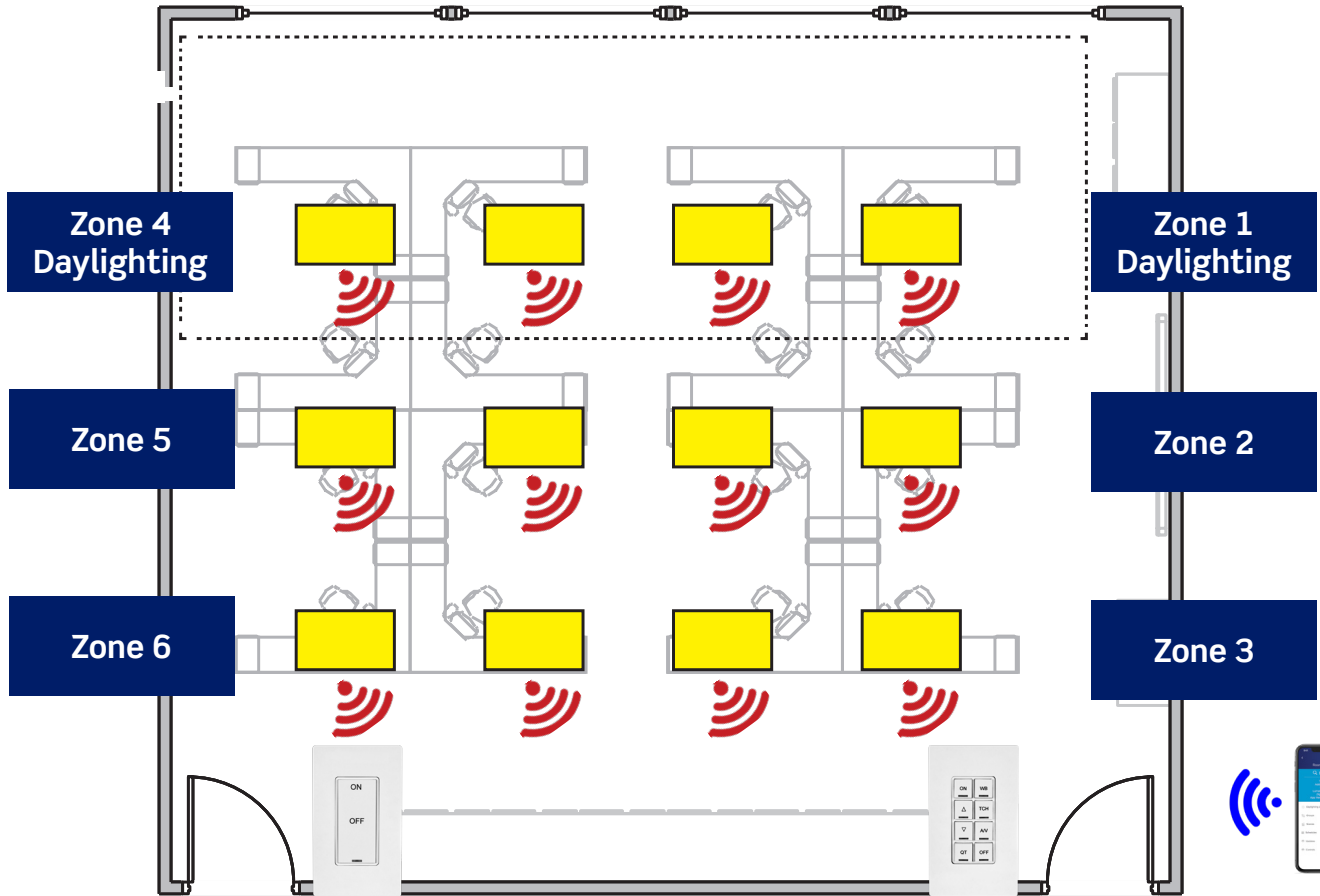
	<b>GreenMAX DRC Line Voltage Room Controller</b> DRC07-ED0	1
	<b>GreenMAX DRC 0-10V Smart Pack</b> DRD07-ED0	6
	<b>GreenMAX DRC Digital Sensor</b> OSR05-ICW	4
	<b>GreenMAX DRC 8-Button Digital Keypad</b> DRKDN-C8W	1
	<b>GreenMAX DRC 1-Button Digital Keypad</b> DRKDN-C1W	1
	<b>Marked Controlled Receptacles</b> 16352-2PW	1

# Open Office

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wireless with Intellect-Enabled Fixtures

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices






#### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

#### Features:

- Multiple zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Multi-Way Switching
- Plug Load Control
- Emergency Lighting
- Wi-Fi Networking

#### What you will need (sold separately)

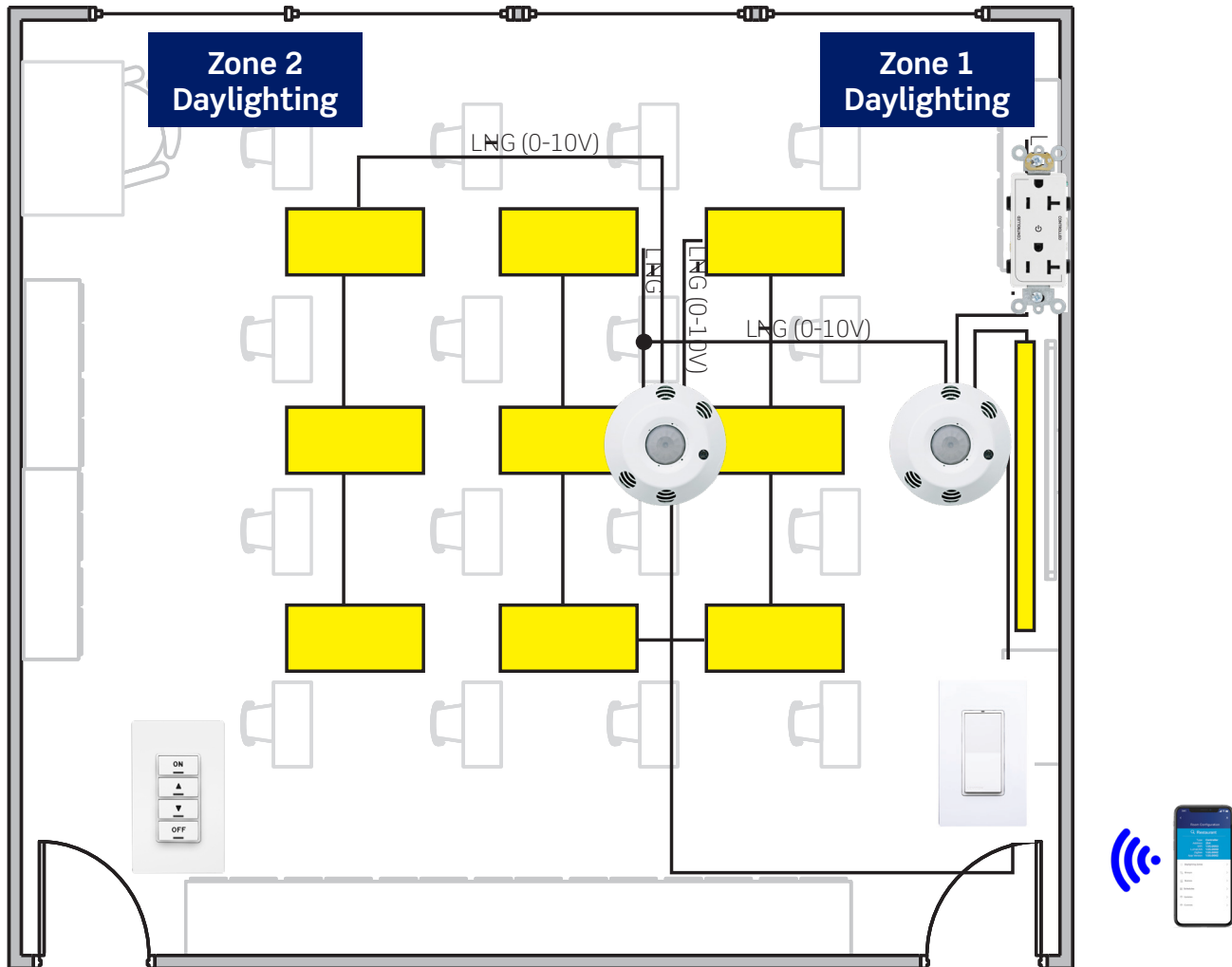
		Quantity
	<b>GreenMAX DRC 8-Button Wireless Keypad Room Controller</b> DRKDN-U8W	1
	<b>1-Button Wireless Multi-Way Remote</b> DLDNK-01W	1
	<b>Intellect-enabled Fixture</b> LRTH2x2-LED835UNV-LV01	12

# Classroom

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Provolt™ Room Controller (PRC)

- Comprehensive solution integrates multiple lighting control strategies—occupancy sensing, 0-10V dimming, daylight harvesting, partial-ON, partial-OFF and demand response
- Combined line voltage multi-technology or PIR sensor, power pack and photocell in a self-contained, easy-to-install compact device
- Configure and test controls from an Android or Apple smart device via the Provolt Bluetooth Mobile App—reduces callbacks



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Self-Contained Occupancy Sensor, Photocell and Power Pack
- Vacancy or Occupancy Sensing with Auto-OFF
- Auto Calibration
- Daylighting Set Point Adjustment through Entry Station

### What you will need (sold separately)

### Quantity

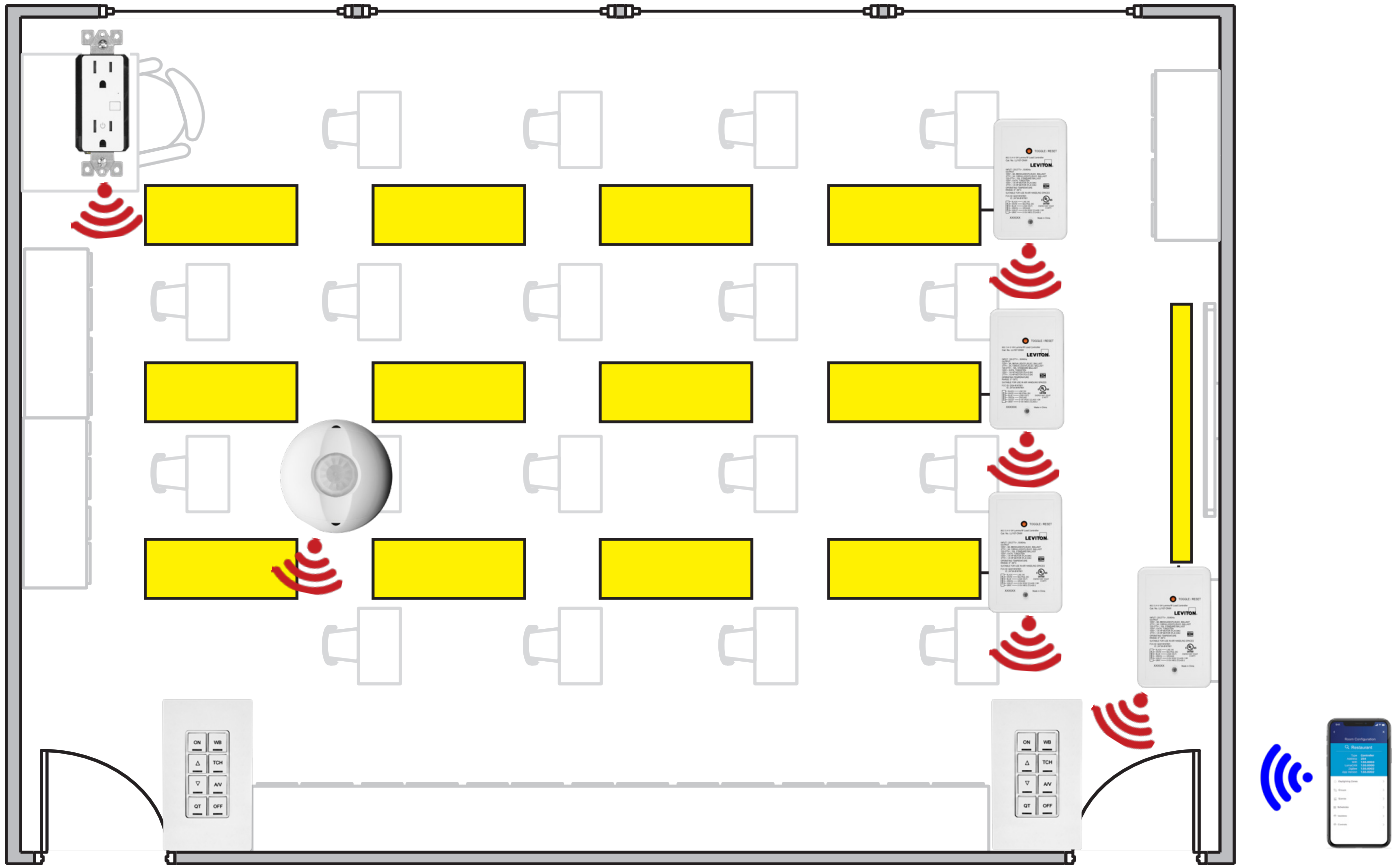
	<b>Provolt Room Controller (PRC)</b> O5C04-IDW	2
	<b>Provolt Low-Voltage Keypad, 4-Button</b> PLVSW-4LW	1
	<b>Provolt Low-Voltage Keypad, 1-Button</b> PLVSW-1LW	1
	<b>Marked "Controlled" Receptacles</b> 16352-2PW	5

