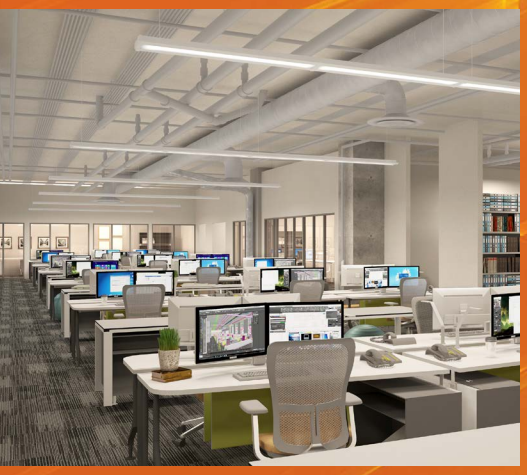
design and application guide
volume 5



WaveLinx Wireless

Connected Lighting System for Indoor | Outdoor | Industrial

Flexible. Connected. Secure.







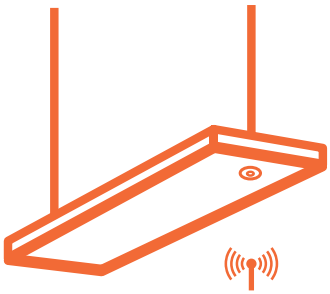
COOPER Lighting Solutions

cooperlighting.com

WAVELINX

Flexible. Connected. Secure.

Integrated sensors provide immediate out-of-the-box performance,
code compliance and can be configured as a system from a secure mobile application.



LIGHTING & CONTROLS

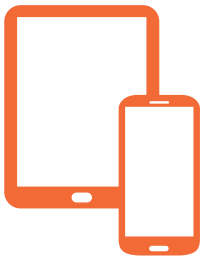
Advanced lighting fixtures

Sensing and communications



CONNECTIVITY

IEEE802.15.4 wireless gateway with edge data processing power



APPS / SOFTWARE

Data accumulation & analysis

Software applications

Industry-leading technology, in a simple package

WaveLinx provides immediate out-of-the-box functionality while the intuitive mobile application simplifies even the most complex installation. Contractors love the simplified installation saving them time on site.

WaveLinx is the designers choice for offices, schools, healthcare facilities, distribution centers and more.

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Connected Lighting

Wireless the way you want it

The value of the WaveLinx Connected Lighting system is to better manage and fully optimize your lighting system with your existing people, energy and property.

Save time on system installation and setup

Eliminates the cost and complexity of typical wireless control system commissioning while providing a flexible and reconfigurable wireless topology for on the fly space adjustments.

Achieve peace of mind

WaveLinx was designed with security and luminaire compatibility in mind from day one, to meet your applications.

Grow your cost savings

Designed to save energy, WaveLinx provides superior code compliance and energy saving sequences while reducing installation and increasing flexibility.



Features & benefits

Contractor Benefits

- Reduce installation time/cost with the WaveLinx wireless system that includes luminaires and controls that just work.
- Peace of mind with fully integrated luminaires and a wireless control system from WaveLinx that are compatible and secure.
- Save time with WaveLinx out-of-the-box functionality, construction grouping and automatic code commissioning that allow the installer to verify functionality at least 40% faster than traditional addressable systems.

Facility Manager/Owner Benefits

- Save on operating costs with a system that was designed to provide consistent energy savings and drive energy efficiency throughout the building.
- Manage flexibility with quickly re-assignable fixtures to create new control zones and areas via WaveLinx Mobile.
- Save on capital with utility and DLC rebates. WaveLinx meets the utility requirements for networked addressable luminaires with energy calculations.

Specifier Benefits

- Worry free design with WaveLinx that was developed to meet the latest energy codes and utility rebate requirements.
- Design flexibility provided with WaveLinx allows spaces to be easily reconfigured and zoned based on occupant work flow.
- Easily integrate with BMS and 3rd party systems.

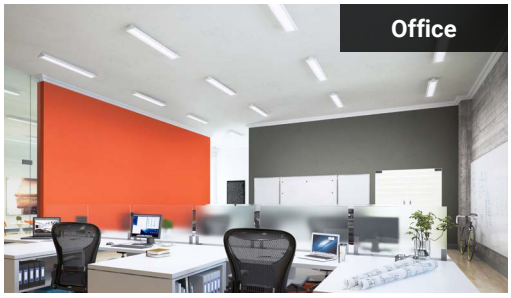
End User Benefits

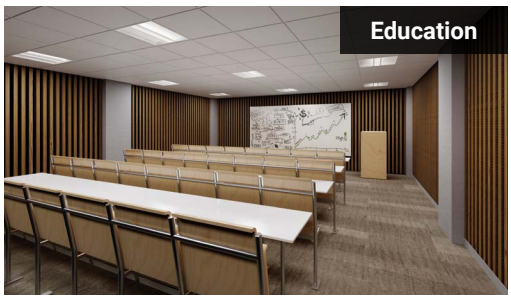
- Control flexibility with simple to use WaveLinx Mobile App to configure area and zone daylight, occupancy and scene controls.
- Reduce training time and simplify control using the intuitive WaveLinx Mobile App.
- Enhance occupant experiences with IoT capabilities to share data via a Public API (REST).

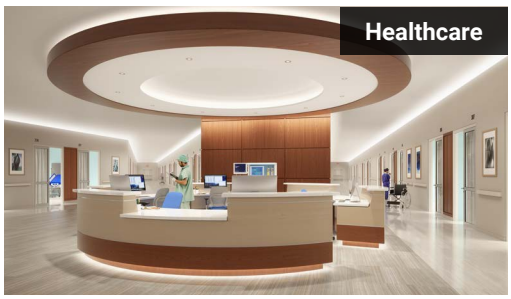
Connected solutions overview

A number of product solutions to meet your code and application requirements. This guide provides information on how WaveLinx can be used to meet or exceed your code and application requirements.

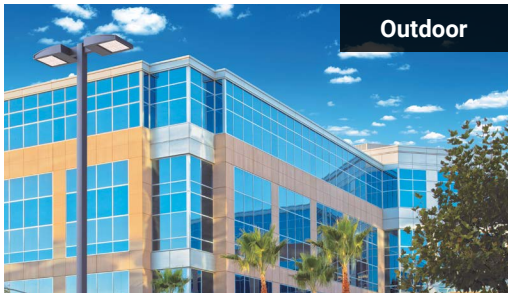
		Trellix* (optional)	
		WaveLinx wireless	**WaveLinx** wired
EQUIPMENT	Wired Switches	●	●
	Battery Switches	●	
	Wired Sensors	●	●
	Battery Sensors	●	
	Wireless fixtures	●	
	Sensor integrated fixtures	●	
	Switchpacks	●	●
	Receptacle Control	●	●
	Low-Voltage Power Module	●	
INSTALLATION	Traditional wiring	●	●
	Modular Wiring System	●	●
	Wireless communications	●	
	Two wire communications		●
	Low-Voltage Power Module	●	●
SOFTWARE	AV integration*	●	●
	BACnet*	●	●
	OpenADR*	●	●
	Mobile App	●	●
	Floorplan*	●	
	Alarms & Events*	●	
	Energy Dashboard*	●	
	API Integration*	●	
APPLICATIONS	Office/ Private/ Open	●	●
	Education/ Classroom	●	●
	Industrial/ Warehouse	●	●
	Outdoor Parking Lot	●	●
	Outdoor Area Site	●	●
	Outdoor Parking Garage		●
CODE	ASHRAE 90.1	●	●
	IECC	●	●
	T24	●	●





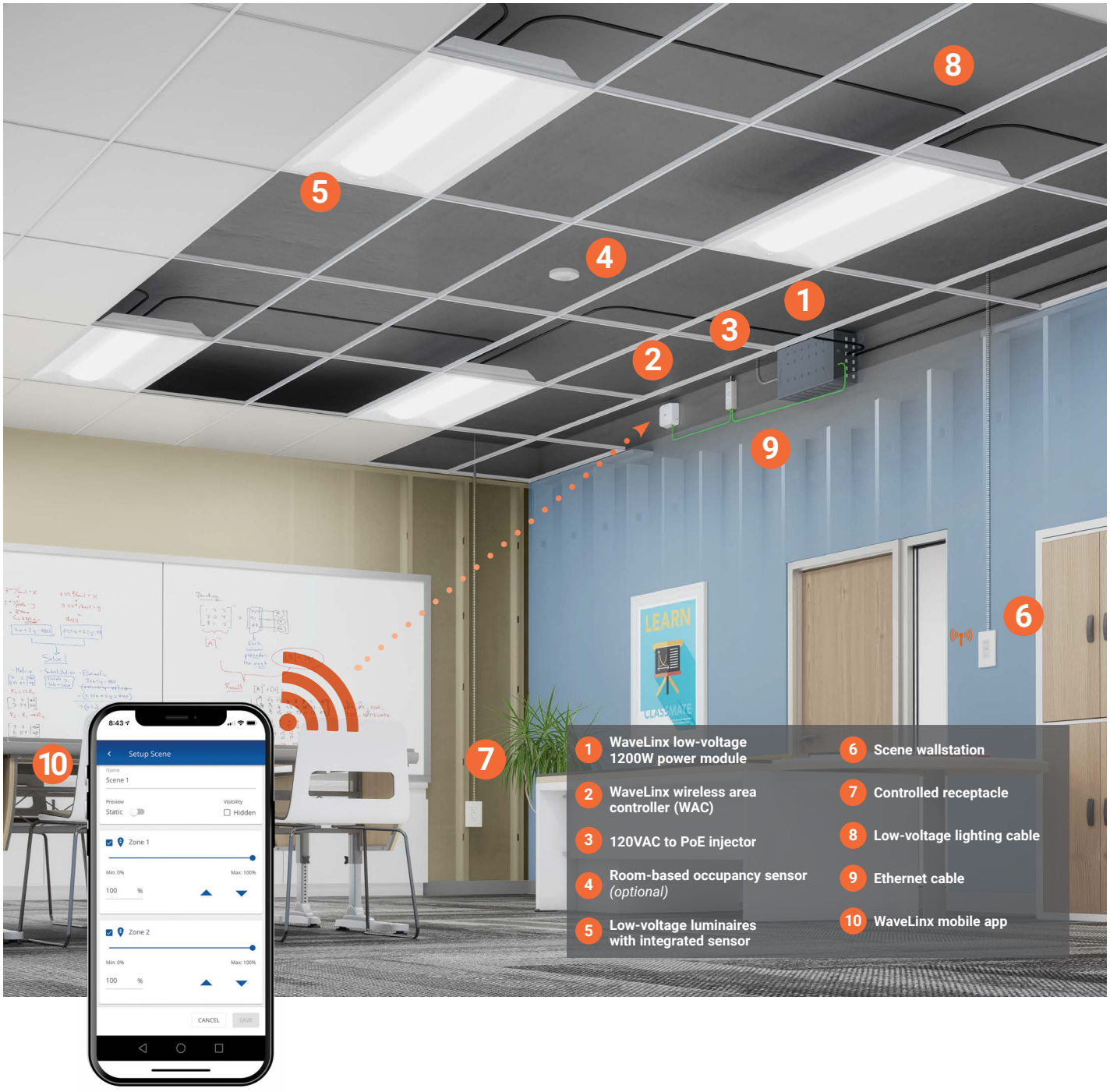






WaveLinx becomes more comprehensive lighting system on the market with the inclusion of low-voltage wiring capabilities via the WaveLinx Low-Voltage Power Module

A system that is so simple that it can be setup without lighting controls knowledge is extremely rare. WaveLinx is setup using an intuitive mobile application that only requires you to create an area and identify which device is in the area. WaveLinx, wireless and low-voltage operating seamlessly, does the rest using our patent pending automatic code commissioning.



Features

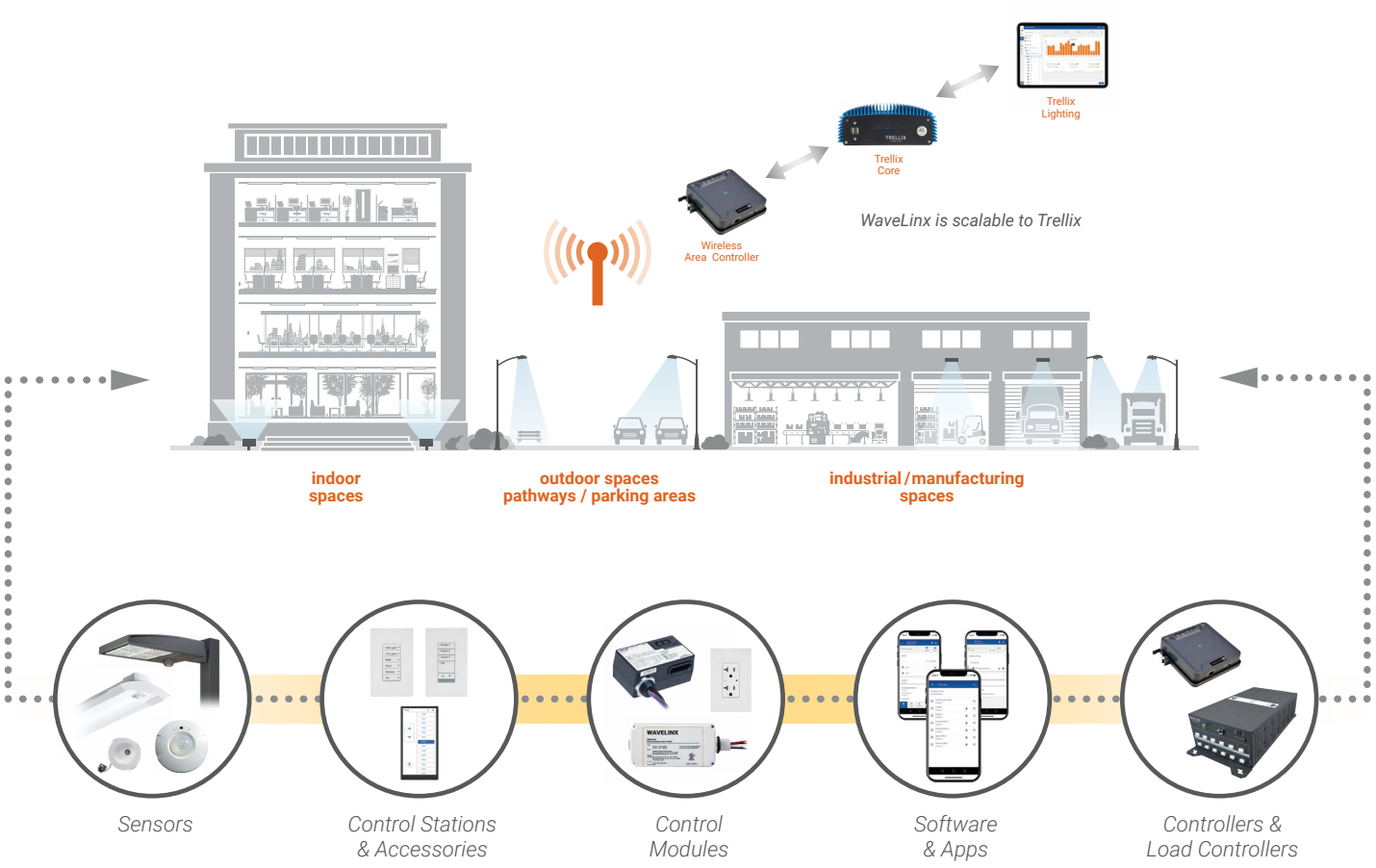
- Wireless controls and luminaires for indoor and outdoor
- Wireless integrated or external multi-sensors
- Comply with latest energy code and incentive requirements
- No new wires, control system installed with fixture
- Integrated low-voltage wiring topology option
- Simplified personal control
- Simplified installation and setup for contractor
- Out-of-the-box functionality
- Future-proof design
- Energy calculations (available through Trellix) (BACnet and API)
- IoT ready and POE capable
- Enterprise networkable
- BACnet and API integration

System Architecture

- Each luminaire, sensor, relay, receptacle and wallstation wirelessly communicate to the Wireless Area Controller (WAC-POE)
- All components are individually addressable and networked back to the Wireless Area Controller
- Setup and personal control are completed using the WaveLinx Mobile app
- The Wireless Area Controllers communicate to Trellix using a LAN or VLAN connection
- Standardized IEEE 802.15.4 wireless communications

Connected doesn't have to mean complex.

One streamlined, easy-to-install system to rule them all.



WaveLinx mobile app

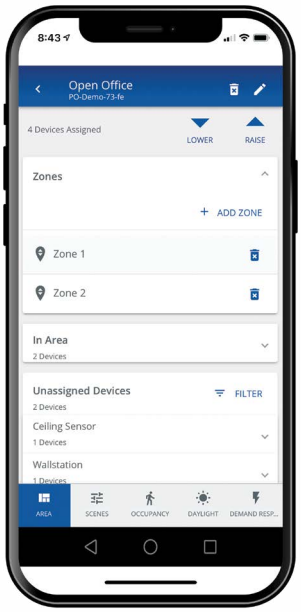
The WaveLinx Mobile App enables users to perform setup, configuration and maintenance of the WaveLinx system from a wireless smartphone or tablet.

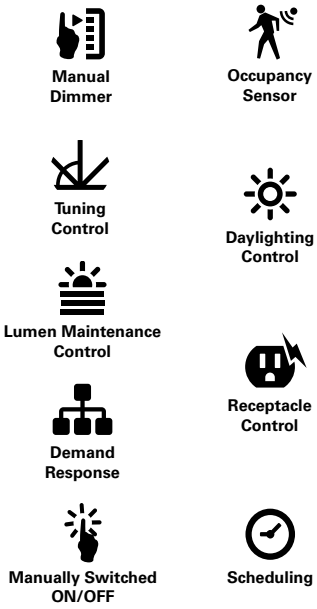
Automatic Code Commissioning

- Create Areas
- Drag devices into Areas/Zones

Automatic Sequence of Operations

- Automatic ON to 50%
- Individual daylight zones to 500 lux
- Automatic OFF of lights & plug load
- Wallstation scene control
  - Dominant button is 50% light level
  - Other buttons are scenes
- Demand Response ready





WaveLinx security

Stay secure with ultimate peace of mind with information security threats and fears on the rise, WaveLinx is designed to keep your data on lockdown with seven tiers of security.



Physical barriers to entry

The WaveLinx Area Controller sits in the ceiling, and hidden from view

Customer security

NIST Cybersecurity Framework and industry best practices

Device security

Features AES 128-bit encryption device-to-device communication

Network segmentation

Isolated targets mean reduced for large scale breaches

Network security

Secure HTTPS protocols and WPA2 technology

Over-the-air updates

Wireless technology allows your system to securely stay up-to-date

WaveLinx security assurance

Continuous monitoring and reporting of internet threats and vulnerabilities. Notifications are sent to user when cybersecurity threats have been identified.

WaveLinx devices are IEC 62443-4-1, IEC 62443-4-2 and UL 2900-1 certified.

Independent certifications have been performed by certified labs.

Data communication and management



WaveLinx controlled and integrated sensor fixtures - wireless and low-voltage options



Wireless 0-10V fixture and plug load control

data collected





Wireless wallstations and connected touchscreens



data connected

at the edge

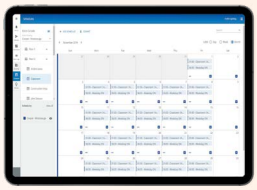
LAN or VLAN



Trellix Core Pro and Trellix Core Enterprise

data exchanged

and shared



Trellix Applications

Admin | Lighting | Exchange

data insight

KEY Wi-Fi Signal | IEEE 802.15.4 | Low-Voltage

Trellix

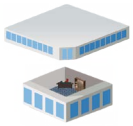
Smart Spaces IoT Platform

Trellix transforms the WaveLinx Connected Lighting System into an IoT infrastructure with limitless potential to keep up with the growing service demands of people, property and resources.

Trellix is a distributed network of smart sensing and beacon technology that captures real-time data; making your facility smarter so you can make smarter decisions.

			
Gateways	1 Wireless Area Controller	up to 20 Wireless Area Controllers	up to 300 Wireless Area Controllers
Devices	150	2,000	45,000
Software	Mobile App	Trellix Core Pro	Trellix Core Enterprise

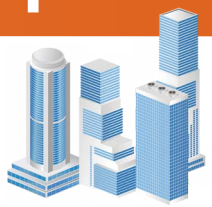
SCALABILITY



Control 150 devices for a single **ROOM / FLOOR**



Add Trellix Core Pro and control up to 2,000 devices for a **BUILDING**



Use a Trellix Core Enterprise server (on premise or virtual) and control up to 45,000 devices for a **CAMPUS**

Unlock the Value of the Data being gathered by Trellix

Connectivity service

Manages data exchange with Wireless Area Controllers and 3rd party gateways using API.

Message Routing service

Manages the routing of the received data to the other Trellix Core microservices.

Data Management service

Manages the real-time data received from the various sources as well as aggregated data for analytics.

Device and Spatial Object Management service

Manages (add, edit, remove) devices connecting the platform as well as spatial objects (clients, buildings, floors, etc) defined within the platform.

Event Management service

Manages the events generated by the devices and spatial objects.

Location service

Computes the location of the assets based on received BLE data.

Security service

Manages the devices authentication as well as data exchange between the various components.

Authentication and Authorization service

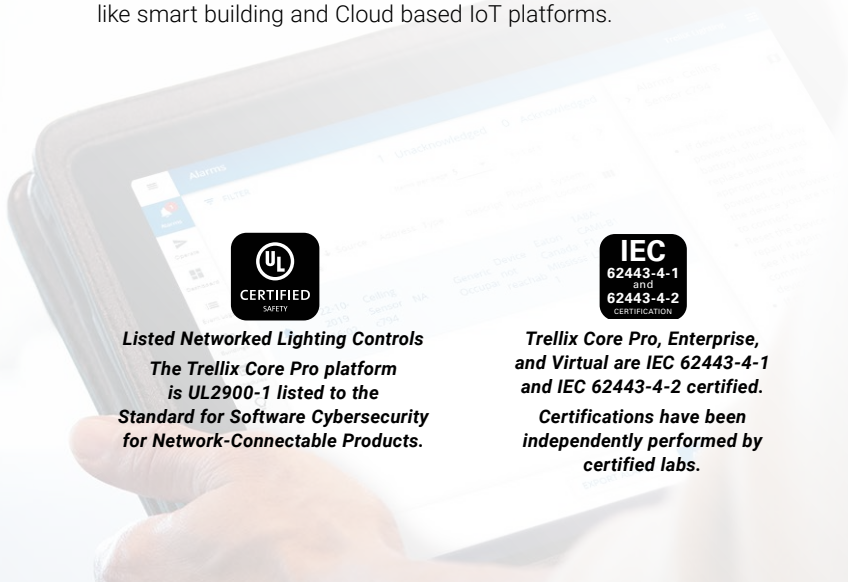
Manages the users that can safely connect to the Trellix platform and applications as well as roles and permissions for each user.

OS & Applications Management service

Manages the operating system and applications hosted on the Trellix platform.

Interfaces service

Manages the various interfaces (REST API and BACnet/IP) that exchange data between the WaveLinx system (energy, occupancy, daylight, location) and other building automation systems, like smart building and Cloud based IoT platforms.



CERTIFIED SAFETY

Listed Networked Lighting Controls

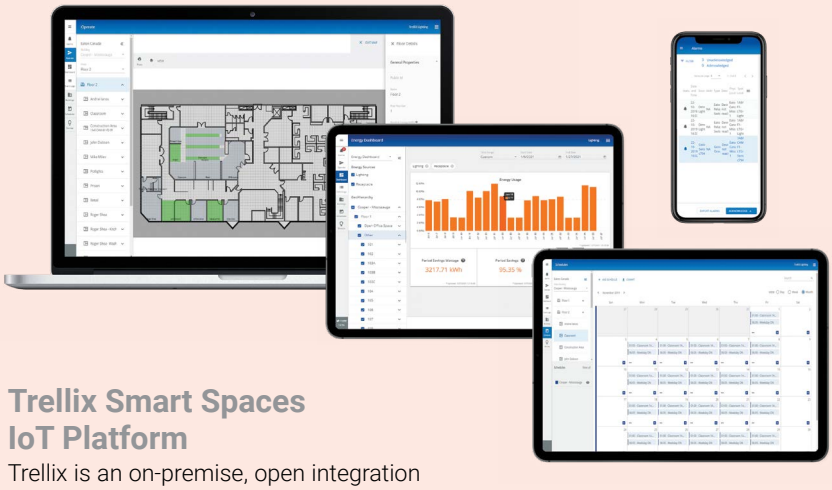
The Trellix Core Pro platform is UL2900-1 listed to the Standard for Software Cybersecurity for Network-Connectable Products.

IEC 62443-4-1 and 62443-4-2 CERTIFICATION

Trellix Core Pro, Enterprise, and Virtual are IEC 62443-4-1 and IEC 62443-4-2 certified.

Certifications have been independently performed by certified labs.

Trellix key features



Trellix Smart Spaces IoT Platform

Trellix is an on-premise, open integration smart spaces IoT platform that moves real-time monitoring and processing to the edge which allows you gain faster insights of buildings operations, drive efficiencies and make effective decisions.

Alarms and Events with Smart Tips

Get alerted to outages and other system health issues, so you can address issues with minimal disruption. You can receive detailed alerts via the app and/or email, eliminating the need for routine checks. Smart Tips also provides time saving suggestions to resolve issues.

Energy Dashboard

Analyze historical usage data across multiple areas, floors, buildings, and sites, to visualize where you're using the most energy and identify areas for improvement.

Schedules

Use the Trellix intuitive scheduling interface to manage lighting and controlled receptacle schedules for one or more buildings – all from a central location.

Operate

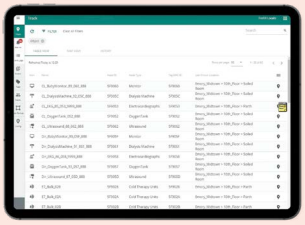
From one fixture to the entire building, lighting control is at your fingertips. Monitor devices, update dimming schedules, send light control commands, and much more – across buildings, floors and areas.



Trellix Locate

Real-Time Location System

Leverage the WaveLinx Wireless integrated sensor along with the Trellix Locate application to monitor and manage critical assets equiped with BLE tags.



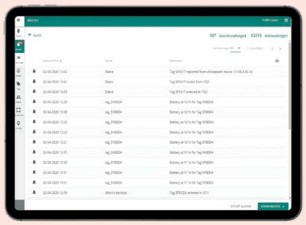
Asset Tracking

Have total visibility to where your assets are by quickly locating them on map or tabular view. Reduce by more than 90% your search time for critical equipment.



Geofencing

Get real-time notifications when a location-based condition associated with a geo-fence is met.
Easily create and manage geo-fence.



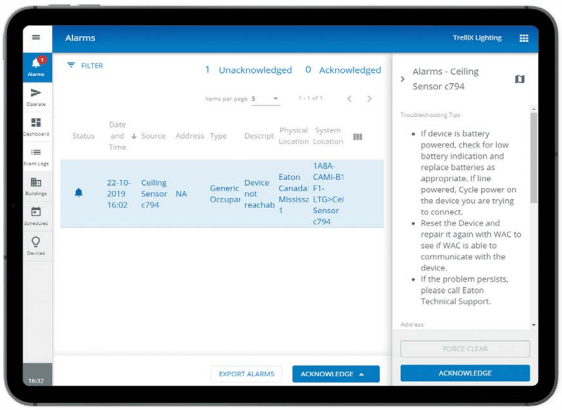
Alarms

Get instant notifications when something needs your attention—like an asset exiting or a fridge exceeding the upper-temperature limit—based on business rules you create. You can quickly see where the situation is located within your floorplan and respond immediately.

Unlock the value of the data being gathered by the Trellix Core

A set of microservices required for fully functional IoT solutions which facilitates device communication, device management, data upload, aggregation and storage, app/solution creation as well as robust user and device security, authentication and authorization.

For more information, see:
cooperlighting.com



Trellix lighting management software application

Enterprise | IoT | BACnet | API Integration

The Trellix lighting management software application helps facility/property managers take full advantage of IoT by connecting WaveLinx with other building systems using BACnet and Public API (REST). Trellix solutions include alarms with smart tips, system events, demand response, platform flexibility and future proofing.

catalog number:

TRX-LGT250 - Additional Trellix Basic licenses (250 nodes).
(Included in TRX-TCPRO2, TRX-TCENT2, TRX-TCVRT2)
(BACnet and API sold seperately).
See product spec sheet for ordering information.

TRX-BAC250 - Additional Trellix BACnet licenses (250 nodes).
(Included in TRX-TCPRO2, TRX-TCENT2, TRX-TCVRT2).
See product spec sheet for ordering information.

TRX-API250 - Additional Trellix API licenses (250 nodes).
(Included in TRX-TCPRO2, TRX-TCENT2, TRX-TCVRT2).
See product spec sheet for ordering information.

TRX-OPNADR - Trellix OpenADR software license (unlimited nodes).
See product spec sheet for ordering information.

TRX-CONFIG - Trellix Energy and Graphical Floorplan Setup Services (250 nodes).
See product spec sheet for ordering information.