# Classroom

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Lumina™ RF Standalone Wireless Room Control System

- Add wireless control to virtually any ON/OFF or dimming device with Lumina RF devices
- Compatible with virtually all lamp fixtures and load control devices
- Scalable, flexible wireless mesh solution to meet the unique control needs of virtually any space all without having to pull new wires
- Configure, monitor, and control the system with the Lumina RF Standalone App using an Android or iOS smart device for Ladderless Commissioning



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Occupancy or Vacancy Sensing
- Multi-Zone Daylight Harvesting
- Plug Load Control
- Wireless Communication via Mesh Network

### What you will need (sold separately)

### Quantity

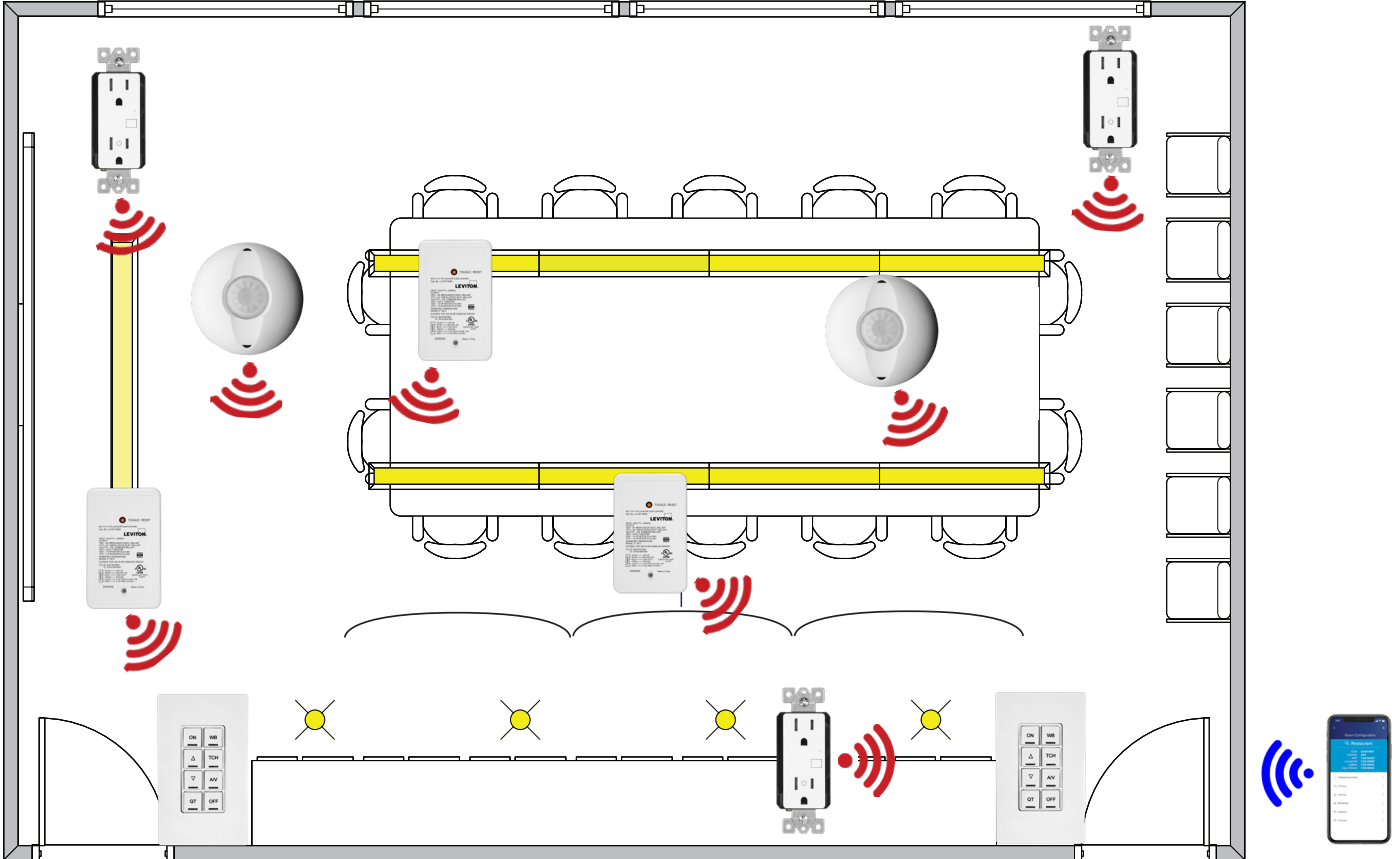
What you will need (sold separately)	Quantity
 <b>Lumina RF Keypad Room Controller</b> DLDNK-08W	2
 <b>Wireless 10A, 0-10V Dimming Power Pack</b> LU107-DNW	4
 <b>Wireless PIR Occupancy Sensor &amp; Photocell</b> ZC015-BIW	1
 <b>Zigbee Controlled Receptacle</b> ZSTLR-1HW	Varies

# Conference Room

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Lumina™ RF Standalone Wireless Room Control System

- Add wireless control to virtually any ON/OFF or dimming device with Lumina RF devices
- Compatible with virtually all lamp fixtures and load control devices
- Scalable, flexible wireless mesh solution to meet the unique control needs of virtually any space all without having to pull new wires
- Configure, monitor, and control the system with the Lumina RF Standalone App using an Android or iOS smart device for Ladderless Commissioning



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Occupancy or Vacancy Sensing
- Multi-Zone Daylight Harvesting
- Receptacle Control
- Wireless Communication via Mesh Network

### What you will need (sold separately)

### Quantity

	<b>Lumina RF Keypad Room Controller</b> DLDNK-08W	2
	<b>Wireless 0-10V Dimming Power Pack</b> LU107-DNW	2
	<b>Wireless PIR Occupancy Sensor &amp; Photocell</b> ZC015-BW	2
	<b>Zigbee Controlled Receptacle</b> ZSTLR-1HW	Varies

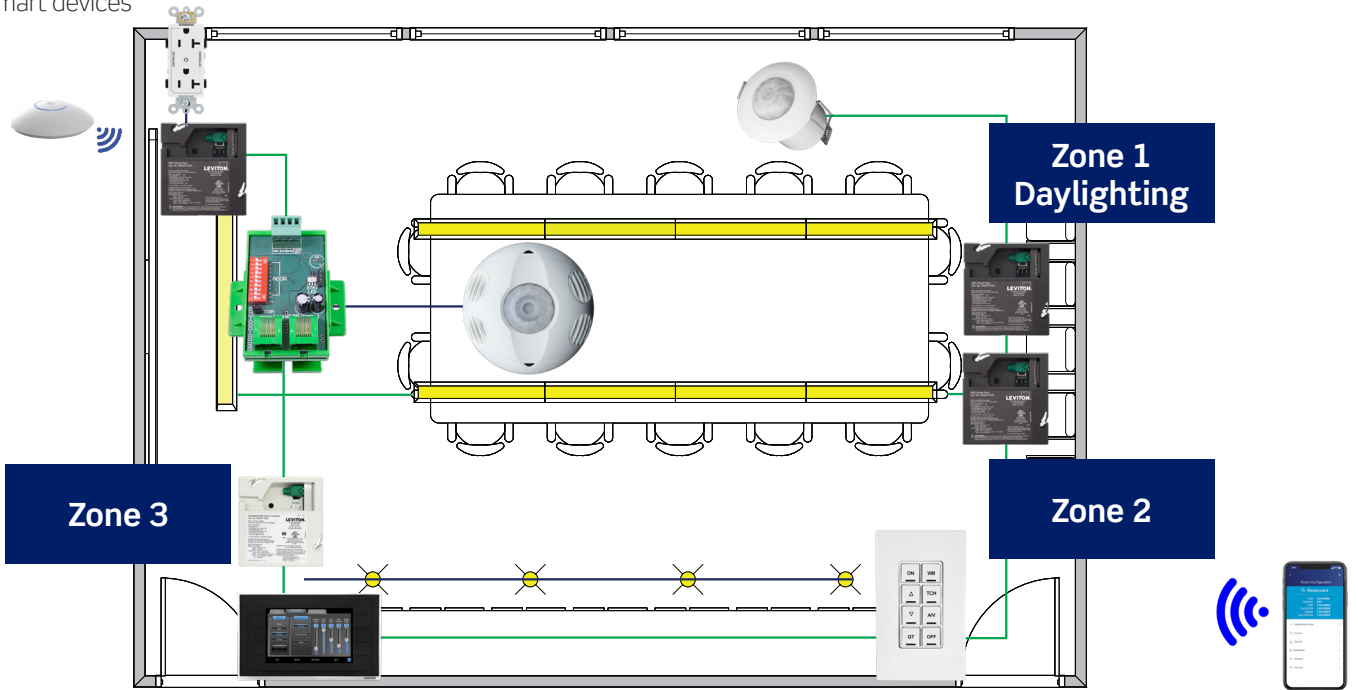
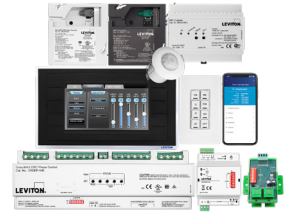


# Conference Room

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Wired with 0-10V Dimming

- Fully distributed room control system
- Room agnostic—each room operates independently of other rooms—not dependent on network processors or centralized controllers for operation
- Easy-to-specify, scalable—add and rearrange products to accommodate the evolving needs of any application, and re-zone/re-group and adjust settings with ease through the GreenMAX DRC App for smart devices