Trellix Core Pro

Enterprise | BACnet | API Integration

The Trellix Core Pro is an on-premise hardware platform hosting Trellix software applications. It networks up to twenty (20) Wireless Area Controllers collecting data that can be shared with third party system via BACnet and Public API (REST).

catalog number:

TRX-TCPR02 - Trellix Core Pro (supports 20 WACs)
Includes: 250 nodes (BACnet, API included)



Trellix Core Enterprise
Virtual Trellix Core Enterprise

Enterprise | BACnet | API Integration

The Trellix Core Enterprise is an on-premise hardware platform hosting Trellix software applications. They network up to three-hundred (300) Wireless Area Controllers collecting data that can be shared with third party system via BACnet and Public API (REST).

catalog number:

TRX-TCENT2 - Trellix Core Enterprise (supports 300 WACs)
Includes: 250 nodes (BACnet, API included)

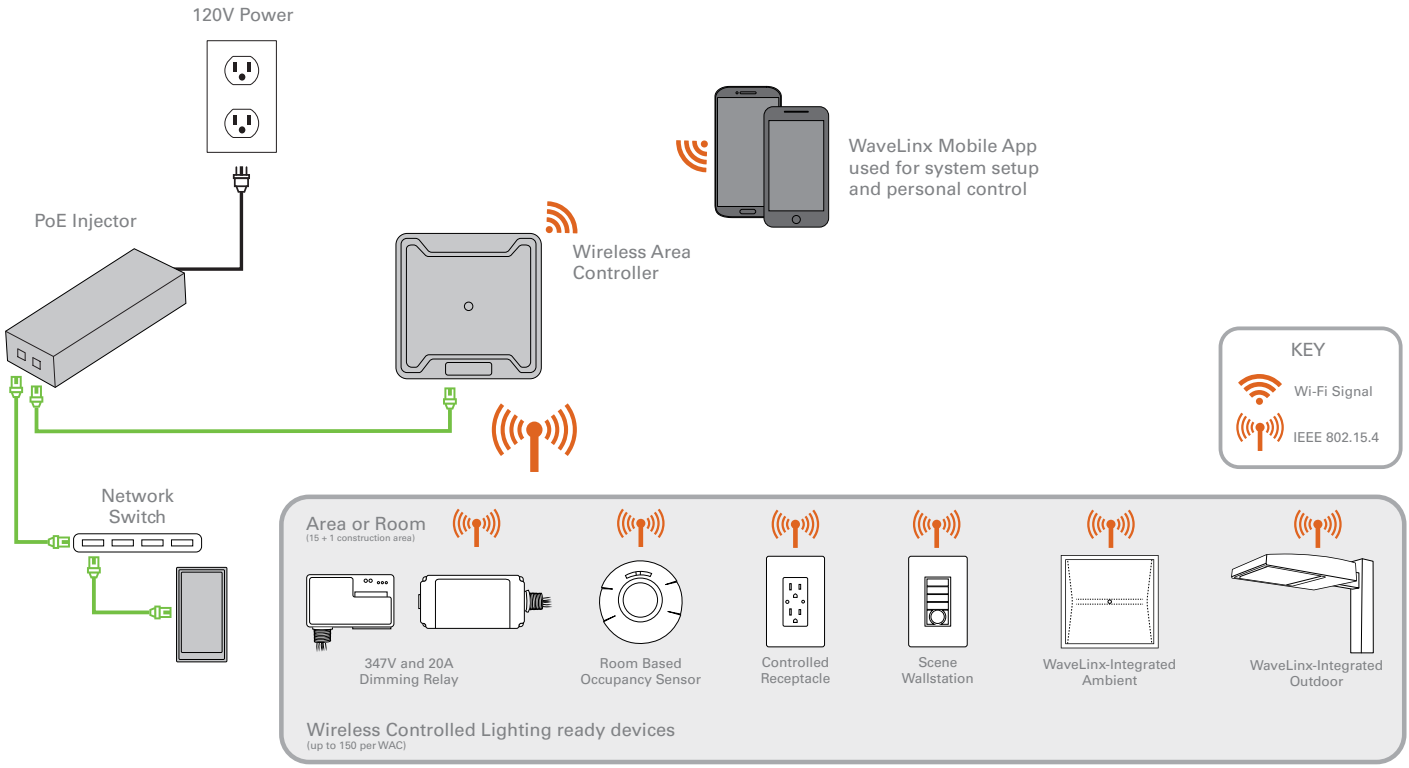
TRX-TCVRT2 - Trellix Core Virtual Enterprise (supports 300 WACs)
Includes: 250 nodes (BACnet, API included)

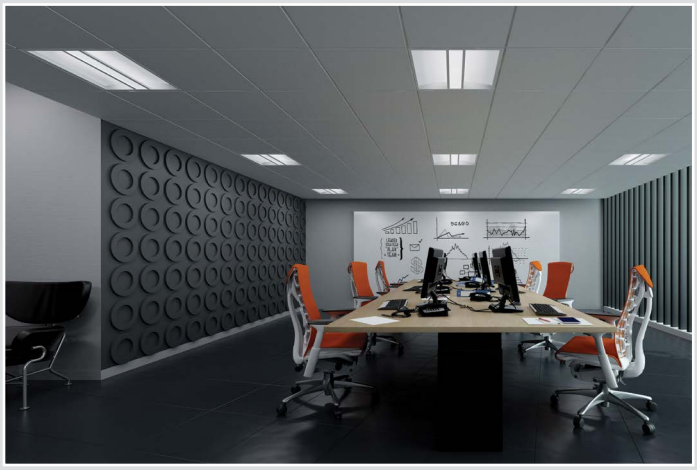


System architecture

WaveLinx dedicated installation

Stand-alone space | IT setup not required | Scalable to join Network



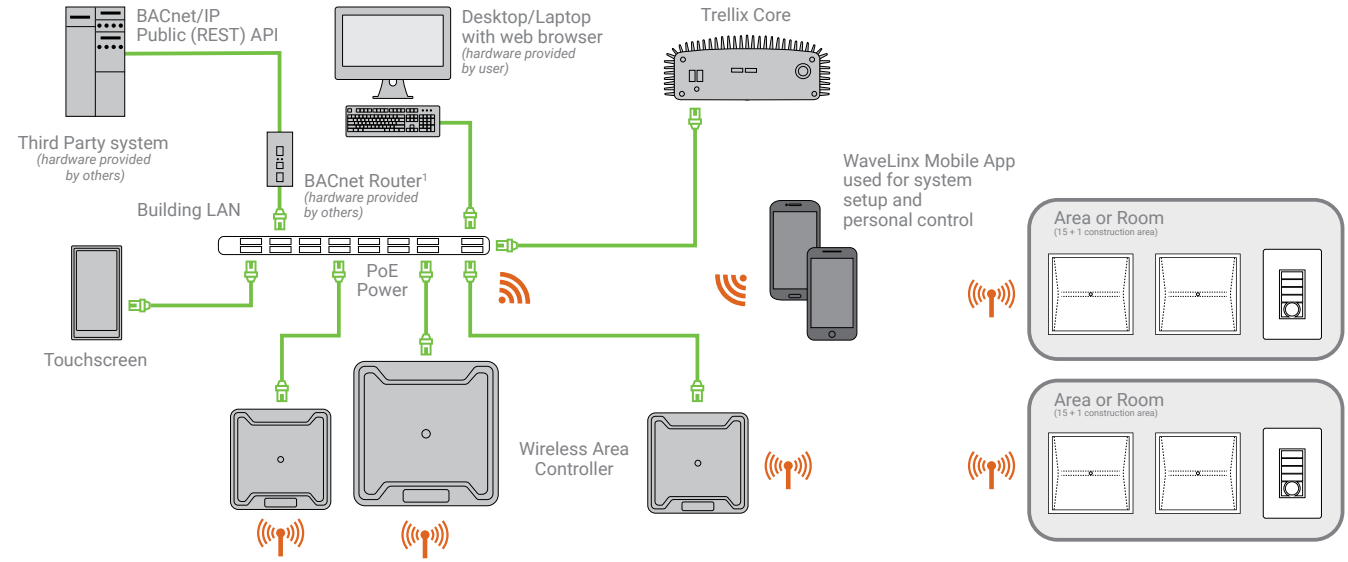


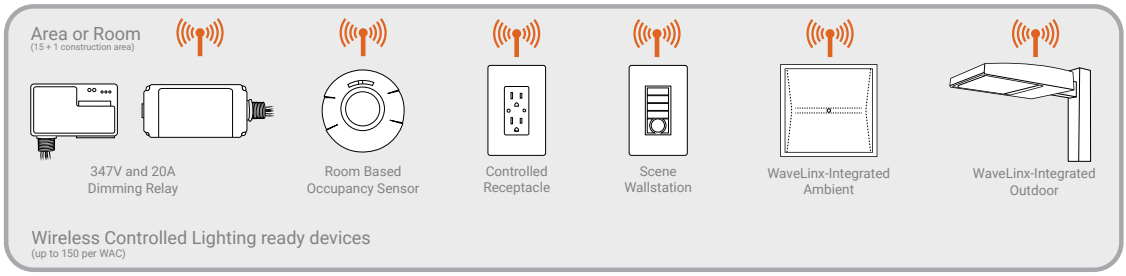
Features

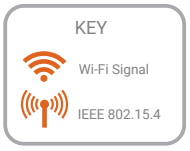
- Creates Wireless Access point for Direct Mobile Connection
- No connection to Building LAN required
- Powered via PoE injector
- Controls up to 150 WaveLinx devices (light fixtures, relay switchpacks, wallstations, sensors, etc.)
- Supports up to 16 Areas (15 user defined) with multiple lighting zones, occupancy sets, and daylight sets per area
- Drag and drop programming of lighting zones and areas via WaveLinx Mobile App

WaveLinx network installation

Entire building solution | Smart building ready | Simple, secure network addition

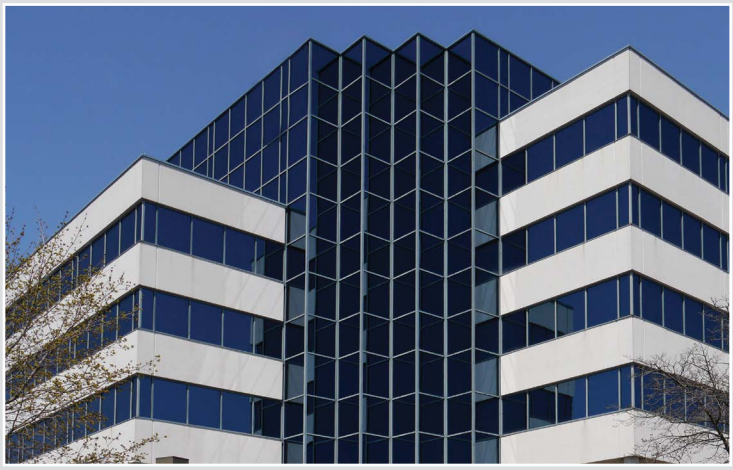






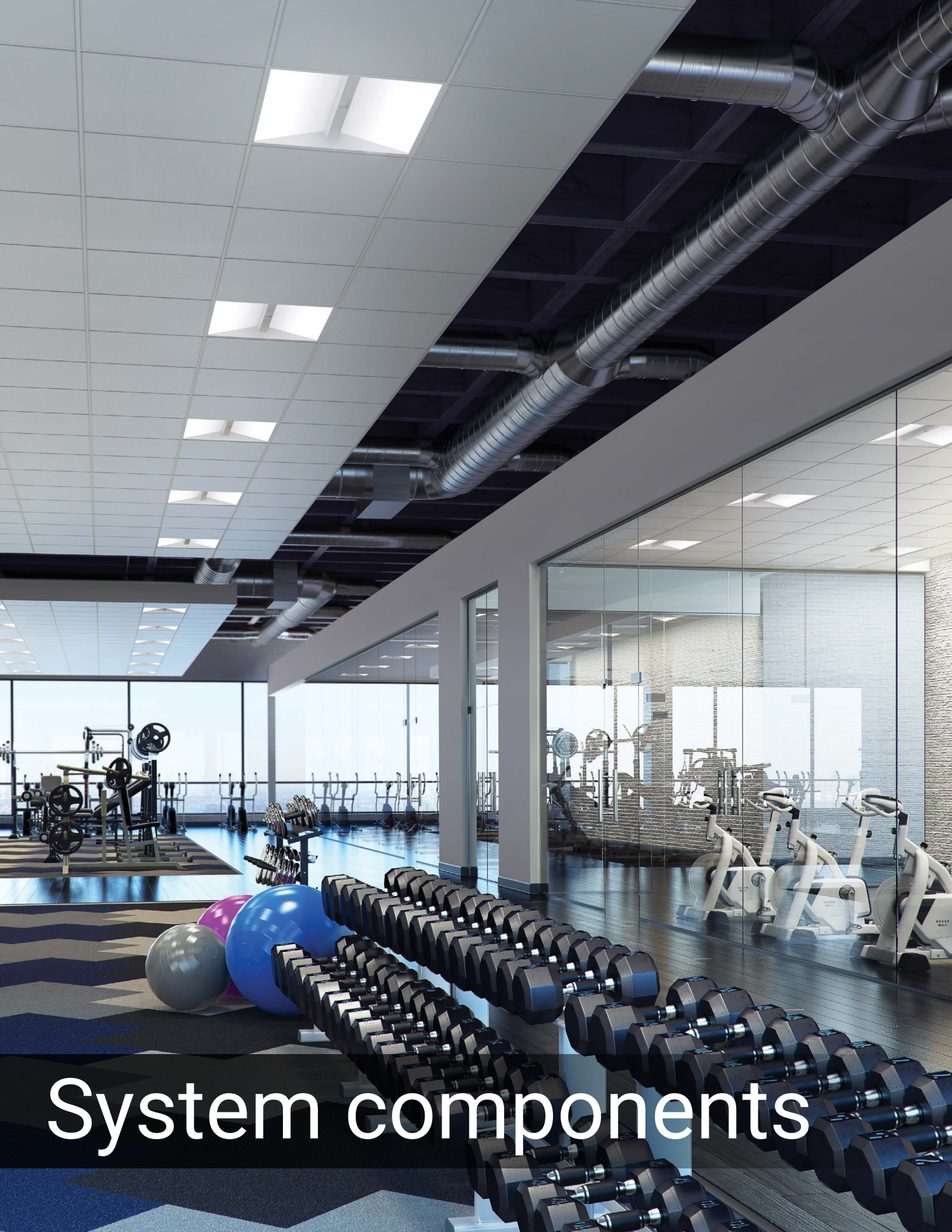
Note:
Trellix Core Pro shown in this illustration. Trellix Core hardware can be either Pro, Enterprise or Virtual.

[1] BACnet Router only required if Trellix Core and third party BACnet client are on differenet subnets.



Features

- Ensures peace of mind with WaveLinx seven layer security assurance
- WaveLinx uses building LAN or VLAN to create enterprise network with Trellix
- Web-based enterprise platform for integration, alarms, events and reporting provided by Trellix
- Enterprise level control of WaveLinx devices (lights, relays, sensors, wallstations, receptacles, etc)
- Trellix Core includes 250 nodes for BACnet and API integration



System components

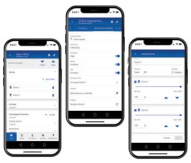
System components

Wireless Connected Lighting

WaveLinx is the most comprehensive and cost effective wireless lighting system on the market. It provides out-of-the-box functionality that facilitates basic occupancy code compliance while also providing an energy saving high end trim. A wireless system that is so simple that it can be setup without lighting controls knowledge is extremely rare. WaveLinx is setup using a mobile application that only requires you identify which device is in each room, WaveLinx does the rest using our patent pending automatic code commissioning.



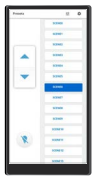
WIRELESS CONNECTED LIGHTING COMPONENTS

DESCRIPTION		T24 2019	ASHRAE 90.1-2019	IECC 2018	CAT NUMBER
Wireless Area Controller Stand-alone | Network Mobile Access		130.1 (e) 130.4 130.1 (c) 6c	9.4.3 9.4.1.1.g	C405.2.2 C405.2.6 C406.1 C406.4 C408.3	WAC-POE WAC-120 WPOE-120
WaveLinx Mobile app Stand-alone | Network Mobile Access		130.1(a) 130.1(b) 130.1(c)1 130.5(a)	9.4.1.1a 9.4.1.1.b 9.4.1.1.c 9.4.1.1.d 8.4.3.1	C405.2.2 C405.2.6 C406.1 C406.4 C408.3	W-APP
Trellix Core Pro Enterprise | BACnet API Integration				C406.4 C408.3	TRX-TCPR01
Trellix Core Enterprise & Virtual Trellix Core Enterprise Enterprise | BACnet API Integration				C406.4 C408.3	TRX-TCENT1 TRX-TCVRT1
Trellix Enterprise | IoT BACnet | API Integration				C406.4 C408.3	TRX-LGT250 TRX-BAC250 TRX-API250 TRX-OPNADR

WIRELESS CONNECTED LIGHTING COMPONENTS

	DESCRIPTION	T24 2019	ASHRAE 90.1-2019	IECC 2018	CAT NUMBER
Wireless Dimming Switchpack 0-10V | 120-277V Plug Load | Wireless					WSP-UV-010
Universal Dimming Switchpack with Dry Contact Input 0-10V | 120-347V Wireless					WSP-CA-010
Wireless Integrated Sensor Sensing | Daylight Wireless		130.1 (c) 130.5 (d) 130.1 (d) 140.6 (d)	9.4.1.1.e 9.4.1.1.f 9.4.1.1.h 9.4.1.1.i 9.4.1.1.g	C405.2.1 C405.2.1.1.2 C405.2.1.2 C405.2.1.3 C405.2.3 C405.2.4 C405.2.5	WAA
Wireless Tilemount Sensor Kit Sensing | Daylight Downlights | Wireless		130.1 (c) 130.5 (d) 130.1 (d) 140.6 (d)	9.4.1.1.e 9.4.1.1.f 9.4.1.1.h 9.4.1.1.i 9.4.1.1.g	C405.2.1 C405.2.1.1.2 C405.2.1.2 C405.2.1.3 C405.2.3 C405.2.4	WTA
Wireless Ceiling Sensor Sensing | Daylight Wireless | Battery		130.1(c) 130.5(d)	9.4.1.1.h 9.4.1.1.i 9.4.1.1.g	C405.2.1 C405.2.1.1.2 C405.2.1.2 C405.2.1.3 C405.2.3 C405.2.4	CWPD-1500
Wireless Outdoor Lighting Control Module Scheduling | Dimming Astronomic | Wireless Zones				C405.2.6	WOLC-7P-10A
Outdoor Fixture Mount Sensor Sensing | Daylighting Individual | Grouping Motion | Astronomic		130.1(a) 130.1(b)	9.4.1.1a 9.4.1.1.b 9.4.1.1.c 9.4.1.1.d	C405.2.1.1.2 C405.2.2 C405.2.2.2 C405.2.5	SWPD4 SWPD5
Industrial High Bay Sensor Sensing | Daylighting Individual | Grouping Motion		130.1(a) 130.1(b)	9.4.1.1a 9.4.1.1.b 9.4.1.1.c 9.4.1.1.d	C405.2.1.1.2 C405.2.2 C405.2.2.2 C405.2.5	SWPD3

WIRELESS CONNECTED LIGHTING COMPONENTS

	DESCRIPTION	T24 2019	ASHRAE 90.1-2019	IECC 2018	CAT NUMBER
Wired Wallstation Manual | Scenes Zones | Wireless		130.1(a) 130.1(b)	9.4.1.1a 9.4.1.1.b 9.4.1.1.c 9.4.1.1.d	C405.2.1.1.2 C405.2.2 C405.2.2.2 C405.2.5	W1L -* W1L - RL -* W2L -* W2L -RL -* W3L -* W2S -* W2S - RL -* W4S -* W4S - RL -* W5S -* W6S -*
Battery Wallstation Battery | Manual Scenes | Zones Wireless		130.1(a) 130.1(b)	9.4.1.1a 9.4.1.1.b 9.4.1.1.c 9.4.1.1.d	C405.2.1.1.2 C405.2.2 C405.2.2.2 C405.2.5	WB2L-S1 -* WB2L-S2 -* WB2L-* WB3L-S2 -* WB3L-D -* WB3L-* WB5-S3 -* WB6S-S3 -* WB6S-S3D -* WB6S-S5 -*
Touchscreen PoE Powered Light Control Architectural Design		130.1(a) 130.1(b)	9.4.1.1a 9.4.1.1.b 9.4.1.1.c 9.4.1.1.d	C405.2.1.1.2 C405.2.2 C405.2.2.2 C405.2.5	TSE57-WLX-B
Wireless Receptacle Plug Load | Wireless		130.5 (d)	8.4.2	C405.2.4	WR-20



WaveLinx:

Convergence of wireless and low-voltage



Blends the benefits of low-voltage wiring with wireless control for speed and flexibility

Optional 1200W Low-Voltage Power Module unlocks material cost and labor efficiencies, effectively creating a hybrid system that combines the installation benefits of class 2 low-voltage wiring with flexibility of wireless control.

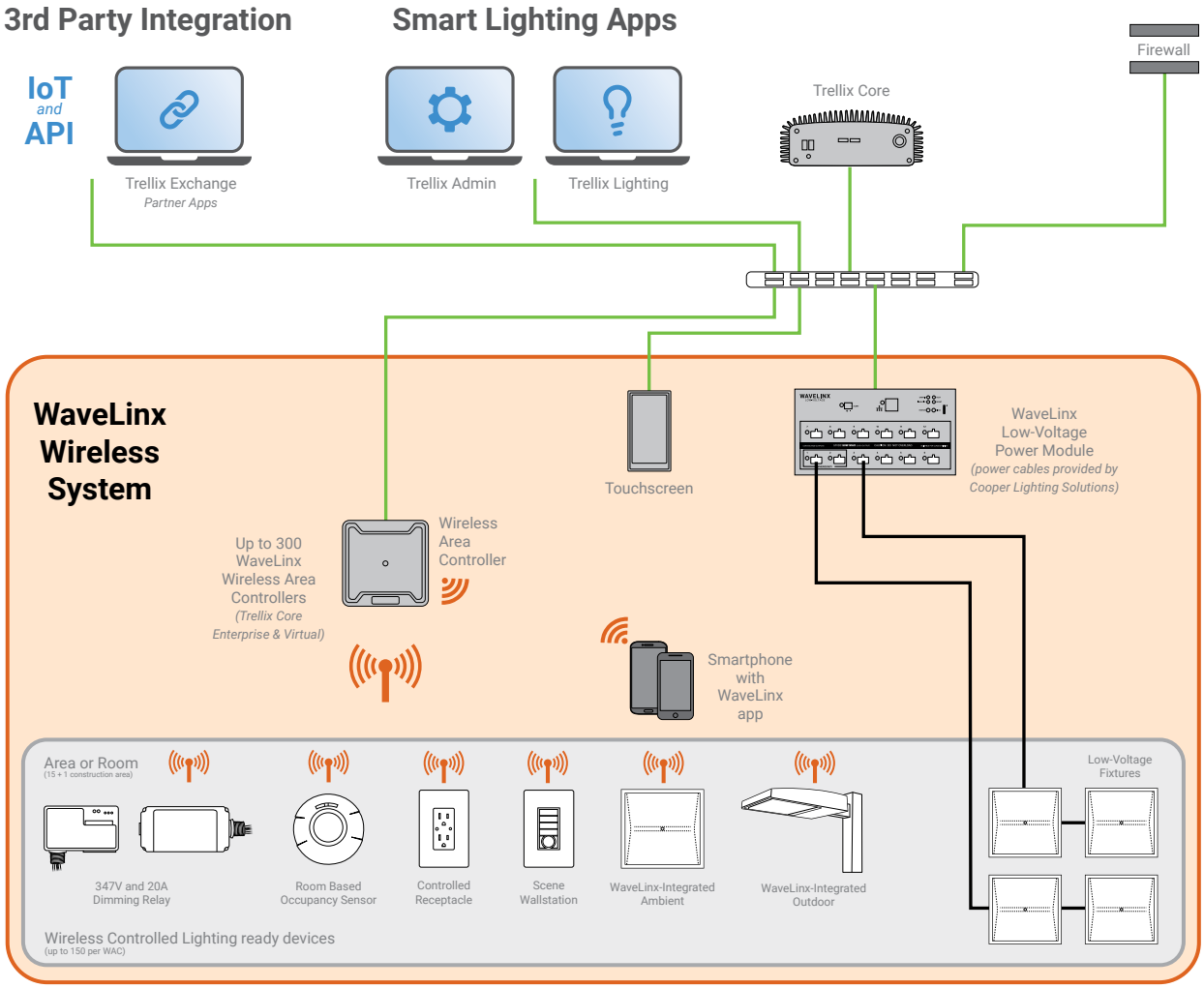


Low-Voltage 1200W Power Module

The WaveLinx 1200W Low-Voltage Power Module is a central feature of the WaveLinx Low-Voltage offering. The WaveLinx Low-Voltage Power Module supports the full functionality of the WaveLinx Connected Lighting System via an Ethernet connection to a Wireless Area Controller (WAC) allowing low-voltage wired and wireless devices to operate harmoniously as part of a single control system.

Note: Low-voltage light fixtures not compatible with Trellix Locate.

catalog number:
LVPM-12-100-64-2E - WaveLinx 1200W Low-Voltage Power Module



simply
plug-and-play



WaveLinx low-voltage fixtures

See pages 27-28 for
available Low-Voltage options = ○

or

For a complete list of compatible products, see:
www.cooperlighting.com

Reduce Labor

WaveLinx Low-Voltage not only reduces the reliance on the in demand Class 1 contractor, but also reduces the overall project time by up to 40%.

Pre-terminated low-voltage cables and fixtures mean that after the initial power module and line voltage cable are installed, the rest of the process can be completed using less specialized labor.

Save on Materials

Still wrestling with conduit and Class 1 materials? There's no need.

WaveLinx Low-Voltage matches your lighting system's power needs with the power provided, so you're able to power each fixture with low-voltage Class 2 cables.

Be Electrically Efficient

The WaveLinx Low-Voltage hybrid model utilizes Class 1 for building power distribution and Class 2 for plug and play connectivity creating an electrically efficient system of discrete micro-grids.



WaveLinx wireless fixtures

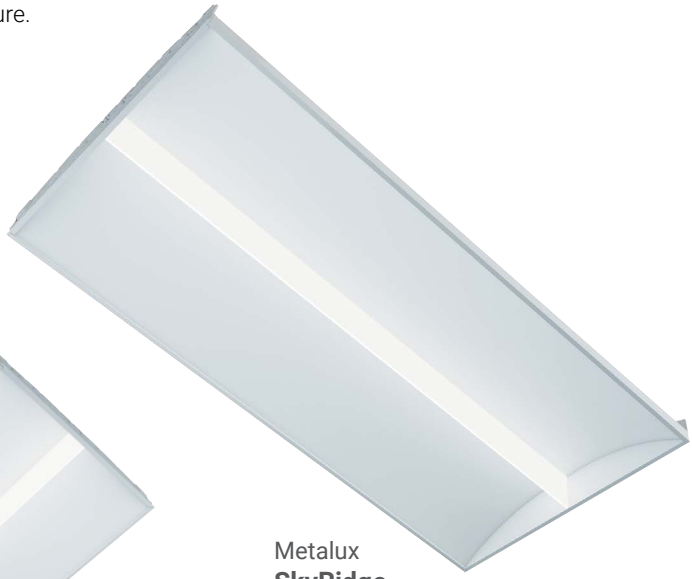
The WaveLinx wireless fixture gives you all the features you need now, with the ability to scale and evolve on your own timeline. Available with select Metalux fixtures, it's a cost-efficient way to lay the foundation for an intelligent building infrastructure.

- **Out-of-the-box wireless control.** Get streamlined code compliance and energy savings, whether you're installing a whole system or standalone fixture.
- **Ready to "plug & play."** Any electrician can easily install this system. There's no 0-10V wiring required, and no control wiring between fixtures.
- **Easier commissioning.** No more waiting weeks for commissioning teams, or dealing with compliance headaches. Each fixture is code compliance out-of-the-box.

Perfect for simple applications

this system covers all the basics while keeping installation time and costs to a minimum





Metalux
SkyRidge
Recessed ambient WaveStream LED

Metalux
Cruze ST
LED recessed ambient



Metalux
Cruze SB
LED recessed ambient



Metalux
Encounter
Recessed ambient WaveStream LED



Metalux
RLN
LED recessed ambient



Metalux
Flat Panel
Ultra-thin LED troffer



Metalux
GRLED
LED recessed troffer

WaveLinx wireless switchpacks



Wireless Dimming Switchpack

Plug Load | 0-10V | Wireless

The wireless dimming switchpack with 0-10V (WSP-UV-010) offers 120-347VAC 20amp zero crossing relay control and continuous 0-10V dimming control of LED and non LED loads. The wireless relay switchpack with 0-10V control also supports 20amp plug load control.

catalog number:
WSP-UV-010 - Wireless Universal Voltage Dimming Switchpack

WSP-UV-010-EM - Wireless Emergency Universal Dimming Switchpack
(see note about UL924 / C22.2 No. 141 functionality)



Universal Dimming Switchpack with Dry Contact Input

0-10V | 120-347VAC | Wireless

The dimming switchpack (WSP-CA-010) offers 120-347VAC 20amp relay control and continuous 0-10V dimming control of LED and non LED loads. May also be used to integrate Greengate low-voltage occupancy (PIR or Dual Tech) sensors or contact closure input for a control area

catalog number:
WSP-CA-010 - Universal Dimming Switchpack with Dry Contact Input

WaveLinx wireless sensors



Wireless Ceiling Sensor

Sensing | Daylight | Wireless | Battery

The room based wireless sensor offers PIR occupancy and daylight sensing of up to 1500 square feet. The room based sensor is battery powered and is one of the smallest ceiling mounted room based wireless occupancy and daylight sensors on the market. The sensor in combination with the WaveLinx mobile application allows you to gain considerable energy savings from occupancy sensing-based control of lighting and plug loads.

catalog number:
CWPD-1500 - Ceiling sensor





Octagonal junction box installation

Wireless Tilemount Sensor Kit

Sensing | Daylight | Downlights | Wireless

The Tilemount Sensor Kit provides PIR occupancy and daylight dimming and control for connected downlight luminaires or other luminaires that do not support the WaveLinx Integrated Sensor. The Tilemount Sensor Kit provides 0-10V dimming control of LED and non LED loads for up to 3amps 120-277V luminaires.

catalog number:
WTA - Tilemount Sensor Kit
(also includes hardware for installation to standard 4" octagonal junction box)

WaveLinx integrated sensor

The luminaire-integrated sensor control system reduces the design time and complexity of meeting energy codes for both lighting and controls. The sensor system was designed to ensure occupancy and daylight harvesting coverage from within the footprint of the luminaire, so the lighting design is the control design. And, the system achieves the lowest installed cost in small spaces compared to traditional control products.

No New Wires

An in-place fixture retrofit is all that's needed to meet most energy codes in commercial spaces. The sensor system is factory wired to the luminaire, switching on or off based on occupancy, and dimming the light when enough daylight is available.