### Meets the Following Requirements:


- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- Multiple zones
- Occupancy/Vacancy Sensing
- Scheduling
- Scene Control
- Daylighting
- Multi-Way Switching
- Plug Load Control
- Emergency Lighting

### What you will need (sold separately)

### Quantity

What you will need (sold separately)	Quantity
 <b>GreenMAX DRC Line Voltage Room Controller</b> DRC07-ED0	1
 <b>GreenMAX DRC 0-10V Smart Pack</b> DRD07-ED0	3
 <b>GreenMAX DRC Digital Sensor</b> OSR05-ICW	1
 <b>GreenMAX DRC Analog Interface (AI)</b> DRID0-C02	1
 <b>Analog Occupancy Sensor</b> OSCxx-MWW	1
 <b>GreenMAX DRC 8-Button Digital Keypad</b> DRKDN-C8W	1
 <b>Sapphire™ Touch Screen</b> TS007-000	1
 <b>Marked Controlled Receptacles</b> 16352-2PW	1
 <b>PoE ACCESS POINT</b> EMA00-000	1

# Common Area

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Provolt™ Room Controller (PRC)

- Comprehensive solution integrates multiple lighting control strategies—occupancy sensing, 0-10V dimming, daylight harvesting, partial-ON, partial-OFF and demand response
- Combined line voltage multi-technology or PIR sensor, power pack and photocell in a self-contained, easy-to-install compact device
- Configure and test controls from an Android or Apple smart device via the Provolt Bluetooth Mobile App—reduces callbacks



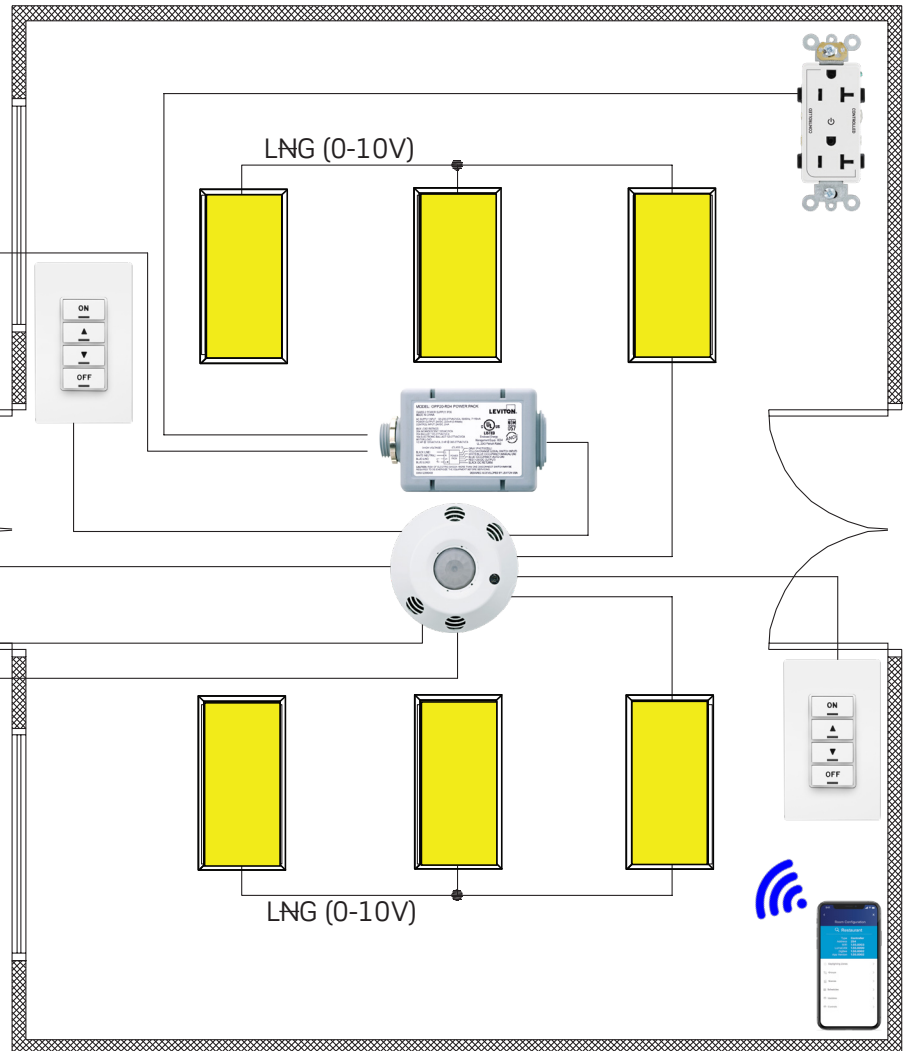
Receptacle  
Circuit  
Line Feed

LNG

Lighting  
Circuit  
Line Feed

LNG

Demand Response  
Emergency Input



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing
- **Section 8.4.2**  
- Automatic Receptacle Control

### Features:

- 0-10V Dimming Control
- Self-Contained Occupancy Sensor, Photocell and Power Pack
- Vacancy or Occupancy Sensing with Auto-OFF
- Auto Calibration
- Daylighting Set Point Adjustment through Entry Station
- Emergency Input
- Decora® 4-Button Entry Station
- Plug Load Control
- Time Clock Input
- Demand Response

### What you will need (sold separately)

### Quantity

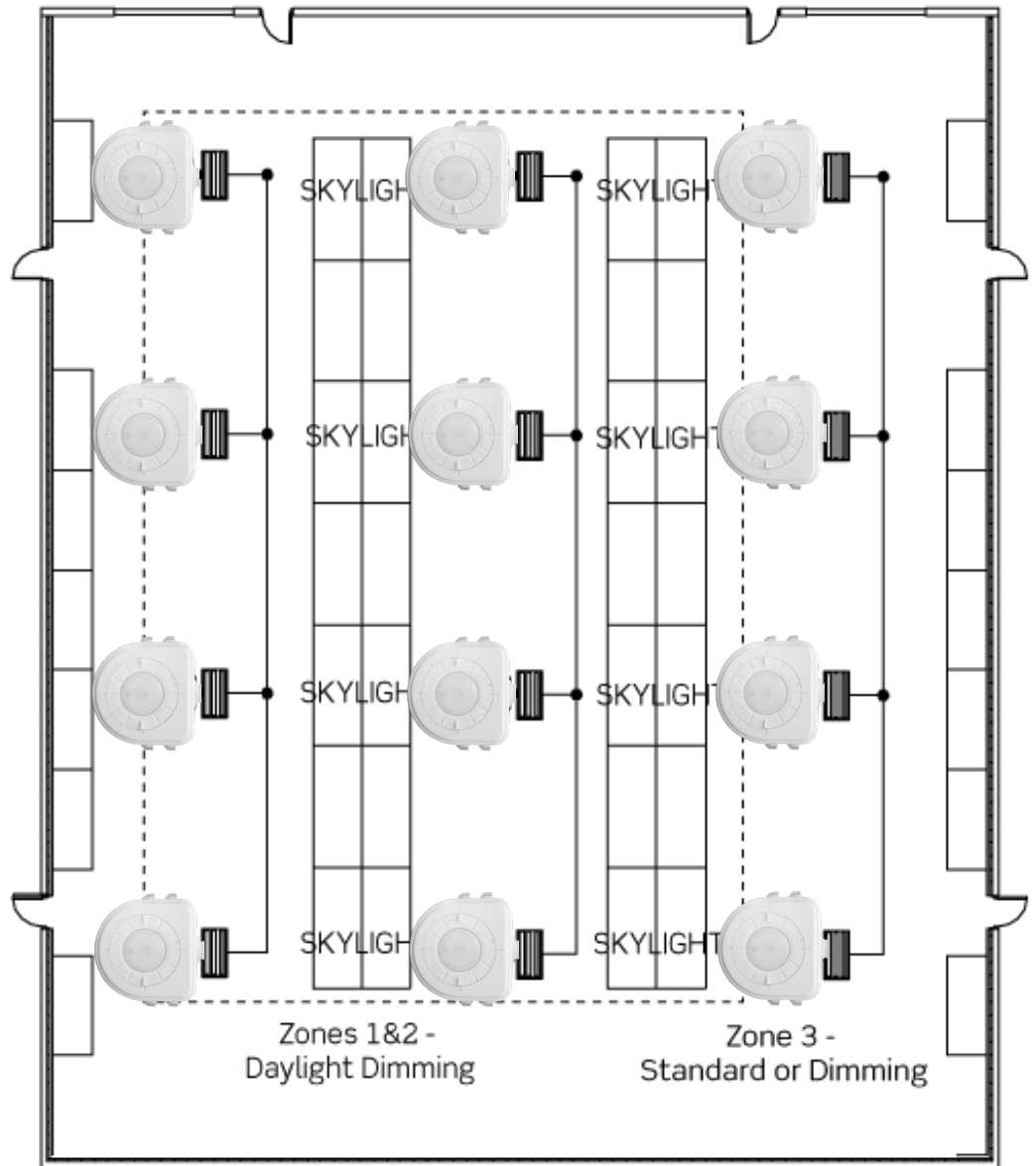
	<b>Provolt Room Controller (PRC)</b> O5C04-IDW	1
	<b>Provolt Low-Voltage Keypad, 4-Button</b> PLVSW-4LW	2
	<b>OPP20 Super Duty Power Pack</b> OPP20-0D1	1
	<b>Marked "Controlled" Receptacles</b> 16352-2PW	5

# Warehouse

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### 0-10V PIR High Bay/Low Bay Fixture Mount Occupancy Sensor

- Built-in photocell for convenient automatic daylight harvesting
- Set time delay—up to 30 minutes
- Includes high and low bay lenses to cover a variety of high ceiling applications
- Patented AutoCal™ for set-it and forget-it photocell calibration
- Suitable for use in standard and cold storage applications



#### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing

#### Features:

- Occupancy Sensing
- Daylight Harvesting
- 0-10V LED Control
- Variable Time Delay
- False Detection Protection