Lighting Controls Without Commissioning

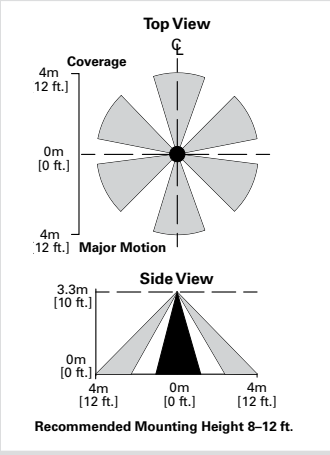
The luminaire-integrated sensor system offers out-of-the-box operation using thoughtful default settings.

Flexibility and Individual Control

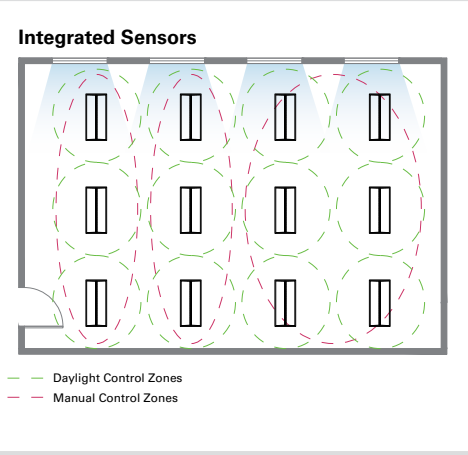
When the application demands more, the sensor system has the option to make changes using the mobile app. The mobile app allows changes from the default settings for occupancy, target light level, preset lighting levels, and more.

Low Installed Cost

With a single product to mount, and a single electrical connection to make, a luminaire with an integrated sensor system saves money on the total installed cost when occupancy and daylighting harvesting controls are needed.







Worry-free Controls Planning

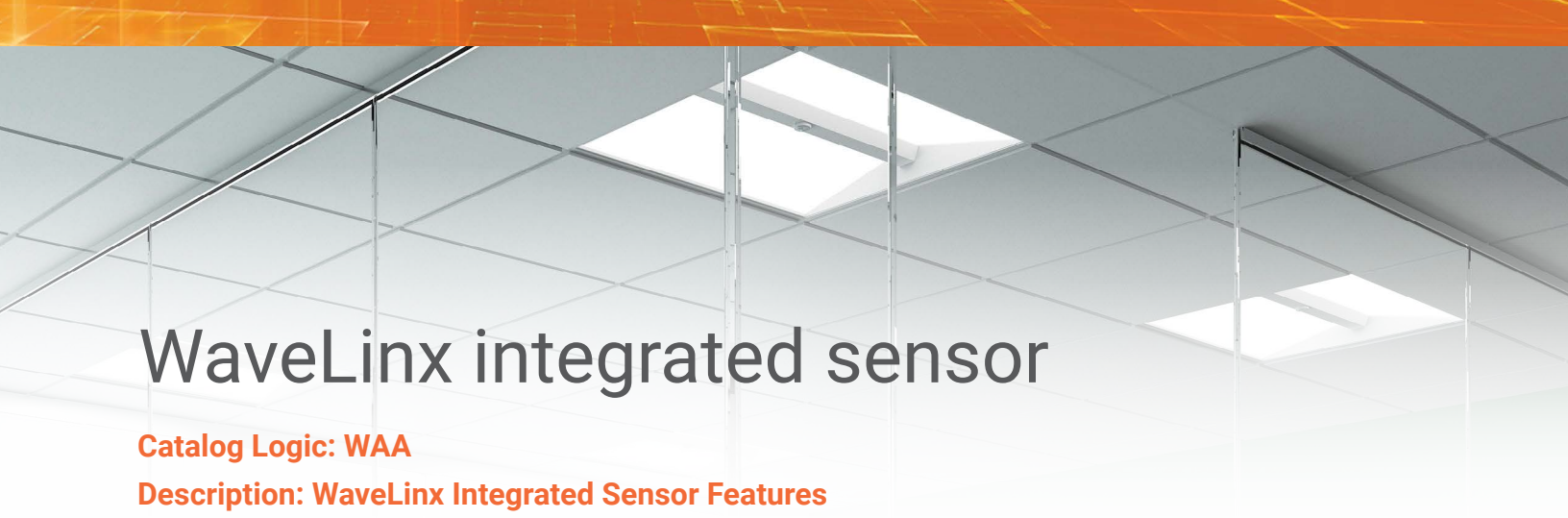
Ensure seamless coverage and performance with a sensor system built into every luminaire. The multi-technology sensor's occupancy and light sensing coverage overlaps the area each fixture illuminates.

Integrated Design

The sensor system adds to the contemporary aesthetic of WaveStream luminaires. The system is factory wired and ready to meet code out of the box.

Daylight Dimming Independence

Integrated sensors for daylighting, manual control zones are completely independent of daylighting control sets.

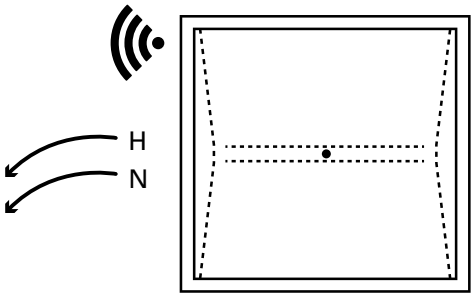


WaveLinx integrated sensor

Catalog Logic: WAA

Description: WaveLinx Integrated Sensor Features

- Factory installed and integrated into luminaires
- Wireless bi-directional communications
- Occupancy/Vacancy
- Closed loop daylighting
- Multicolored LED for status and diagnostics
- Energy calculations (available through Trellix)
- Bluetooth beacon for RTLS capabilities (Trellix Locate and BLE tags required)

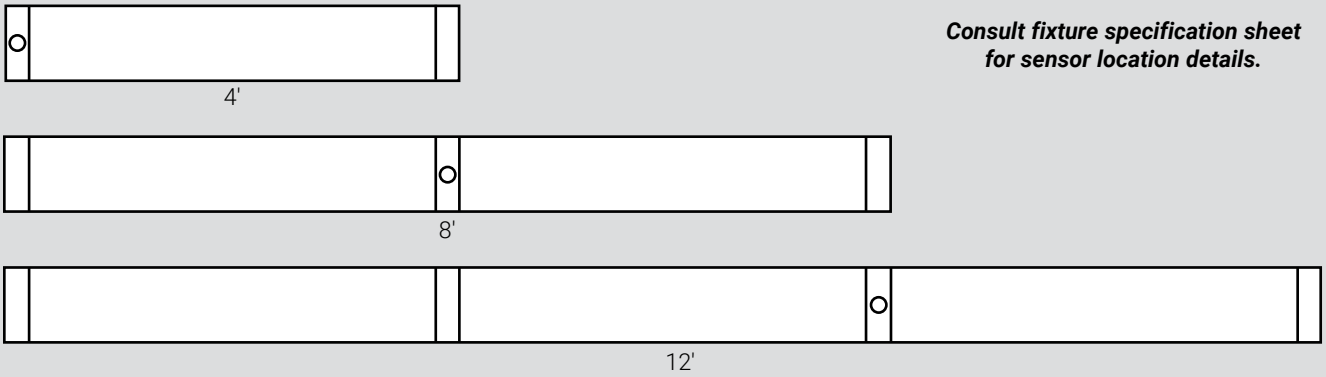


*Include **WAA** with the specified luminaire catalog logic*

22EN-LD2-34-UNV-L835-HCD-WAA-U

Encounter 2x2 with WaveLinx Integrated Sensor

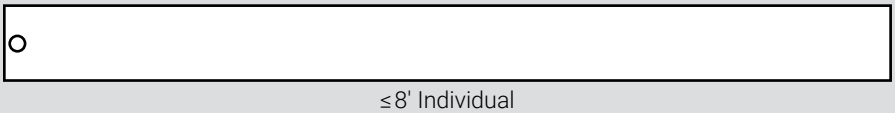
WaveLinx sensor locations in Metalux and Corelite linear products



Consult fixture specification sheet for sensor location details.

Sensors will be approximately located as shown on individual luminaires. When configured in linear runs, the same locations will apply based on the size of sections that comprise the run. Each 4', 8', or 12' section will be individually controllable with the WaveLinx system. Consult fixture specification sheet for details.

WaveLinx sensor locations in Neo-Ray linear products



Consult fixture specification sheet for sensor location details.

Luminaires longer than 8ft have sensors placed every 8-12ft along the length of the luminaire.

Lighting products with integrated sensors

The WaveLinx technology offers an intelligent, simple, easily control of various luminaires to meet application requirements:

- Supports integrated or tile mount connected sensors for occupancy and daylighting
- Designed and tested to provide guaranteed compatibility
- Eliminate the worry of controls and luminaire integration



Ambient lighting

Integrated sensors
Sensing | Daylighting | Individual | Grouping

Click on products to **learn more**

Low-Voltage option available = ○



Integrated Sensor

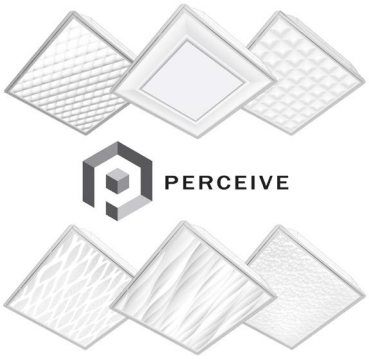
Sensing | Daylight | Wireless

The integrated sensor combines control within the light fixtures to reduce installation and design time; while meeting energy codes. With the integrated sensor the lighting design is the control design capable of IoT features without hardware replacement.

catalog number:
WAA - Integrated sensor
See luminaire spec sheets for ordering information

WLA - Low-voltage integrated sensor
(WLA sensors are not compatible with Trellix Locate)
See luminaire spec sheets for ordering information

For a complete list of compatible products, see:
www.cooperlighting.com



Metalux
Perceive (PD) ○
LED recessed ambient



Metalux
Cruze ST & SB ○
LED recessed ambient



Metalux
Encounter ○
Recessed ambient
WaveStream LED



Metalux
Cruze Retrofit Kit
LED recessed ambient



Metalux
WSL ○
Linear surface / suspended
series WaveStream LED



Metalux
SkyRidge ○
Recessed ambient
WaveStream LED



Metalux
Accord ○
LED recessed ambient



Metalux
RBG ○
Architectural
linear slot



Metalux
SRL
Linear LED
striplight



Metalux
Flat Panel (FPX)
○
Ultra-thin LED panel



Metalux
RLN ○
LED recessed ambient



Metalux
GR ○
General recessed
LED troffer



Metalux
SWLED
Linear LED striplight

Architectural lighting

Integrated sensors
Sensing | Daylighting | Individual | Grouping

Low-Voltage option available = ○

Click on products to **learn more**





Corelite
Bridge ○
Architectural recessed
WaveStream LED



Corelite
Iridium i3
Linear suspended
WaveStream LED



Neo-Ray
Define Gen 2
Linear recessed &
Linear Suspended LED

Corelite
Continua &
Continua SQ4
Linear suspended LED



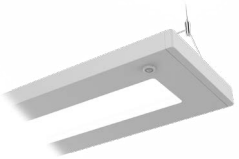
Corelite
RX / ZX ○
Architectural recessed
LED



Corelite
D3X ○
Architectural recessed
LED



Corelite
Divide
Suspended
WaveStream LED



Corelite
Jaylum
Suspended LED



RSA
MRZ
Architectural recessed
integral LED

For a complete list of compatible products, see:
www.cooperlighting.com

Recessed lighting

Tile Mount Sensing when installed with
WTA Tilemount Sensor Kit



Low-Voltage option available = ○

Click on products to **learn more**



HALO Commercial
PR Series ○
4", 6" and 8"
SeleCCTable Downlights



HALO Commercial
HC Series ○
4", 6" and 8"
Downlights



Portfolio
LDA Series ○
2", 3", 4" and 6"
Adjustable Downlights



Portfolio
LD Series ○
2", 4", 6" and 8"
Downlights



Portfolio
LE / LS Series
- Cylinders ○
2", 4" and 6" Round & Square
8" Round
2", 4" and 6" Round & Square
Shallow



Portfolio
LAM and LDM Series
- Multiples
1" (1 cell to 15 cells)
Downlight or Adjustable
4" (1 head to 4 heads)





Metalux
Steeler
High bay LED

Industrial lighting

Integrated sensors
Sensing | Daylighting | Individual | Grouping | Motion

Click on products to **learn more**



Industrial High Bay Sensor

The WaveLinx industrial high bay sensors offer passive infrared (PIR) occupancy with a photocell for closed loop daylight sensing. The sensors are IP66 rated for warehouse, manufacturing and industrial spaces with installation heights up to 40 feet and coverage up to 5000 square feet. Easy tool-less fixture connection (Zhaga Book 18 socket) with out-of-the-box controls functionality. Factory or field install this sensor with 4 pin connector standard.

catalog number:
SWPD3 - Fixture Mount High Bay Sensor, 15 - 40ft (4.5 - 12.2m)



Metalux
ILED
LED Linear Bay



Metalux
Benchmark
High bay LED



Metalux
VHB
High bay LED



Metalux
HBLED
High bay LED



Metalux
Optimized HB
High bay LED

Outdoor lighting with **Fixture Mount Sensors**

Sensing | Daylighting | Individual | Grouping | Motion | Astronomic

LEDs can be fitted with smart and connected controls, allowing lighting infrastructure to be easily configured to operate based on astronomic or time schedules, for all or zones of outdoor luminaires.

Click on products to **learn more**



Outdoor Fixture Mount Sensor

The WaveLinx outdoor sensors (high and low mounted) offer passive infrared (PIR) occupancy with a photocell for closed loop daylight sensing. The sensors are IP66 rated for outdoor site and indoor environments with installation heights up to 40 feet and coverage up to 5000 square feet. Easy tool-less fixture connection (Zhaga Book 18 socket) with out of the box controls functionality. Available color options: white, black and bronze. Factory or field install this sensor with 4 pin connector standard.

catalog number:
SWPD4 - Outdoor Fixture Mount - Low Bay Sensor, 7 - 15ft (2.1 - 4.5m)

SWPD5 - Outdoor Fixture Mount - High Bay Sensor, 15 - 40ft (4.5 - 12.2m)





Galleon LED
Area and site, Wall, PC and Flood



Arbor LED
Area and site



Impact Elite Cylinder LED
Wall



Prevail/Prevail XL
Area and site



Luxescape LED
Area and site

Outdoor lighting with **Wireless Outdoor Lighting Control Module**

Scheduling | Dimming | Astronomic | Wireless | Zones



Luxescape LED
Area and site



Prevail/Prevail XL
Area and site



Night Falcon
Floodlight



Talon
Area and site



Wireless Outdoor Lighting Control Module

The WaveLinx 7-pin outdoor lighting control module enables schedules to provide ON, OFF and dimming controls based on astronomic or time schedules based on a 7 day week. Allows to create multiple control zones.

catalog number:
WOLC-7P-10A - Outdoor lighting control module



Caretaker
Area and site



Verdeon
Area and site





Galleon LED
Area and site,
Wall, PC
and Flood



Navion
Area and site



Ventus
Area and site



Impact Elite Cylinder LED
Wall



Arbor LED
Area and site

Why Contractors should use WaveLinx?

Rising conduit and wire costs

Conduit and copper has seen continued cost increase, as much as 100% over the past 12 months.

- Eliminate up to 60% of the wire runs
- Less wire - Less pipe

Training

How do you keep up with the latest technology? WaveLinx provides local and classroom certification programs

- Learn how the system works in as little as 2 hours
- Simply mobile

Shortage of qualified labor

80% of electrical contracting firms are reporting difficulty filling hourly craft worker positions and higher salaries.

- Save up to 45 minutes per control zone
- Less time - Less people

Instructional videos

What if I need a tutorial on site? WaveLinx has fifteen, 5-minute videos that walk you through it.

- Free mobile app
- Free training videos

Installation times

Get off the job at least 40% faster simple install and simple setup.

- More jobs with the same people means more money for you
- Faster install

Utility incentives

Many states provide rebate incentives for LED fixtures with integrated sensors.

- Less material to install, and the rebate pays for it
- Incentives up to $75 per fixture

Energy savings

How do you make sure you meet local code and provide energy savings to your customer?

- Network Lighting Controls (NLCs) provide 47-70% savings with integrated luminaire lighting controls
- Up to 70% energy savings

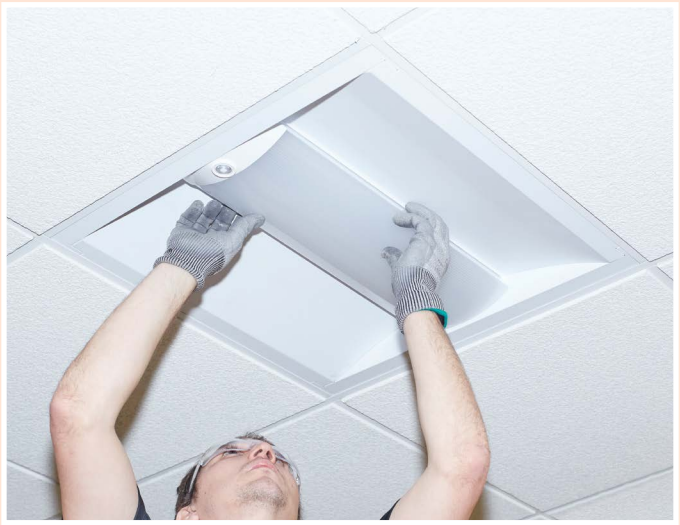
Cybersecurity

Are you concerned with cybersecurity? You should be, but rest assured as WaveLinx has the UL2900-1 listing for Network Cybersecurity.

- Help customers stay secure
- Peace of mind that the product is backed by independently certified UL and IES cybersecurity standards

Wireless, code-compliant and cost-effective for today's **Electrician**

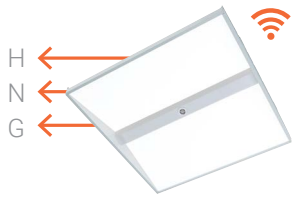
WaveLinx How to Videos



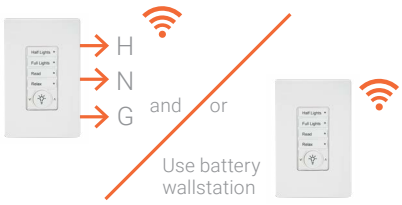
Use what you already know

Complete projects faster while reducing costs with the WaveLinx system for LED lighting and controls.

Wire integrated luminaire or retrofit kit

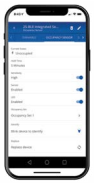


Wire for power not load switching

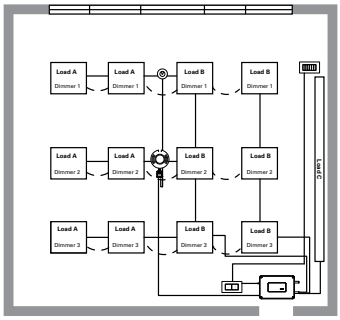


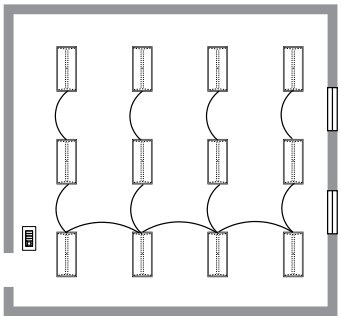
Easy programing with mobile application

(Wireless Area Controller required)



Go from this...





To this!

Now simple standard wiring provides so much more. Here's what you get:

Lighting
- Continuous dimming
- Individual control

Occupancy
- Auto On to 50% or Vacancy
- Auto Off of lighting and plug loads

Daylighting
- Continuous dimming to OFF
- Open or closed loop

Scheduling

Security
- IEC 62443-4-1, IEC 62443-4-2 and UL 2900-1 certified
- UL924

DLC NLC V5 qualified

Assuming 12 fixtures in a typical classroom, MWS will save more than 1 day per electrician per room.

Pipe and Wire

QTY.	MATERIAL
60 ft	1/2" EMT
252 ft	#12 THHN
2	1/2" Couplings
10	1/2" Couplings
5	J-box covers
12	Fixture whips

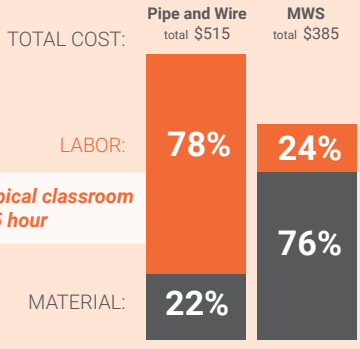
Simplified BOM

MWS

QTY.	MATERIAL
12	12FC12 / 2G09
2	12ST12 / 2G
3	12EC12 / 2G11



12 Fixtures in typical classroom and Labor @ $75 hour



up to 30% LOWER TOTAL COST
75% LESS LABOR



Design layout steps

Choose the right products

1. Select and layout **Fixtures**

- Use integrated luminaires to make the most of your lighting aesthetics and controls requirements.
- Add the WaveLinx Outdoor Load Control module to area, site and flood lighting for complete building site control.



2. Place **Wallstations**

- Wallstations are the users primary method of control, make sure the placement and engraving delight the customer.
- Wallstations are fully programmable to control any zone or scene in the area.



3. Place **Receptacle**

(Where required by energy code)

- Receptacle control is required to meet California Title 24 and current ASHRAE 90.1 code.
- These wireless receptacles make it easy to meet code for any new construction or retrofit.



4. Place **Relays, Ceiling Sensors and Tilemount**

- The WaveLinx dimming switchpack with 0-10V makes it easy to control large zones of lighting or any 3rd party luminaire.
- The ceiling sensor adds extra occupancy coverage to the areas that either do not have integrated sensor or need extra coverage.
- Tilemount daylight sensors enable 0-10V dimmable downlights to support daylight dimming and add them to the control zones.



5. Place **Wireless Area Controllers**

- Every application needs at least one Wireless Area Controller (WAC).
- Mounted above the ceiling tile the WAC controls up to 150 devices over 15 user-defined areas.



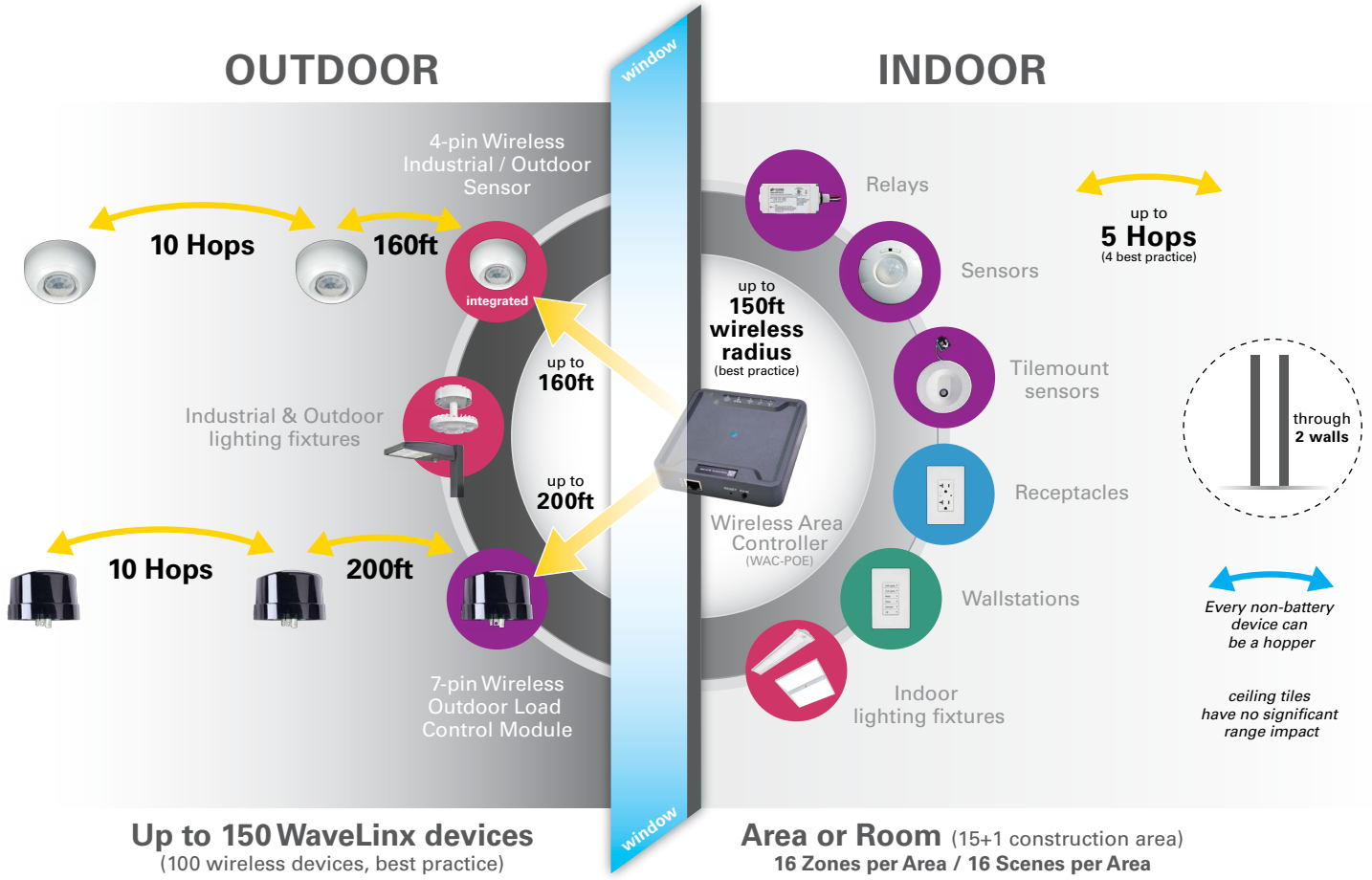
6. Connected to **Enterprise LAN Network**

(optional)

- For enterprise solutions ensure all WACs and Trellix are on the same network.
- Trellix Core Pro can communicate with up to 20 WACs.
- Core Pro includes 250 BACnet and API nodes for 3rd party integration.



WaveLinx installation rules



Up to 150 WaveLinx devices
(100 wireless devices, best practice)

Area or Room (15+1 construction area)
16 Zones per Area / 16 Scenes per Area



WAVELINX OUTDOOR GUIDANCE

DEVICE	LOS Line of Sight	SWPD2-5 4-pin integrated	WOLC-7P-10A 7-pin integrated
Wireless Area Controller WAC-POE	LOS through window[3]	160ft (49m)	200ft (60m)
	Through 7" concrete	40ft (12m)	60ft (18m)
Wireless Outdoor Lighting Control Module WOLC-7P-10A (7-pin)	LOS node to node	160ft (49m)	200ft (60m)
Outdoor Fixture Mount Sensor SWPD4-5 (4-pin integrated)	LOS node to node	160ft (49m)	200ft (60m)
Hops	Outside WAC connect range	10	10

1 - This guidance does NOT include Parking Structures (Site and Area ONLY)
2 - MAX is based on 90% probability of establishing a WaveLinx connection
3 - Tinting / metallic shades reduce range by 20ft (6m)

Basic steps to design a WaveLinx System

1. Select and layout **Fixtures**



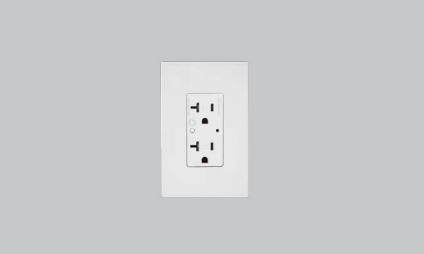
- Fixture layout can be sensor layout
- Numerous recessed and suspended options

2. Place **Wallstations**

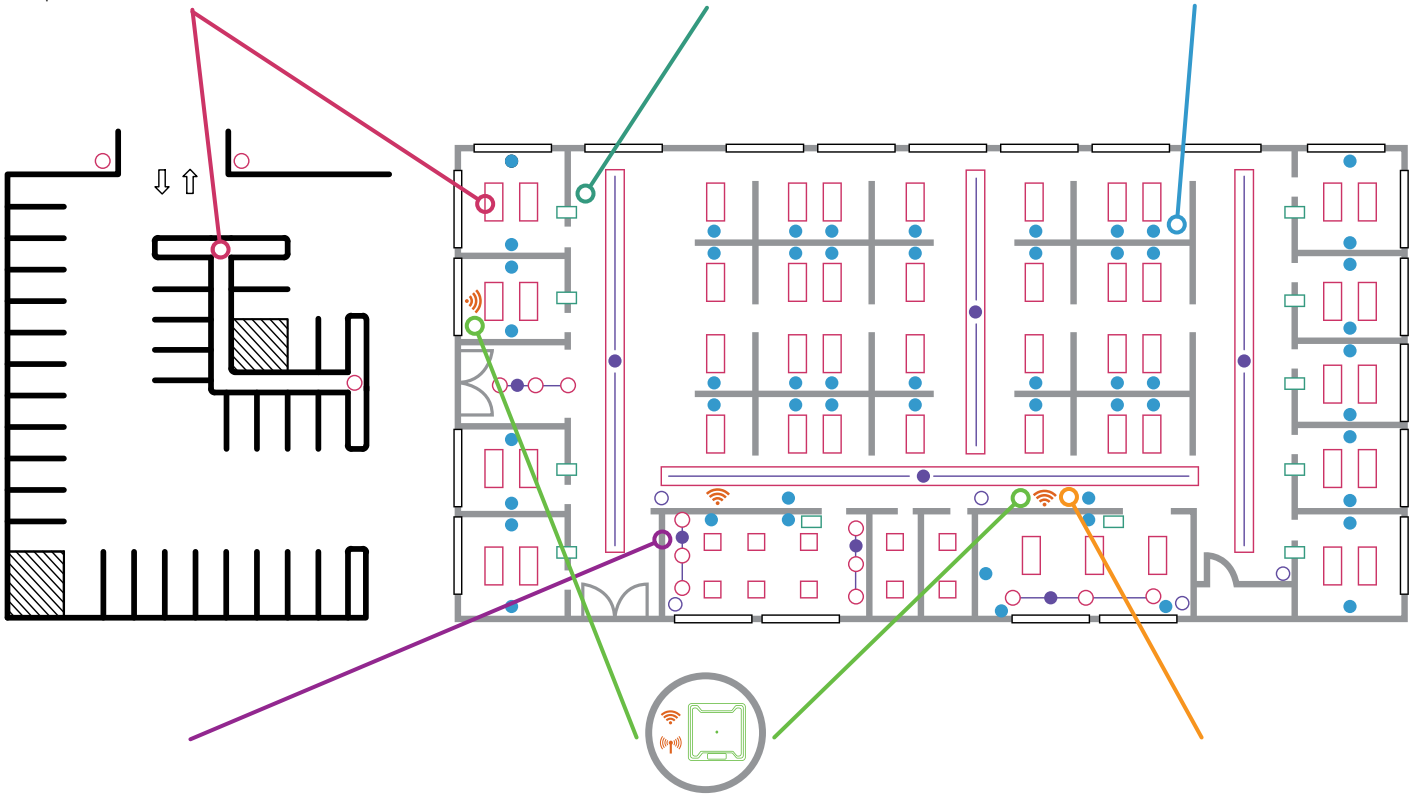


- Multiple programmable configurations
- Mains and battery powered options

3. Place **Receptacle**



- Required for modern energy codes
- Power measurement to Trellix



4. Place **Relays and Sensors**



- Dimming relay for 3rd party luminaires
- Tilemount sensor option

5. Place **Wireless Area Controllers**



- 150-ft communications radius



6. Connect to **Enterprise LAN**



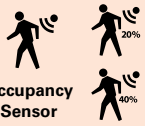
- Network WAC's
- IoT connectivity to LAN or VLAN
- Integrates with BACnet, Demand Response and API



Energy codes

Built-in energy saving lighting control strategies

WaveLinx provides these energy saving strategies with a simple configuration app.