#### What you will need (sold separately)

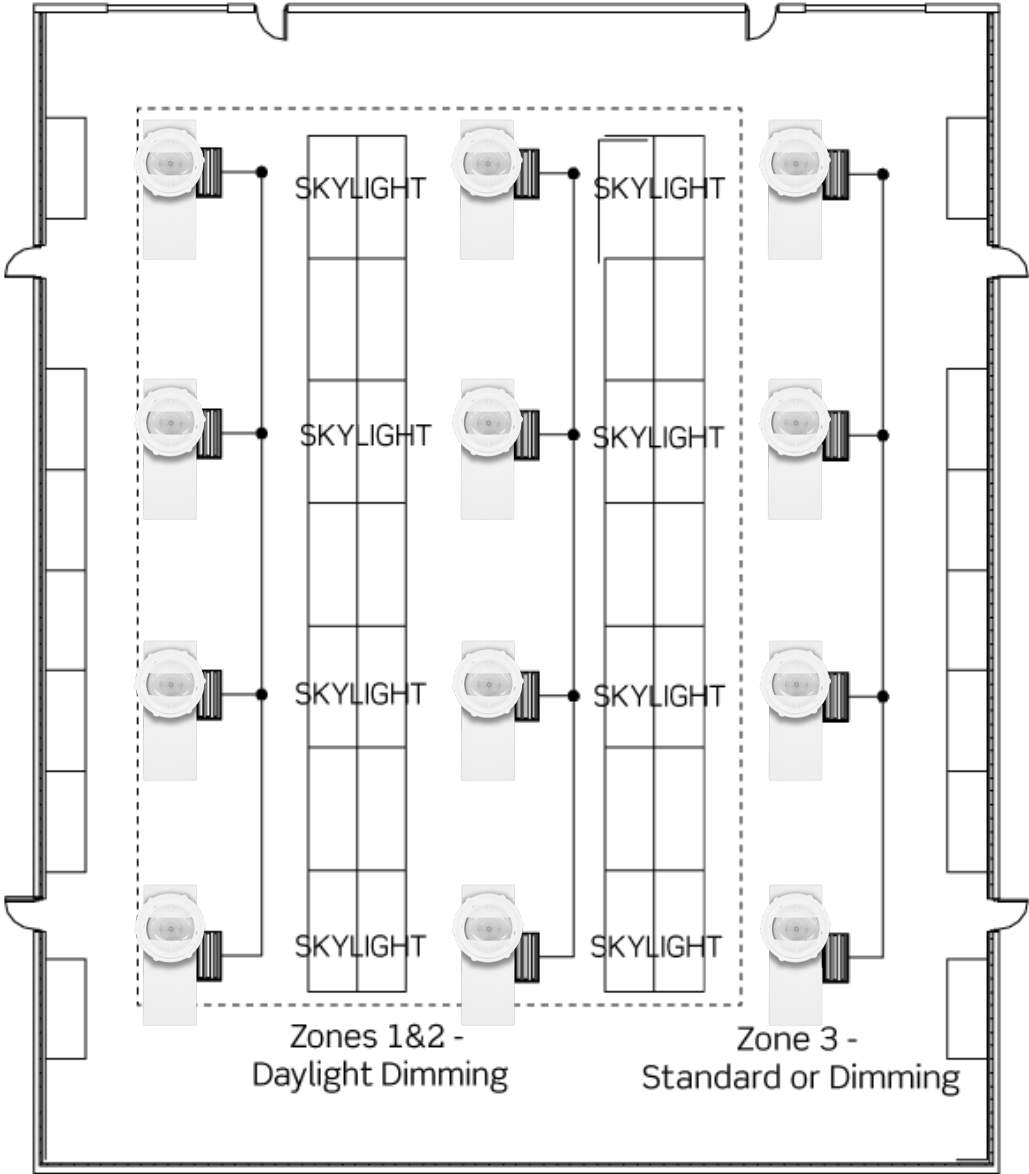
	Quantity
 Fixture Mount 0-10V PIR High/Low Bay Occupancy Sensor HB011-PDX	1 per fixture

# Warehouse

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### Smart PIR Integrated Fixture Mount Sensor

- Designed for use with switching or 0-10V dimming ballasts/drivers
- Mounting heights from 8-40 ft.
- Multiple daylight modes as well as partial-OFF operation
- High and low bay lenses
- Auto and manual calibration
- Out-of-the-box configuration default modes



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing

### Features:

- Occupancy Sensing
- Daylight Harvesting
- 0-10V LED Control
- Variable Time Delay
- False Detection Protection

### What you will need (sold separately)

### Quantity

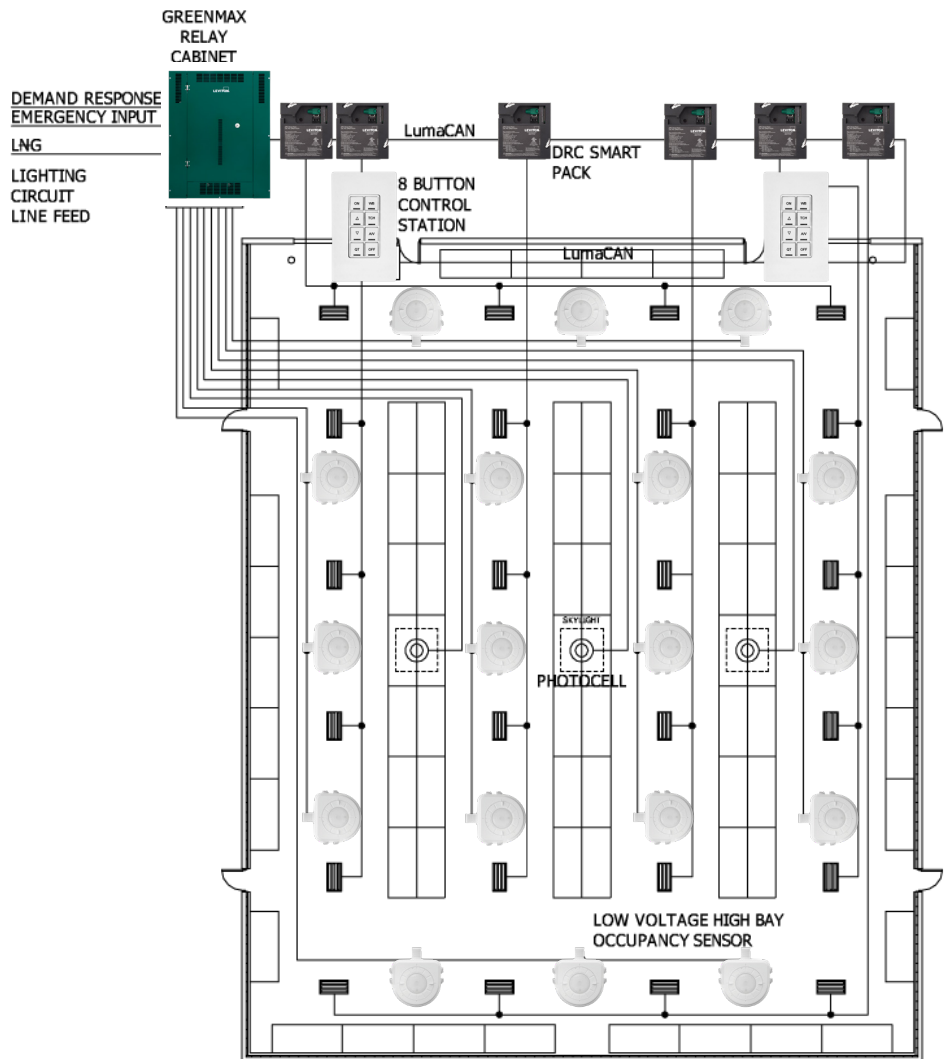
	<b>Smart PIR Integrated Fixture Mount Sensor</b> ZLD1Z-10W	1 per fixture
--	---	---------------

# Warehouse

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® DRC Smart Packs

- Integrates common sensing, dimming, switching, and advanced daylight harvesting applications from the same cabinet
- BACnet IP native in each cabinet for seamless BMS integration
- Industry leading 25,000A Short Circuit Current Rating (SCCR) at 277V
- Integrated 0-10V dimming/switching relay
- Built-in override switch allows manual control of each load individually



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing

### Features:

- Relay Control
- Occupancy Sensing
- Daylight Harvesting
- Decora® 4 Button Entry Stations
- Software and Handheld Remote Programming
- Astronomical Time Clock
- Scheduling (Behavior Control)
- Demand Response
- HVAC and Emergency Interface
- Building Automation (BACnet)
- Fail-Safe Circuitry (NFPA Compliant)
- Partial-OFF

### What you will need (sold separately)

### Quantity

	<b>GreenMAX Relay Control System</b> RxxTC-100   RPMxx-xxx   Rxxxx-xxx   RHU1-xxx   RELAY-xxx	1
	<b>GreenMAX DRC Smart Pack (DRC)</b> DRD07-ED0	6
	<b>Fixture Mount PIR High/Low Bay Dimming Occupancy Sensor</b> HB011-PDX	18
	<b>GreenMAX Digital Lighting Control Station, 8-Button</b> RDGSW-8CW	2

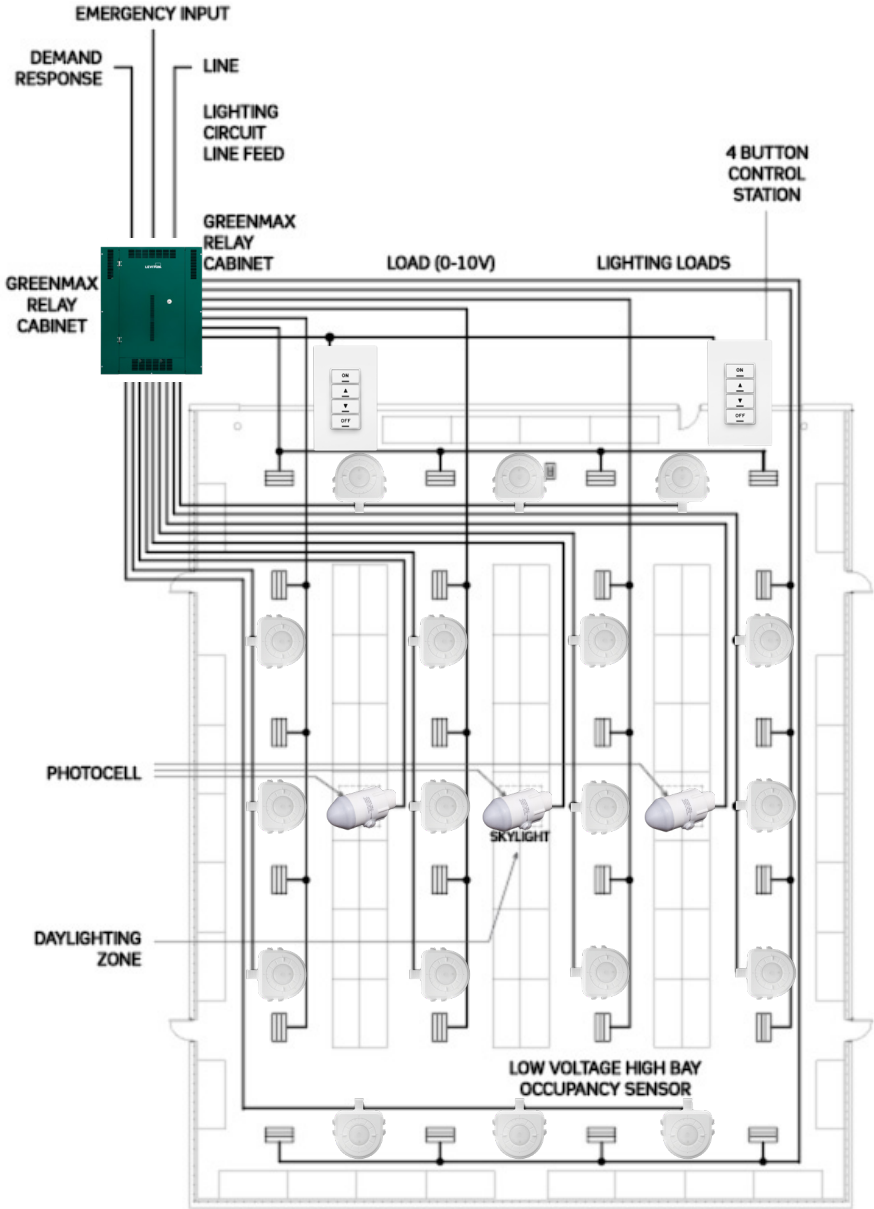
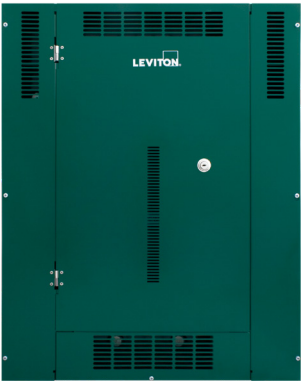


# Warehouse

## FEATURED LEVITON ASHRAE 90.1 SOLUTION

### GreenMAX® Relay Control System

- Integrates common sensing, dimming, switching, and advanced daylight harvesting applications from the same cabinet
- BACnet IP native in each cabinet for seamless BMS integration
- Industry leading 25,000A Short Circuit Current Rating (SCCR) at 277V
- Integrated 0-10V dimming/switching relay
- Built-in override switch allows manual control of each load individually



### Meets the Following Requirements:

- **Section 9.4.1**  
- Lighting Controls
- **Section 9.4.1.1**  
- Interior Lighting Control
- **Section 9.4.3**  
- Functional Testing

### Features:

- Relay Control
- Occupancy Sensing
- Daylight Harvesting
- Decora® 4 Button Entry Stations
- Software and Handheld Remote Programming
- Astronomical Time Clock
- Scheduling (Behavior Control)
- Demand Response
- HVAC and Emergency Interface
- Building Automation (BACnet)
- Fail-Safe Circuitry (NFPA Compliant)
- Partial-OFF

### What you will need (sold separately)

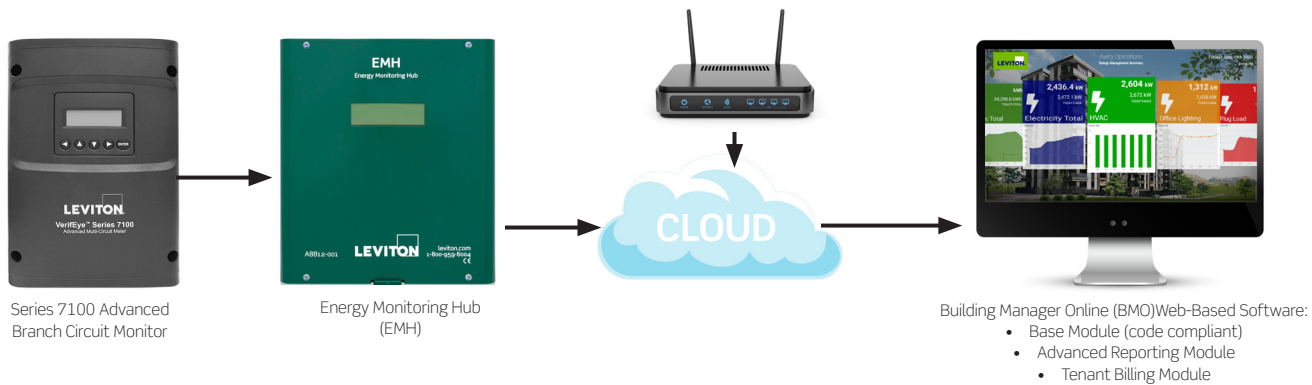
### Quantity

What you will need (sold separately)	Quantity
 <b>GreenMAX Relay Control System</b> RxxTC-100   RPMxx-xxx   Rxxxx-xxx   RHDU1-xxx   RELAY-xxx	1
 <b>Lighting Control Station</b> RLVSW-4LW	2
 <b>Low Voltage High Bay Occupancy Sensor</b> OSFHD-xxW	18
 <b>Indoor Photocell</b> PCSKY-000	3

# Energy Monitoring Solution

## FEATURED LEVITON ASHRAE 90.1 SOLUTION VerifEye™ Submetering Solutions

- Comprehensive line of submeters, communication products, and software solutions
- Simple installation in new or existing facilities
- Measurement & Verification (M&V) capabilities with data collection and storage
- Ideal for real-time energy monitoring and tenant billing
- Integrate with Building Management Systems for energy efficiency and savings
- Meets separation of load requirements with the ability to measure various loads



### Meets the Following Requirements:

- Section C405.12-12.3  
- Energy Monitoring

### Notes

- Meets all local and national submetering requirements including IECC 2021, City of Seattle, and New York Local Law 88

### What you will need (sold separately)

### Quantity

	<b>Series 7000-7100 Advanced Branch Circuit Monitor</b> 71D48-XXX / 71D12-XXX	1
	<b>Energy Monitoring Hub</b> A8812-xxx	1
	<b>Building Manager Online (BMO)</b> BMOSW-050 / BMOSW-MTR	Varies by metering points required







# Leviton Non-Residential Solutions for ASHRAE 90.1 2022

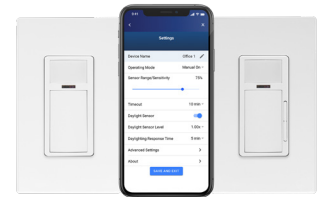
## Sensing Controls

- Broadest range of occupancy and vacancy sensors for any application
- Plug load control with OPP20 Super Duty Power Pack
- 24 AC/DC input for integration with HVAC/BAS systems
- Industry-leading layout and applications



## Smart Wallbox Sensors

- Combines occupancy/vacancy sensing with ON/OFF switching, 0-10V, or phase dimming
- Easy programming and configuration with default mode, pushbutton configuration, or the Smart Sensor App
- Add a Power Pack and Controlled Receptacles for plug load control
- Create multi-way control with up to 5 devices
- Non-neutral and antimicrobial models available



## Provolt™ Room Controller (PRC)

- Requires only two devices to be installed for high performance lighting controls—0-10V dimming, occupancy and vacancy sensing, partial-ON, partial-OFF, daylight harvesting and demand response
- Perform all testing, configuration and control using the Provolt App
- Features customizable room templates for fast multi-room replication



## Integrated Room Control (IRC)

- Combines 0-10V dimming, occupancy/vacancy sensing, partial-ON, partial-OFF, daylight harvesting and demand response capabilities in a stand-alone package
- Kitted with sensor, photocell, and 4-button switch
- Autocal™ automatic photocell calibration and Ladderless Commissioning™
- Easy automatic closed or open loop multi-zone daylight harvesting control
- Auto 100 hour burn-in



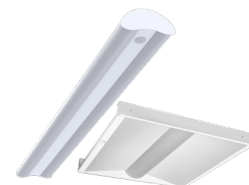
## Lumina™ RF Standalone Wireless Room Control System

- Ideal retrofit solution for multi-zone control with wireless controls
- Compatible with virtually all lamps
- Wireless control for any ON/OFF, 0-10V and phase cut dimming applications
- Add additional components for multi-location control, occupancy/vacancy sensing, daylight harvesting and more
- Program using the Lumina RF Standalone App



## Intellect™ - enabled Fixtures

- Virtually any fixture can be Intellect enabled for in fixture control
- Integrates wireless dimming, occupancy/vacancy sensing and multi-zone daylight harvesting
- Configure, monitor and control a space using the GreenMAX DRC App



### GreenMAX® DRC Room Control System

- Scalable wired and wireless distributed room control system with each room operating independently of others
- Plug-and-play, Category 6, RJ45 hardwired digital network or wireless mesh system
- Fully configurable using the GreenMAX DRC App



### GreenMAX® Relay Control System

- Integrates common sensing, dimming, switching, and advanced daylight harvesting applications from the same cabinet
- BACnet IP native in each cabinet for seamless BMS integration
- Industry leading 25,000A Short Circuit Current Rating (SCCR) at 277V
- Integrated 0-10V dimming/switching relay
- Built-in override switch allows manual control of each load individually
- Program with preset “Behaviors” using the handheld display Unit (HDU)



### Track Light Limiting Panel (TLLP)

- Prevents overloaded circuits
- Provides tamper-proof current limiting protection for track lighting
- Sets a fixed power consumption limit for designer lighting installations by using the volt amperage rating of the breaker instead of watts per linear feet
- Factory configured to customer specifications—arrives ready to install
- Reduces installation costs—no programming required



### Sapphire™ Touch Screen Room Controller

- Room Controller function — connects all energy management devices together in a space without requiring a gateway or hub
- Color turning—for circadian rhythms
- Scheduler—provides 7-day rotating schedule, holiday exception calendar, special events calendar and astronomical time clock
- AV controls—delivers single control interface for lighting and AV; ideal for classroom and restaurant application



### Marked “Controlled” Receptacles

- Meets requirements for identifying receptacles that will automatically be de-energized as part of an overall plug load control program
- 2014 and 2017 NEC requires all 15A and 20A, 125V receptacles that are automatically controlled to be marked with a specific symbol (Ⓢ)

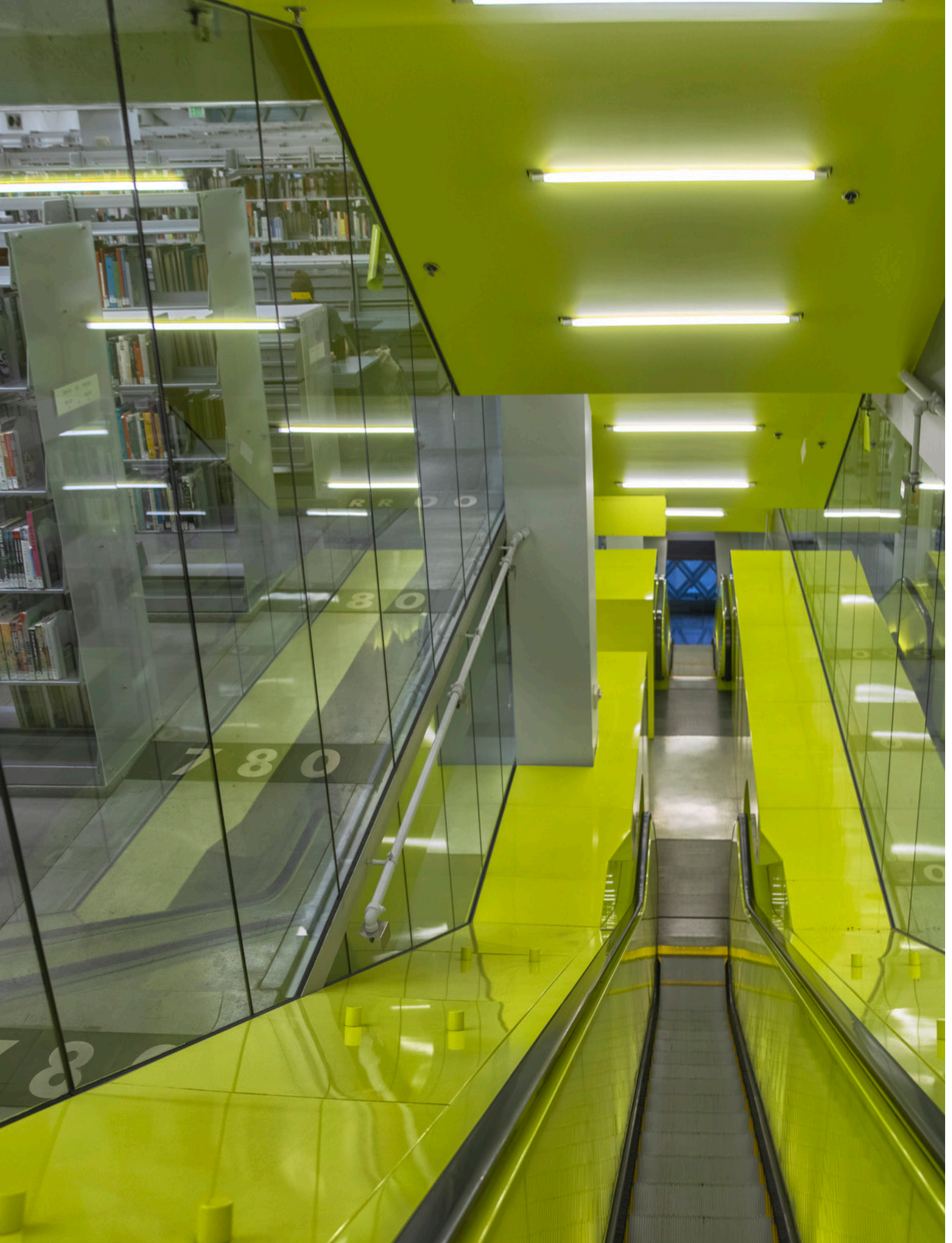


### VerifEye™ Submetering Solutions

- Complete utility submetering solution
- Comprehensive line of submeters, communication products, and software solutions
- Simple installation in new or existing facilities
- Measurement & Verification (M&V) capabilities with data collection and storage
- Ideal for real-time energy monitoring and tenant billing