STRATEGY	DESCRIPTION	ESTIMATED SAVINGS
 **Manual Dimmer**	Manual/personal dimming control – is one of five alternative methods to meet the multi-level lighting control requirements.	**10-20%**
 **Occupancy Sensor**	Occupancy/vacancy sensing – provides Manual On/Automatic Off or Automatic On/ Automatic Off and Partial Off capabilities.	**20-60%**
 **Daylighting Control**	Daylight dimming – provides multiple daylight dimming zones that automatically adjust the lighting based on daylight available in the space, or fixture integrated sensors for completely granular daylighting control.	**20-45%**
 **Receptacle Control**	Plug load control – automatically turns On receptacles upon occupancy regardless of light status. Ensures receptacles are turned Off when the space is vacant.	**15-50% Controlled loads**
 **Tuning Control**	High-end/Task Tuning – lowers the maximum light level for automatic energy savings.	**10-30%**
 **Demand Response**	Demand Response – automatically reduces light level based on signal from 3rd party system.	**10-40%**
 **Remote Signal Control**	BACnet- Coordinate control through BMS Remote Signal Control – Communicates to 3rd party systems via API.	**20%**
 **Outdoor Control**	Outdoor Control - automatically adjust area, site, flood lighting via scheduling or astronomic clock.	**25%**

Energy Codes application notes

ANSI / ASHRAE / IES Standard 90.1-2019

Energy Standard for Buildings Except Low-Rise Residential Buildings (Standard 90.1-2019) adopted as of May 2018. This code significantly fine-tunes the design requirements for code-compliant lighting controls systems, mechanical systems, and the building envelope. This application note summarizes the new mandatory lighting control requirements and highlights where they can be used in various spaces. Please note: this document is intended to provide a general reference and design professionals should consult Standard 90.1-2013 and the authority having jurisdiction for project-specific requirements and interpretation.

ASHRAE 90.1 was recognized by the U.S. Department of Energy (DOE) as the national energy reference standard.

Below summarizes changes from 90.1-2016 to 90.1-2019:

- Reduced LPD by ~5%
- Includes DC Low-voltage lighting systems with flexible cabling for plug-in connection
- Step dimming requirements removed in favor of continuous dimming
- Partial off is subject to daylighting

International Energy Conservation Code (IECC) 2018

IECC 2018 establishes minimum energy efficiency requirements for new and renovated buildings. This latest iteration contains dramatic changes to the prescriptive and performance-based criteria that previously defined IECC-compliant lighting and lighting control systems. ASHRAE 90.1 is recognized by the DOE as the national reference standard, however IECC is adopted by many states. Please note: this document is intended to provide a general reference and design professionals should consult IECC 2018 and the authority having jurisdiction for project-specific requirements and interpretation.

Below summarizes changes from 2015 to 2018:

- Use Luminaire level lighting controls (LLLC) to satisfy controls requirements
- Daylighting enhancements
- Expand occupancy sensor requirements to open office
- Reduces Light Power Densities (LPD) for interior and exterior lighting systems

California Title 24

California's Building Energy Efficiency Standards are updated on an approximately three-year cycle. The 2019 Standards will continue to improve upon the 2016 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The effective date of the 2019 Standards is January 1, 2020.

Below summarizes changes from 2016 to 2019:

- Indoor lighting power allowances reduced by 37 percent (complete building method), and 29 percent (area category method)
- Mandatory automatic daylighting control language clarified

Quick Reference Guide Commercial Requirements

IECC (2018), ASHRAE 90.1 (2019), Title 24 (2019), NECB (2017)

	IECC 2018	ASHRAE 90.1 2019	T24 2019	WaveLinx
Automatic Controls				
Occupancy Sensors	C405.2.1	9.4.1.1(h)	130.1(c)	●
Partial Off	C405.2.1.2 (warehouse) C405.2.1.3 (open office)	9.4.1.1(g)	130.1(c)	●
Full Off	C405.2.1.1.1 (20min)			●
Scheduled Off	C405.2.2	9.4.1.1(h)	130.1(c) - (warehouse, corridor, stairwell, library stacks)	●
Plug Load Off	N/A	8.4.2	130.1(d)	●
Manual On/Partial On	C405.2.1.1.2	9.4.1.1(b) - (manual ON) 9.4.1.1(c) - (partial ON)	130.1(c) - (office <250ft^2, classrooms, conference rm)	●
Manual Controls				
Manual On/Partial On	C405.2.1.1.2	9.4.1.1(b) - (manual ON) 9.4.1.1(c) - (partial ON)	130.1(c) - (office <250ft^2, classrooms, conference rm)	●
Manual Light Reduction	C405.2.2.2			●
Area/Local Controls	C405.2.5	9.4.1.1(a)	130.1(b)-(multi-level controls)	●
Daylighting				
Daylight Responsive Control	C405.2.3	9.4.1.1(e) - (>150W sidelighting) 9.4.1.1(e) - (>150W toplighting)	130.1(d) - (>120W with < .5W/ft^2 dimming optional) 130.1(d) - (>120W with > .5W/ft^2 dimming required)	●
Exterior Controls				
Parking Garage Lighting		9.4.1.2		●
Exterior Lighting	C405.2.5	9.4.1.4		●
Special Items				
Specific Application Controls	C405.2.4			●
Additional Efficiency Packages	C406.1			●
Guest Room or Sleeping Units	C405.2.4.3	9.4.1.3(b)		●
Functional Testing	C408.3	9.4.3	130.4	●
Metering			130.5(a)	●
Demand Responsive Controls			130.1(e) - (>10K ft^2 reduce by 15%)	●

Application code compliant sequence best practices

	ASHRAE 90.1 2019	IECC 2018	T24 2019	Atrium	Banking	Classroom / Training / Lecture	Conference / Meeting room
Local Control	9.4.1(a)	C405.2.5	130.1(a), (b)	●	●	●	●
Manual ON	9.4.1(b)	C405.2.5	130.1(a), (b)	○	○	○	○
Partial Automatic ON	9.4.1(c)	C405.2.1.1.2	130.1(b)	○	○	○	○
Bi-level Lighting	9.4.1(d)					●	●
Daylighting Side lighting	9.4.1(e)	C405.2.3.2	130.1(d)	●	●	●	●
Daylighting Top lighting	9.4.1(f)	C405.2.3.3	130.1(d)	●	●	●	●
Automatic Partial OFF	9.4.1(g)	C405.2.1.3	130.1(c).6				
Automatic Full OFF	9.4.1(h)	C405.2.1.1.1	130.1(c).5	○	○	○	○
Scheduled Shutoff	9.4.1(i)	C405.2.2	130.1(c)	○	○	○	○
Receptacle Control	8.4.2	C405.2.4	130.5(d)		●	●	●
Energy Monitoring	8.4.3.2		130.5(b)	○	○	○	○
Parking Garage Lighting Control	9.4.2	C405.2.6	130.1(a), (b)				
Functional Testing	9.4.3	C408.3	130.1(a), (b)	●	●	●	●
Demand Response			130.1(a), (b)	○	○	○	○
Enhanced Digital Lighting Controls		C406.4		○	○	○	○

● Required ○ Choose one ○ Choose one ○ Choose one

Copy / Print room	Corridor	Courtroom	Dining area	Food preparation	Library	Office	Restroom	Sales area	Stairwell
●	●	●	●	●	●	●	●	●	●
○		○	○	○	○	○	○	○	○
○		○	○	○	○	○	○	○	○
●	●	●	●	●	●	●		●	●
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
									●
○	○	○	○	○	○	●	○	○	○
○	○	○	○	○	○		○	○	○
●			●		●	●	●	●	
○	○	○	○	○	○	○	○	○	○
●	●	●	●	●	●	●	●	●	●
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○

● Required ○ Choose one ○ Choose one ○ Choose one

Best practices / FAQs

What components do I need to have a complete WaveLinx system?

- Wireless Area Controller (Gateway)
- Trellix Core Pro (Enterprise Gateway)
- Trellix Core Enterprise (Enterprise Gateway)
- Trellix (web based application)
- WaveLinx Mobile App (Commissioning and user personal control)
- WaveLinx Wallstation (Manual lighting and scene control)
- Wireless Integrated Sensor (Fixture integrated occupancy sensor, ambient light sensor and control)
- WaveLinx Dimming Switchpack with 0-10V
- WaveLinx Receptacle (Wall mounted power outlet)
- WaveLinx Ceiling Sensor (Ceiling mounted PIR occupancy sensor)
- WaveLinx Outdoor Load Control Module (ON/OFF/DIM via astronomic clock)
- WaveLinx direct driver luminaires (ON/OFF/DIM of wireless drivers)

What are the wireless design best practices?

DESIGN CONSIDERATION	BEST PRACTICE	MAXIMUM
WCL devices per WAC	100	150
User-defined areas per WAC	15	15
Construction areas per WAC	1	1
Zones per Area	3	16
Scenes per Area	16	16
WAC range (indoor WCL devices)	150ft (45m) LOS[1]	300ft (91m) LOS[2]
WAC range (outdoor WCL devices)	See sensor spec sheets	
Device hops beyond WAC (indoor / outdoor)	4 / 10	5 / 10

Notes

[1] Considering two (2) interior walls of standard construction

[2] Considering no LOS obstructions (walls, columns, etc.)

Can WaveLinx communicate through interior walls?

Yes, WaveLinx will communicate through two to three interior walls of standard sheetrock construction with wood or aluminum framing.

Can sensors be disabled?

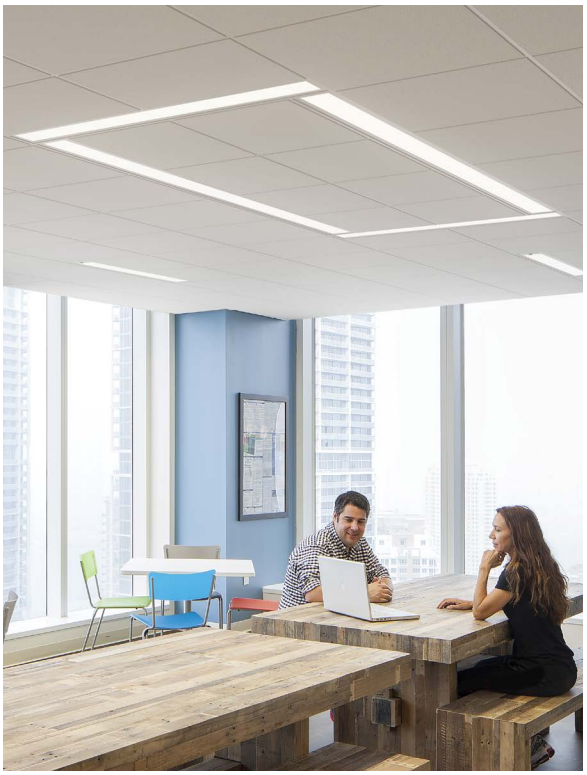
Yes, Integrated or external sensors can be disabled or have the sensitivity adjusted.

Does the Wireless Area Controller (WAC) need to be installed in the space or can it be installed in the Plenum?

The WAC can installed in the plenum above the drop ceiling and will communicate to the devices in the space. It should not be installed on or next to a metal or concrete wall.

Should I install the WAC next to a concrete or metal wall?

No, Concrete or metal walls severely impact the strength of the wireless signal and will reduce the overall coverage and performance of the WaveLinx system. The WAC should be installed in the center of the overall space that it will be controlling.

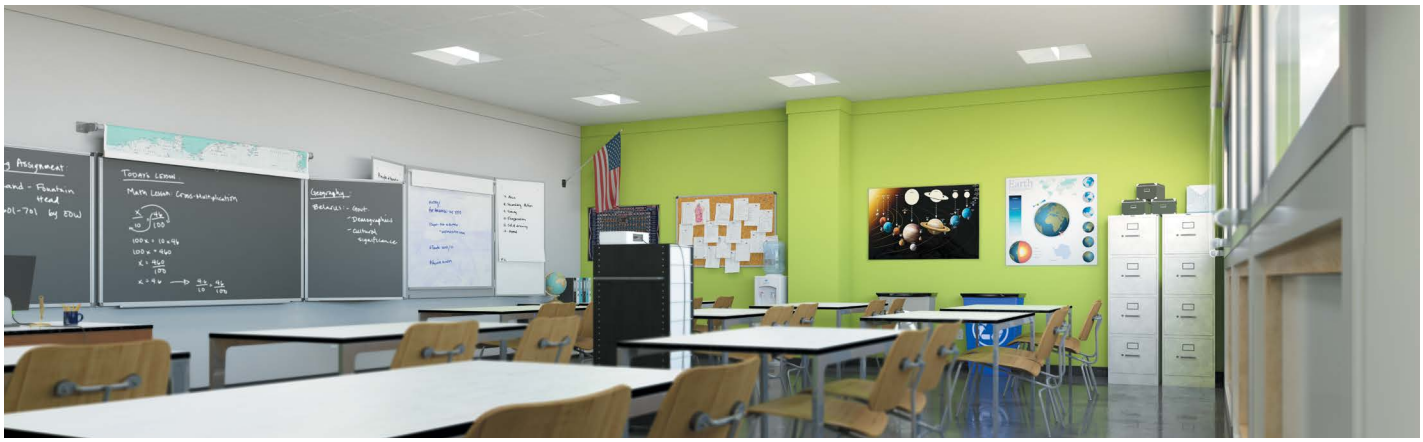


Should I install the WAC in an Electrical Closet or IT room?

No, these types of rooms are typically surrounded by concrete walls. Concrete walls severely impact the strength of the wireless signal and will reduce the overall coverage and performance of the WaveLinx system. The WAC should be installed in the center of the overall space that it will be controlling.

How does WaveLinx communicate through or around concrete spaces, like stairwells and electrical closets?

The Wireless Area Controller emits an wireless signal using the IEEE 802.15.4 wireless protocol in the 2.4Mhz frequency range. This signal pulses out from the WAC in a wireless bubble. Concrete or metal structures will break this bubble. Ensure to place the WAC at least 15 feet away from these structures to allow the wireless signal to have the best angle around these structures. In addition most WaveLinx devices act as a signal repeater which can allow the wireless signal to communicate around difficult spaces.