## ASHRAE 90.1 2022 Mandatory Provisions Supplemental

**Table 9.5.1 Lighting Power Density Allowances Using the Building Area Method**

Building Area Type <sup>a</sup>	LPD, W/ft <sup>2</sup>
Automotive Facility	0.73
Convention Center	0.64
Dining: Bar Lounge/Leisure	0.74
Dining: Cafeteria/Fast Food	0.70
Dinning: Family	0.65
Dormitory	0.52
Exercise Center	0.72
Fire Station	0.56
Gymnasium	0.75
Health Care Clinic	0.77
Hospital	0.92
Hotel/Motel	0.53
Library	0.83
Manufacturing Facility	0.82
Motion Picture Theater	0.43
Multi-Family	0.46
Museum	0.56
Office	0.62
Parking Garage	0.17
Penitentiary	0.65
Performing Arts Theater	0.82
Police Station	0.62
Post Office	0.64
Religious Facility	0.66
Retail	0.78
School/University	0.70
Sports Arena	0.73
Town Hall	0.67
Transportation	0.56
Warehouse	0.45
Workshop	0.86

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.3.1-1 Simplified Building Method for Office Buildings

Interior Space Type and LPA	Controls
<p>All spaces in office buildings other than parking garages</p> <p>The total LPA for the building other than parking garages shall not exceed 0.56 W/ft<sup>2</sup>.</p>	<p>All lighting shall be automatically controlled to turn off when individual spaces are either unoccupied or scheduled to be unoccupied. (<b>Exception:</b> Lighting load not exceeding 0.02 W/ft<sup>2</sup> multiplied by the gross lighted area of the space shall be permitted to operate at all times.)</p> <p>Each space shall have a manual control device that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.</p>
Office spaces ≤ 150 ft, classrooms, conference rooms, meeting rooms, training rooms, storage rooms, and break rooms	These spaces shall also be controlled by manual-ON occupant sensors
Office spaces >150 ft <sup>2</sup> and restrooms	These spaces shall also be controlled by occupant sensors.
Stairwells and corridors in office buildings	These spaces shall also be controlled by occupant sensors that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 15 minutes and be controlled to turn off when the building is either unoccupied or scheduled to be unoccupied.
<p>Parking garages: The LPA shall not exceed 0.14 W/ft<sup>2</sup> for the interior parking floors.</p> <p>Uncovered floors of a garage shall use LPA and control requirements in Table 9.3.2 for parking lots.</p>	<p>All lighting shall be controlled by occupant sensors. Controls shall reduce the power by a minimum of 50% when no activity is detected for not longer than 15 minutes. No device shall control more than 3600 ft<sup>2</sup>.</p>

## Table 9.3.1-2 Simplified Building Method for Retail Buildings

Interior Space Type	Controls
<p>All spaces in retail buildings other than parking garages.</p> <p>The total LPA for the building other than parking garages shall not exceed 0.70 W/ft<sup>2</sup>.</p>	<p>All lighting shall be automatically controlled to turn off when individual spaces are either unoccupied or scheduled to be unoccupied. (Exception: Lighting load not exceeding 0.02 W/ft<sup>2</sup> multiplied by the gross lighted area of the space shall be permitted to operate at all times.) Each space shall have a manual control device that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.</p>
Sales Area	<p>These spaces shall also be automatically controlled to:</p> <ul style="list-style-type: none"> <li>• Reduce the general lighting power by a minimum of 75% during nonbusiness hours,</li> <li>• To turn off all lighting other than general lighting during nonbusiness hours, and</li> <li>• By continuous daylight dimming controls in spaces with toplighting.</li> </ul>
Stock rooms, dressing/fitting rooms, locker rooms, and restrooms	These spaces shall also be controlled by; auto-ON or manual-ON occupant sensors, and continuous daylight dimming controls in spaces with toplighting.
Office spaces, conference rooms, meeting rooms, training rooms, storage rooms, break rooms, and utility spaces	These spaces shall also be controlled by; manual-ON occupant sensors, and continuous daylight dimming controls in spaces with toplighting.
Stairwells and corridors in retail buildings	These spaces shall also be controlled by occupant sensors that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 15 minutes and be controlled to turn off when the building is either unoccupied or scheduled to be unoccupied.
<p>Parking garages: The LPA shall not exceed 0.14 W/ft<sup>2</sup> for the interior parking floors.</p> <p>Uncovered floors of a garage shall use LPA and control requirements in Table 9.3.2 for parking lots.</p>	<p>All lighting shall be controlled by occupant sensors. Controls shall reduce the power by a minimum of 50% when no activity is detected for not longer than 15 minutes. No device shall control a more than 3600 ft<sup>2</sup>.</p>

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.3.1-3 Simplified Building Method for School Buildings

Interior Space Type	Controls
All spaces in school buildings other than parking garages.  The total LPA for the building other than parking garages shall not exceed 0.63 W/ft <sup>2</sup>	All lighting shall be automatically controlled to turn off when individual spaces are either unoccupied or scheduled to be unoccupied. (Exception: Lighting load not exceeding 0.02 W/ft <sup>2</sup> multiplied by the gross lighted area of the space shall be permitted to operate at all times.)  Each space shall have a manual control device that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.
Classrooms, offices spaces, conference rooms, meeting rooms, library, storage rooms, and break rooms	These spaces shall also be controlled by manual-ON occupant sensors
Gymnasiums and cafeterias	These spaces shall also be controlled by occupant sensors.
Restrooms	These spaces shall also be controlled by occupant sensors.
Stairwells and corridors in school buildings and parking garages	These spaces shall also be controlled by occupant sensors that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 15 minutes and be controlled to turn off when the building is either unoccupied or scheduled to be unoccupied.
Parking Garages: The LPA shall not exceed 0.14 W/ft <sup>2</sup> for the interior parking floors.  Uncovered floors of a garage shall use LPA and control requirements in Table 9.3.2 for parking lots.	All lighting shall be controlled by occupant sensors. Controls shall reduce the power by a minimum of 50% when no activity is detected for not longer than 15 minutes. No device shall control a more than 3600 ft <sup>2</sup> .

## Table 9.3.2 Simplified Building Method for Building Exteriors

Exterior Area Type	Exterior Lighting Power Allowance <sup>a,b</sup>	Controls
All exterior areas	—	All lighting shall be automatically controlled to shut off the lighting when daylight is available.
Base allowance	200 W	Luminaires shall be turned off or the power reduced by a minimum of 75% during non-operating hours.
Facade lighting	0.10 W/ft <sup>2</sup>	
Roof terraces, special feature areas, walkways, plazas and ramps	0.07 W/ft <sup>2</sup>	
Landscape	0.036 W/ft <sup>2</sup>	
Entry doors	14 W/linear ft	
Stairs	Exempt	No additional controls required.
Parking lots and drives	0.037 W/ft <sup>2</sup>	Luminaires mounted 25 ft or less above grade shall be controlled to reduce the power by at least 50% when no activity is detected for not longer than 15 minutes.
All other areas not listed	0.20 W/ft <sup>2</sup>	Luminaires shall be turned off or the power reduced by a minimum of 75% during non-operating hours.

<sup>a</sup> To calculate the exterior allowance, multiply the space or area square footage by the allowed W/ft<sup>2</sup> and sum the exterior allowances and the base allowance.

Facade lighting shall be calculated separately by multiplying the facade area by the allowed W/ft<sup>2</sup>. Facade allowance shall not be traded with other exterior areas or between separate facade areas.

<sup>b</sup> For buildings in Lighting Zone 2, as defined in Table 9.4.2-1, multiply exterior allowances by 0.7. For buildings in Lighting Zone 4, as defined in Table 9.4.2-1, multiply exterior allowances by 1.4.



# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

**Table 9.5.2.1-1 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method**

<b>Informative Note:</b> This table covers common space types typically found in multiple building types. Table 9.5.2.1-2 covers building-specific space types typically found in a single building type.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
---	---

Common Space Types <sup>a</sup>	LPD, W/ft <sup>2</sup>	RCR	Local Control	Manual ON	Partial-ON	Multi-Level Lighting Control				
			9.4.1.1(a)	9.4.1.1(b)	9.4.1.1(c)	9.4.1.1(d)				
<b>Atrium</b>										
<20 ft in height	0.32	N/A	REQ	ADD1	ADD1	—				
≤20 ft and ≥ 40 ft in height	0.41	N/A				—				
>40 ft in height	0.51	11				—				
<b>Audience Seating Area</b>										
Auditorium	0.57	6	REQ	ADD1	ADD1	REQ				
Gymnasium	0.23	6								
Motion Picture Theater	0.27	4								
Performing Arts Theater	1.10	8								
Sports Arena	0.27	4								
All Other Audience Seating Areas	0.23	4				—				
<b>Banking Activity Area</b>	0.56	6				REQ				
<b>Classroom/Lecture Hall/Training Room</b>										
Shop classroom	1.17	6	REQ	ADD1	ADD1	—				
All other Classrooms/ Lecture Halls/ Training Rooms	0.72	4				REQ				
<b>Computer Room</b>	0.75	4								
<b>Conference/ Meeting/ Multipurpose Rooms</b>	0.88	6								
<b>Control/Editing Room or Booth</b>	0.73	6								
<b>Copy/Print Room</b>	0.56	6					—			
<b>Corridor</b>	0.44	width < 8 ft					—			
<b>Courtroom</b>	1.08	6					REQ			
<b>Dining Areas</b>										
Bar/Lounge or Leisure Dining	0.76	4					REQ	ADD1	ADD1	REQ



# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-1 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

**Informative Note:** This table covers common space types typically found in multiple building types. Table 9.5.2.1-2 covers building-specific space types typically found in a single building type.

The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type:  
 (1) All REQs shall be implemented.  
 (2) At least one ADD1 (when present) shall be implemented.  
 (3) At least one ADD2 (when present) shall be implemented.

	Daylight Response Sidelight	Daylight Response Toplight	Auto Reduction (Full OFF complies)	Auto Full OFF	Scheduled Shutoff		
Common Space Types <sup>a</sup>	9.4.1.1(e) <sup>b</sup>	9.4.1.1(f) <sup>b</sup>	9.4.1.1(g)	9.4.1.1(h)	9.4.1.1(i)		
<b>Atrium</b>							
<20 ft in height	REQ	REQ	—	ADD2	ADD2		
≤20 ft and ≥40 ft in height							
>40 ft in height							
<b>Audience Seating Area</b>							
Auditorium	REQ	—	—	ADD2	ADD2		
Gymnasium		REQ					
Motion Picture Theater	—	—	—	ADD2	ADD2		
Performing Arts Theater	—	—					
Sports Arena	—	—					
All Other Audience Seating Areas	REQ	REQ					
<b>Banking Activity Area</b>							
<b>Classroom/Lecture Hall/Training Room</b>							
Shop Classroom	REQ	REQ	—	—	REQ		
All other Classrooms/Lecture Halls/Training Rooms			—	REQ	—		
<b>Computer Room</b>			—	ADD2	ADD2		
<b>Conference/Meeting/Multipurpose Rooms</b>			—	REQ	—		
<b>Control/Editing Room or Booth</b>			—	ADD2	ADD2		
<b>Copy/Print Room</b>			—	REQ	—		
<b>Corridor</b>			REQ	ADD2	—		
<b>Courtroom</b>			—	ADD2	ADD2		
<b>Dining Areas</b>							
Bar/Lounge or Leisure Dining			REQ	REQ	—	ADD2	ADD2

a. Where both a common space type and a building-specific space type are listed, the building-specific space type shall apply (see Table 9.5.2.1-2 for building-specific space types).

b. Automatic daylight responsive controls are mandatory only if the space meets the requirements of the specified sections.

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-1 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

**Informative Note:** This table covers common space types typically found in multiple building types. Table 9.5.2.1-2 covers building-specific space types typically found in a single building type.

The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type:  
 (1) All REQs shall be implemented.  
 (2) At least one ADD1 (when present) shall be implemented.  
 (3) At least one ADD2 (when present) shall be implemented.

Common Space Types <sup>a</sup>	LPD, W/ft <sup>2</sup>	RCR	Local Control	Manual ON	Partial-ON	Multi-Level Lighting Control
			9.4.1.1(a)	9.4.1.1(b)	9.4.1.1(c)	9.4.1.1(d)
Cafeteria or Fast-Food Dining	0.36	4	REQ	ADD1	ADD1	—
Family Dining	0.52	4				REQ
All other Dining Areas	0.42	4				—
<b>Electrical/Mechanical Room</b>	0.71	6	ADD1	ADD1	ADD1	—
<b>Emergency Vehicle Garage</b>	0.51	4				—
<b>Equipment Room</b>	0.73	6				—
<b>Food Preparation Area</b>	1.19	6				—
<b>Guest Room</b>	0.41	6	See Section 9.4.1.3(b)			
<b>Laboratory</b>						
In or as a Classroom	1.05	6	ADD1	ADD1	ADD1	REQ
All other Laboratories	1.21	6				
<b>Laundry/Washing Area</b>	0.51	4				
<b>Loading Dock, Interior</b>	0.87	6				
<b>Lobby</b>						
Elevator	0.64	6	—	—	—	—
Hotel	0.48	4	—	—	—	—
Motion Picture Theater	0.20	4	—	—	—	—
Performing Arts Theater	1.21	6	—	—	—	—
All Other Lobbies	0.80	4	—	—	—	—
<b>Locker Room</b>	0.43	6	ADD1	ADD1	ADD1	REQ
<b>Lounge/Breakroom</b>						
<b>Mother's/Wellness Room</b>	0.68	6	ADD1	ADD1	ADD1	REQ
<b>All other Lounges/Breakrooms</b>	0.55	4				

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-1 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

<b>Informative Note:</b> This table covers common space types typically found in multiple building types. Table 9.5.2.1-2 covers building-specific space types typically found in a single building type.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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	Daylight Response Sidelight	Daylight Response Toplight	Auto Reduction (Full OFF complies)	Auto Full OFF	Scheduled Shutoff
Common Space Types <sup>a</sup>	9.4.1.1(e) <sup>b</sup>	9.4.1.1(f) <sup>b</sup>	9.4.1.1(g)	9.4.1.1(h)	9.4.1.1(i)
Cafeteria or Fast-Food Dining	REQ	REQ	—	ADD2	ADD2
Family Dining			—		
All other Dining Areas			—		
<b>Electrical/Mechanical Room</b>	—	—	—	—	—
<b>Emergency Vehicle Garage</b>	REQ	REQ	—	ADD2	ADD2
<b>Equipment Room</b>			—		
<b>Food Preparation Area</b>			—		
<b>Guest Room</b>	See Section 9.4.1.3(b)				
<b>Laboratory</b>					
In or as a Classroom	REQ	REQ	REQ	ADD2	ADD2
All other Laboratories			—		
<b>Laundry/Washing Area</b>			—	REQ	
<b>Loading Dock, Interior</b>	—	—	—	ADD2	ADD2
<b>Lobby</b>					
Elevator	REQ	REQ	—	ADD2	ADD2
Hotel			—		
Motion Picture Theater			—		
Performing Arts Theater			—		
All Other Lobbies			REQ		
<b>Locker Room</b>	—	—	—	REQ	—
<b>Lounge/Breakroom</b>					
<b>Mother's/Wellness Room</b>	—	—	REQ	—	—
<b>All other Lounges/Breakrooms</b>	REQ	REQ			

a. Where both a common space type and a building-specific space type are listed, the building specific space type shall apply (see Table 9.5.2.1-2 for building-specific space types).  
b. Automatic daylight responsive controls are mandatory only if the space meets the requirements of the specified sections.

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

**Table 9.5.2.1-1 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method**

<b>Informative Note:</b> This table covers common space types typically found in multiple building types. Table 9.5.2.1-2 covers building-specific space types typically found in a single building type.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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Common Space Types <sup>a</sup>	LPD, W/ft <sup>2</sup>	RCR	Local Control 9.4.1.1(a)	Manual ON 9.4.1.1(b)	Partial-ON 9.4.1.1(c)	Multi-Level Lighting Control 9.4.1.1(d)
<b>Office</b>						
Office ≤ 150 ft <sup>2</sup>	0.73	8	REQ	ADD1	ADD1	REQ
Office > 150 and ≤ 300 ft <sup>2</sup>	0.66	8				
Offices > 300 ft <sup>2</sup>	0.56	4				
<b>Parking Garage</b>						
Daylight Transition Zone	1.06	4	See Section 9.4.1.2			
All Other Parking and Drive Areas	0.11	4	See Section 9.4.1.2			
<b>Pharmacy Area</b>	1.59	6	REQ	ADD1	ADD1	REQ
<b>Restroom</b>	0.74	8	—	—	—	—
<b>Sales Area</b> (For accent lighting, see Section 9.5.2.2[b])	0.85	6	REQ	ADD1	ADD1	—
<b>Seating Area, General</b>	0.21	4				—
<b>Security Screening</b>						
Airport/Bus/Ship/Train Transportation Screening	0.93	6	REQ	—	—	—
Airport/Bus/Ship/Train Screening Queue	0.56	6		—	—	—
General Security Screening	0.64	6		—	—	—
<b>Stairway</b>	The <i>space</i> containing the stairway shall determined the <i>LPD</i> and control requirements for the stairway					
<b>Stairwell</b>	0.47	10	—	—	—	—
<b>Storage Room</b>						
<50 ft <sup>2</sup>	0.49	9	REQ	REQ	—	—
≥50 ft <sup>2</sup>	0.35	6		—	—	—
<b>Vehicular Maintenance Area</b>	0.59	4		ADD1	ADD1	—
<b>Workshop (Including Workshop Classroom)</b>	1.17	6		—		

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-1 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

<b>Informative Note:</b> This table covers common space types typically found in multiple building types. Table 9.5.2.1-2 covers building-specific space types typically found in a single building type.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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Common Space Types <sup>a</sup>	Daylight Response Sidelight 9.4.1.1(e) <sup>b</sup>	Daylight Response Toplight 9.4.1.1(f)	Auto Reduction (Full OFF complies) 9.4.1.1(g)	Auto Full OFF 9.4.1.1(h)	Scheduled Shutoff 9.4.1.1(i)
<b>Office</b>					
Office ≤ 150 ft <sup>2</sup>	—	—	—	REQ	—
Office > 150 and ≤ 300 ft <sup>2</sup>	—	—	—		—
Offices > 300 ft <sup>2</sup>	REQ	REQ	REQ		—
<b>Parking Garage</b>					
Daylight Transition Zone	See Section 9.4.1.2				
All Other Parking and Drive Areas	See Section 9.4.1.2				
<b>Pharmacy Area</b>	—	—	—	ADD2	ADD2
<b>Restroom</b>	—	—	—	REQ	
<b>Sales Area</b> (For accent lighting, see Section 9.5.2.2[b])	—	—	—	ADD2	ADD2
<b>Seating Area, General</b>	—	REQ	—		
<b>Security Screening</b>					
Airport/Bus/Ship/Train Transportation Screening	REQ	REQ	—	ADD2	ADD2
Airport/Bus/Ship/Train Screening Queue					
General Security Screening					
<b>Stairway</b>	The <i>space</i> containing the stairway shall determined the <i>LPD</i> and control requirements for the stairway				
<b>Stairwell</b>	REQ	REQ	REQ	ADD2	ADD2
<b>Storage Room</b>					
<50 ft <sup>2</sup>	—	—	—	REQ	—
≥50 ft <sup>2</sup>	—	—	—		—
<b>Vehicular Maintenance Area</b>	REQ	REQ	—	ADD2	ADD2
<b>Workshop (Including Workshop Classroom)</b>			—		

a. Where both a common space type and a building specific space type are listed, the building specific space type shall apply (see Table 9.5.2.1-1 for common space types)  
b. Automatic daylight responsive controls are mandatory only if the space meets the requirements of the specified sections.



# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

**Table 9.5.2.1-2 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method**

<b>Informative Note:</b> This table covers building-specific space types typically found in a single building type. Table 9.5.2.1-1 covers common space types typically found in multiple building types.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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Building-Specific Space Types <sup>a</sup>	LPD, W/ft <sup>2</sup>	RCR	Local Control 9.4.1.1(a)	Manual-ON 9.4.1.1(b)	Partial-ON 9.4.1.1(c)	Multi-Level Lighting Control 9.4.1.1(d)
<b>Casino—Gaming Area</b>						
Betting/ Sportsbook/Keno/ Bingo Areas	0.82	5	—	—	—	—
High-Limit Gaming Area	1.68	4	—	—	—	REQ
Slot Machine/Digital Gaming Area	0.54	5	—	—	—	
Table Games Area	1.09	5	—	—	—	
<b>Convention Center—Exhibit Space</b>	0.50	4	REQ	ADD1	ADD1	
<b>Correctional Facilities</b>						
Audience Seating Area	0.56	4	REQ	ADD1	ADD1	—
Classroom/Lecture Hall/Training Room	0.74	4		REQ		
Confinement Cells	0.60	6		—	—	—
Dining Area	0.35	6		ADD1	ADD1	REQ
<b>Dormitory—Living Quarters</b>	0.48	8		—	—	—
<b>Facility For the Visually Impaired</b> (A facility for the visually impaired is a facility that can be documented as being designed to comply with the light levels in ASNI/IES RP-28 and that is or will be licensed by local/state authorities for senior long-term care, adult daycare, senior support, and/or people with special visual needs)						
Chapel (used primary by residents)	0.58	4	REQ	ADD1	ADD1	REQ
Corridor (used primary by residents)	0.71	width <8 ft		—	—	—
Dining (used primary by residents)	1.22	4		ADD1	ADD1	REQ
Lobby	1.44	4				
Recreation Room/ Common Living Room (used primary by residents)	1.20	6	—	ADD1	ADD1	REQ
Restroom (used primary by residents)	0.96	8	—	—	—	—
<b>Fire Station—Sleeping Quarters</b>	0.22	6	REQ	—	—	—

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-2 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

<b>Informative Note:</b> This table covers building-specific space types typically found in a single building type. Table 9.5.2.1-1 covers common space types typically found in multiple building types.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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	Daylight Responsive Sidelight	Daylight Response Toplight	Auto Reduction (Full OFF complies)	Auto Full OFF	Scheduled Shutoff
Building-Specific Space Types <sup>a</sup>	9.4.1.1(e) <sup>b</sup>	9.4.1.1(f) <sup>b</sup>	9.4.1.1(g)	9.4.1.1(h)	9.4.1.1(i)
<b>Casino—Gaming Area</b>					
Betting/Sportsbook/Keno/Bingo Areas	—	—	—	ADD2	ADD2
High-Limit Gaming Area	—	—	—		
Slot Machine/Digital Gaming Area	—	—	—		
Table Games Area	—	—	—		
<b>Convention Center—Exhibit Space</b>	REQ	REQ	—	—	REQ
<b>Correctional Facilities</b>					
Audience Seating Area	REQ	REQ	—	—	ADD2
Classroom/Lecture Hall/Training Room			—	ADD2	—
Confinement Cells	—	—	—	—	REQ
Dining Area	—	REQ	—	ADD2	ADD2
<b>Dormitory—Living Quarters</b>	—	—	—	—	—
<b>Facility For the Visually Impaired</b> (A facility for the visually impaired is a facility that can be documented as being designed to comply with the light levels in ASNI/IES RP-28 and that is or will be licensed by local/state authorities for senior long-term care, adult daycare, senior support, and/or people with special visual needs)					
Chapel (used primary by residents)	—	—	—	ADD2	ADD2
Corridor (used primary by residents)	—	—	REQ		
Dining (used primary by residents)	—	—	—		
Lobby	—	—	REQ		
Recreation Room/Common Living Room (used primary by residents)	—	—	—		
Restroom (used primary by residents)	—	—	—	—	—
<b>Fire Station—Sleeping Quarters</b>	—	—	—	REQ	—

a. Where both a common space type and a building specific space type are listed, the building specific space type shall apply (see Table 9.5.2.1-1 for common space types)

b. Automatic daylight responsive controls are mandatory only if the space meets the requirements of the specified sections.

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-2 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

**Informative Note:** This table covers building-specific space types typically found in a single building type. Table 9.5.2.1-1 covers common space types typically found in multiple building types.

The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type:  
 (1) All REQs shall be implemented.  
 (2) At least one ADD1 (when present) shall be implemented.  
 (3) At least one ADD2 (when present) shall be implemented.

Building-Specific Space Types <sup>a</sup>	LPD, W/ft <sup>2</sup>	RCR	Local Control 9.4.1.1(a)	Manual-ON 9.4.1.1(b)	Partial-ON 9.4.1.1(c)	Multi-Level Lighting Control 9.4.1.1(d)
<b>Gymnasium/Fitness Center</b>						
Exercise Area	0.82	4	REQ	ADD1	ADD1	REQ
Playing Area	0.82	4				
<b>Healthcare Facility</b>						
Control Room (MRI/CT/Radiology/PET)	0.78	8	REQ	REQ	—	REQ
Exam/Treatment Room	1.33	8		—	—	
Hospital Corridor	0.61	width < 8 ft		—	—	—
Imaging Room	0.94	6		—	—	REQ
Lounge	0.77	6		—	—	—
Medical Supply Room	0.56	6		ADD1	ADD1	—
Nursery	0.87	6		—	—	REQ
Nurse's Station	1.07	6		—	—	
Operating Room	2.31	6		—	—	
Patient Room	0.78	6		—	—	
Physical Therapy Room	0.82	6		—	—	
Recovery Room	1.18	6		—	—	
Telemedicine	1.44	8		ADD1	ADD1	—
<b>Library</b>						
Reading Area	0.86	4	REQ	ADD1	ADD1	REQ
Stacks	1.18	4				—
<b>Manufacturing Facility</b>						
Detailed Manufacturing Area	0.75	4	REQ	ADD1	ADD1	—
Extra High Bay Area (>50 feet floor-to-ceiling height)	1.36	8				—

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-2 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

<b>Informative Note:</b> This table covers building-specific space types typically found in a single building type. Table 9.5.2.1-1 covers common space types typically found in multiple building types.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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Building-Specific Space Types <sup>a</sup>	Daylight Responsive Sidelight	Daylight Responsive Toplight	Auto Reduction (Full OFF complies)	Auto Full OFF	Scheduled Shutoff
	9.4.1.1(e) <sup>b</sup>	9.4.1.1(f) <sup>b</sup>	9.4.1.1(g)	9.4.1.1(h)	9.4.1.1(i)
<b>Gymnasium/Fitness Center</b>					
Exercise Area	REQ	REQ	—	ADD2	ADD2
Playing Area			—		
<b>Healthcare Facility</b>					
Control Room (MRI/CT/Radiology/PET)	—	—	—	REQ	—
Exam/Treatment Room	REQ	REQ	—	ADD2	ADD2
Hospital Corridor			ADD2		
Imaging Room	—	—	—	REQ	—
Lounge	REQ	REQ	—		
Medical Supply Room	—	—	—	ADD2	ADD2
Nursery	REQ	—	—		
Nurse's Station	—	REQ	—	ADD2	ADD2
Operating Room	—	—	—		
Patient Room	—	—	—	—	—
Physical Therapy Room	REQ	REQ	—	ADD2	ADD2
Recovery Room	—	—	—		
Telemedicine	REQ	REQ	—	REQ	—
<b>Library</b>					
Reading Area	REQ	REQ	—	ADD2	ADD2
Stacks	—	—	REQ		
<b>Manufacturing Facility</b>					
Detailed Manufacturing Area	REQ	REQ	—	ADD2	ADD2
Extra High Bay Area (>50 feet floor-to-ceiling height)			—		

a. Where both a common space type and a building specific space type are listed, the building specific space type shall apply (see Table 9.5.2.1-1 for common space types)  
b. Automatic daylight responsive controls are mandatory only if the space meets the requirements of the specified sections.

# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-2 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

<b>Informative Note:</b> This table covers building-specific space types typically found in a single building type. Table 9.5.2.1-1 covers common space types typically found in multiple building types.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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Building-Specific Space Types <sup>a</sup>	LPD, W/ft <sup>2</sup>	RCR	Local Control	Manual-ON	Partial-ON	Multi-Level Lighting Control
			9.4.1.1(a)	9.4.1.1(b)	9.4.1.1(c)	9.4.1.1(d)
High Bay Area (25 to 50 ft floor-to-ceiling height)	1.24	6	REQ	ADD1	ADD1	—
Low Bay Area (25 ft floor-to-ceiling height)	0.85	3				
<b>Museum</b>						
General Exhibition Area	0.31	6	REQ	ADD1	ADD1	REQ
Restoration Area	1.24	4				—
<b>Performing Arts Theater—Dressing Room</b>	0.39	6				—
<b>Post Office—Sorting Area</b>	0.71	4				REQ
<b>Religious Facility</b>						
Audience Seating Area	0.72	4	REQ	—	—	REQ
Fellowship Hall	0.50	4		ADD1	ADD1	
Worship/Pulpit/Choir Area	0.75	4				
<b>Retail Facility</b>						
Dressing/Fitting Room	0.45	8	—	ADD1	ADD1	—
Hair Care	0.65	6	REQ			—
Mall Concourse	0.57	4				REQ
Massage	0.81	8				—
Nail Care	0.75	6				—
<b>Sports Arena—Playing Area (Class of play as defined by ASNI/IEC RP-6)</b>						
Class I Facility	2.86	4	REQ	REQ	—	—
Class II Facility	1.98	4			—	—
Class III Facility	1.29	4			—	—
Class IV Facility	0.85	4		ADD1	ADD1	—



# ASHRAE 90.1 2022 Mandatory Provisions Supplemental

## Table 9.5.2.1-2 Space-by-Space Lighting Power Density Allowances and Minimum Control Requirements Using Either Method

<b>Informative Note:</b> This table covers building-specific space types typically found in a single building type. Table 9.5.2.1-1 covers common space types typically found in multiple building types.	The control functions below shall be implemented in accordance with the descriptions found within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.
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Building-Specific Space Types <sup>a</sup>	Daylight Response Sidelight	Daylight Response Toplight	Auto Reduction (Full OFF complies)	Auto Full OFF	Scheduled Shutoff
	9.4.1.1(e) <sup>b</sup>	9.4.1.1(f) <sup>b</sup>	9.4.1.1(g)	9.4.1.1(h)	9.4.1.1(i)
High Bay Area (25 to 50 ft floor-to-ceiling height)	REQ	REQ	—	ADD2	ADD2
Low Bay Area (25 ft floor-to-ceiling height)			—		
<b>Museum</b>					
General Exhibition Area	REQ	REQ	—	ADD2	ADD2
Restoration Area			—		
<b>Performing Arts Theater—Dressing Room</b>	—	—	—	—	—
<b>Post Office—Sorting Area</b>	REQ	REQ	REQ	—	—
<b>Religious Facility</b>					
Audience Seating Area	REQ	REQ	—	ADD2	ADD2
Fellowship Hall			—		
Worship/Pulpit/Choir Area			—		
<b>Retail Facility</b>					
Dressing/Fitting Room	—	—	—	ADD2	ADD2
Hair Care	—	—	—		
Mall Concourse	—	REQ	—		
Massage	—	—	—		
Nail Care	—	—	—		
<b>Sports Arena—Playing Area (Class of play as defined by ASNI/IEC RP-6)</b>					
Class I Facility	REQ	REQ	—	—	REQ
Class II Facility				—	
Class III Facility				—	
Class IV Facility				ADD2	ADD2

a. Where both a common space type and a building specific space type are listed, the building specific space type shall apply (see Table 9.5.2.1-1 for common space types)  
b. Automatic daylight responsive controls are mandatory only if the space meets the requirements of the specified sections.

# Service and Support

## During Every Step of the Process

There is much more to making lighting more energy efficient than just installing a simple device or two. System design, product selection, installation and service: it all has to come together. That's where Leviton service and support options come in. We'll help you design your system and make the right product selections so you can create a lighting control system that does exactly what you want it to do while saving electricity, meeting codes and standards, and even garnering rebates.

It all starts with the Leviton sales representative. Our lighting control specialists are here to support you every step of the way. They can perform on-site facility audits and suggest specific products and strategies for improving lighting energy efficiency.

### Exclusive Wealth of Resources

- **Exclusive Training** - contact your local Leviton representative to have an ASHRAE 90.1 expert provide training in person or online exclusively for your team
- **ASHRAE 90.1 App** - simplifies ASHRAE 90.1 lighting control requirements and provides examples for common applications - available for Android and Apple devices - download at [Leviton.com/apps](https://www.leviton.com/apps)
- **ASHRAE 90.1 Web Portal** - access application diagrams and product solutions - visit [Leviton/ashrae](https://www.leviton.com/ashrae)
- **Occupancy sensor layout services** - have a team of experts create occupancy sensor layouts directly on your CAD drawings, complete with a List of Equipment at no cost - go to [portal.leviton.com](https://portal.leviton.com)
- **ez-Learn™** - get Leviton smart from the comfort of your home or office with this exclusive 24/7 online training - go to [Leviton.com/ezlearn](https://www.leviton.com/ezlearn)
- Lighting control specialists at your disposal
- Field service engineers for top-level support
- Factory commissioning service
- Dedicated technical support via phone at **800 959-6004**



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