What is the maximum distance the WaveLinx system can communicate?

The Wireless Area Controller can control up to 150 WaveLinx devices within 150 ft line of sight (LOS). If you have not reached the 150 device limit within 150ft, wireless hopping will allow you to reach additional devices up to the 150 device limit. Each wireless device can act as a signal repeater or (hopper) and provides an additional 75 feet of wireless coverage as long as the device is within 75ft of a device within the WAC 150ft range. WaveLinx supports a maximum of 5 hops each adding 75ft of communications beyond the WAC 150ft range. (150ft + (75*5))=525ft radius. Remember successful wireless coverage includes not only distance but also wall construction, wall thickness and number and density of devices. If you are unsure of application communication coverage consult WaveLinx support.

Can WaveLinx be installed in the same area as the building Wi-Fi?

Yes, although 802.15.4 communications use a similar frequency as standard Wi-Fi it uses different channels, modulation and communications structure. This reduces the risk of conflicts between wireless systems.

Can multiple 802.15.4 wireless networks exist in the same area of a building?

Yes, 802.15.4 is self-healing, auto channel selecting mesh network. This means that these networks can coexist if set up correctly. In addition WaveLinx devices will only communicate with the assigned Wireless Area Controller. Other 802.15.4 wireless networks may not include all the security and performance qualities of WaveLinx and may not perform as well.

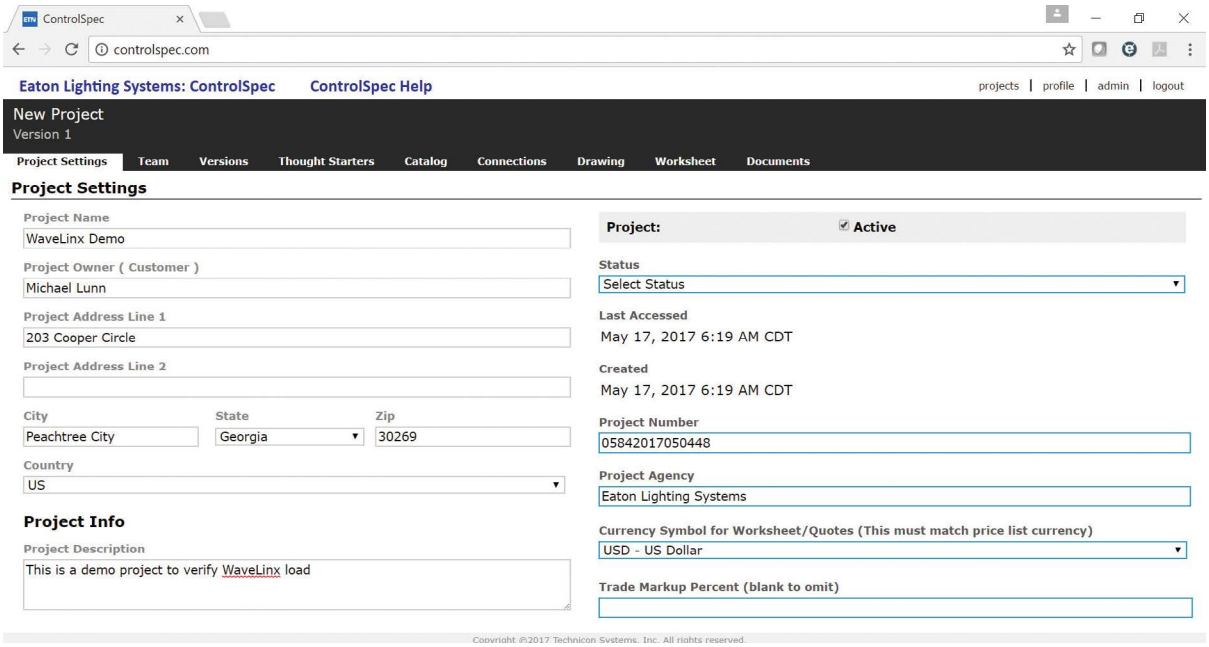


ControlSpec design tool

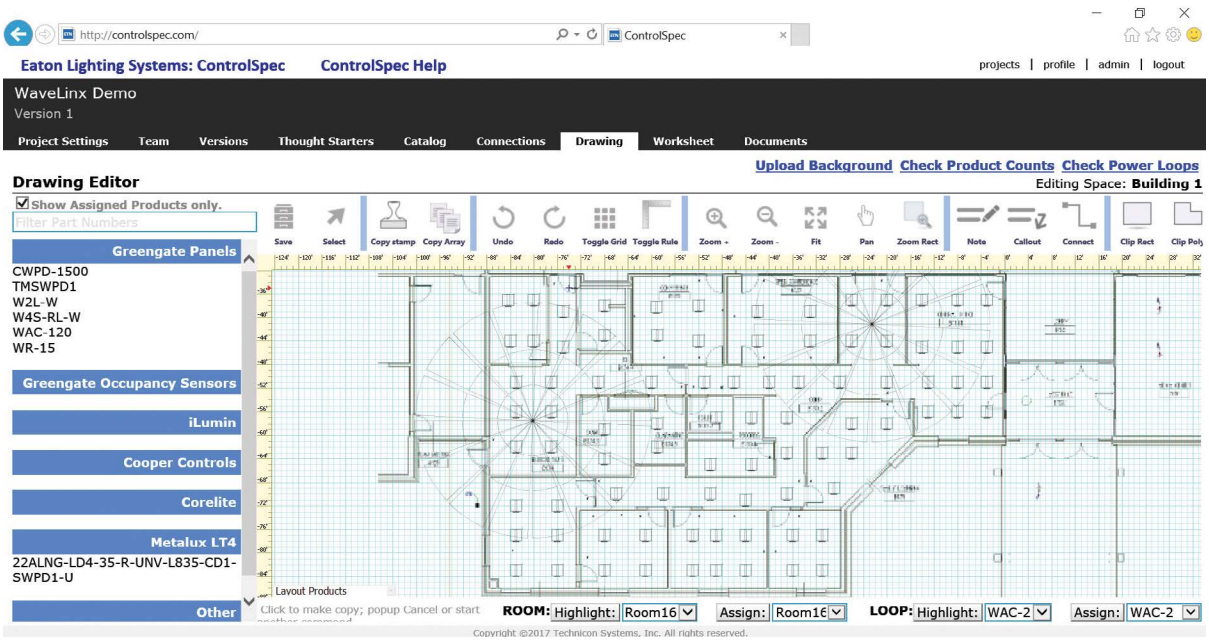
ControlSpec is your design and quote tool of choice, enabling you to layout, quote and submit on a project from within one tool. For the WaveLinx product line all control devices and a large selection of WaveLinx integrated fixtures are at your fingertips. Create your project, perform a takeoff, create one-line drawings and price your project. Product pricing is inside ControlSpec reducing your quote time.

ControlSpec value to you:

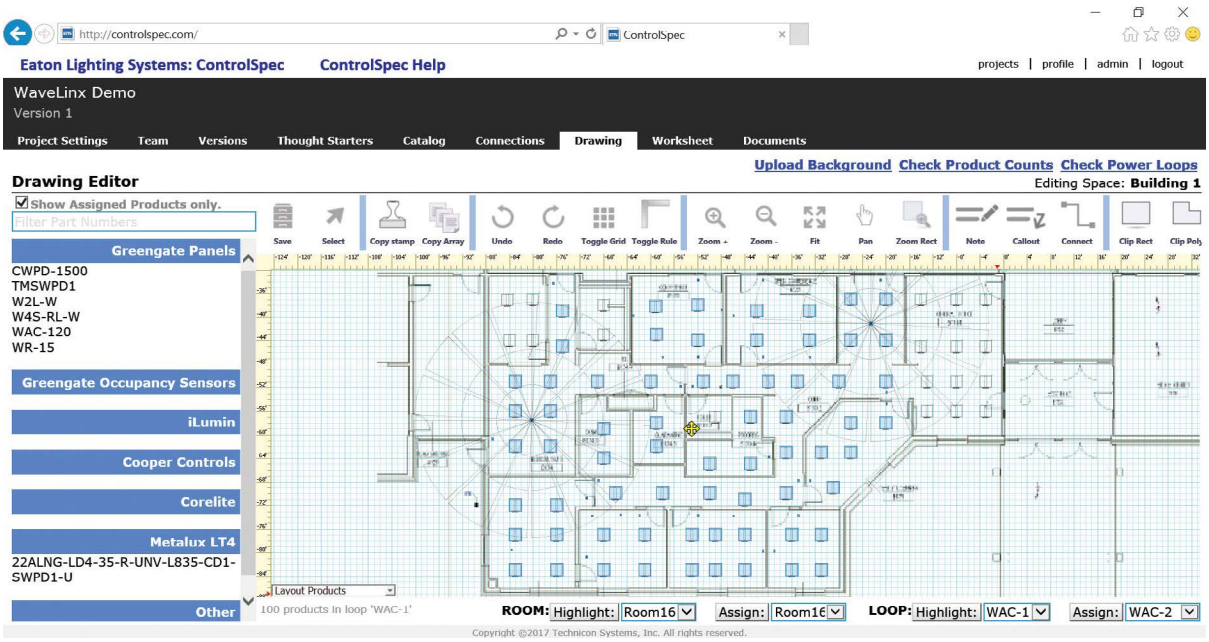
- Create a project
- Perform layout take-off
- Review and adjust pricing
- Create customized one line drawings
- Print quote and submittal documentation
- Product filtering for faster access and selection
- Quick product addition on every screen



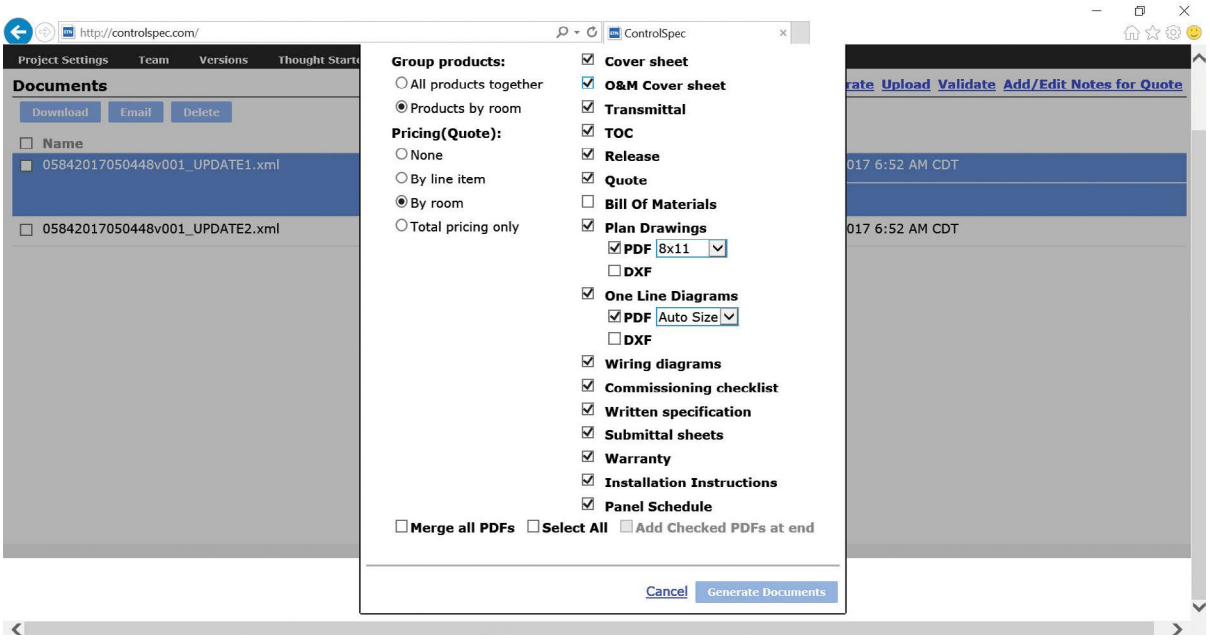
Create a project with customer information and share with other members of the design team.



Use the floorplan tool to layout your project, add luminaires, wallstations, receptacles, tilemount sensors, ceiling sensors, relays and Wireless Area Controllers.



Define rooms, and assign WaveLinx devices to each Wireless Area Controller. Highlight areas to confirm your design.

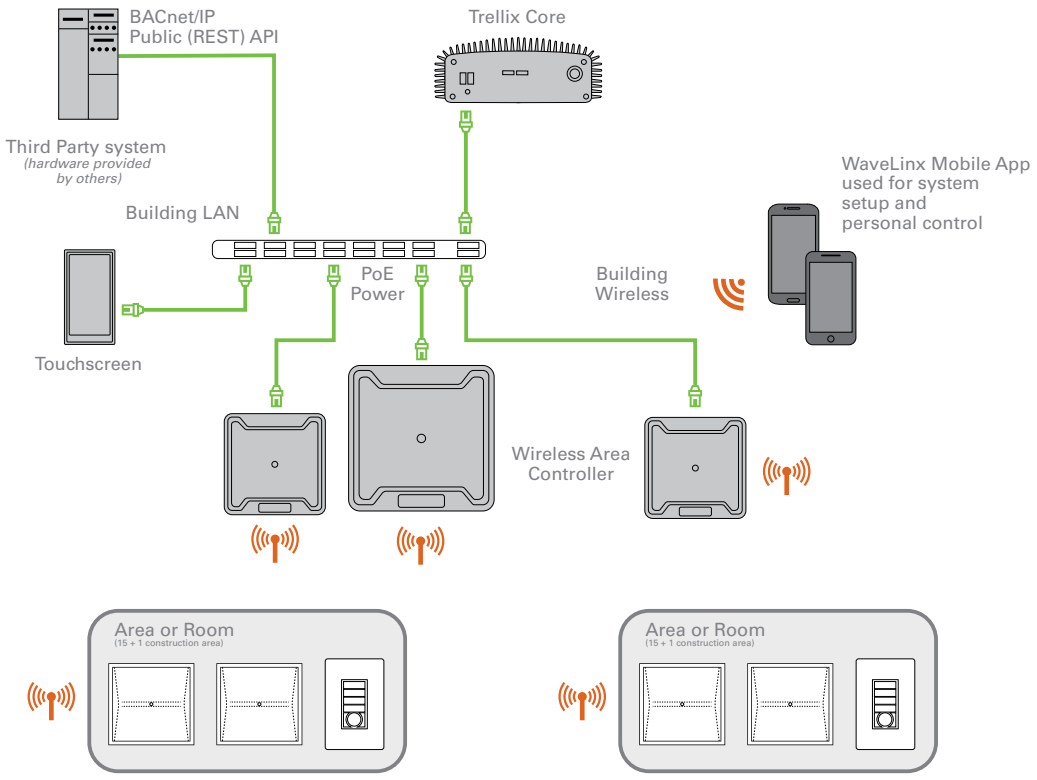


Generate a full submittal package, quotation, one lines and floor plan drawings.



Typical applications wiring diagrams

WaveLinx network integration



Third party systems connect to the same LAN or VLAN as the Trellix and Wireless Area Controllers.

Trellix exposes BACnet points to the BMS system which include:

Network
- Write Demand Response Active/Inactive

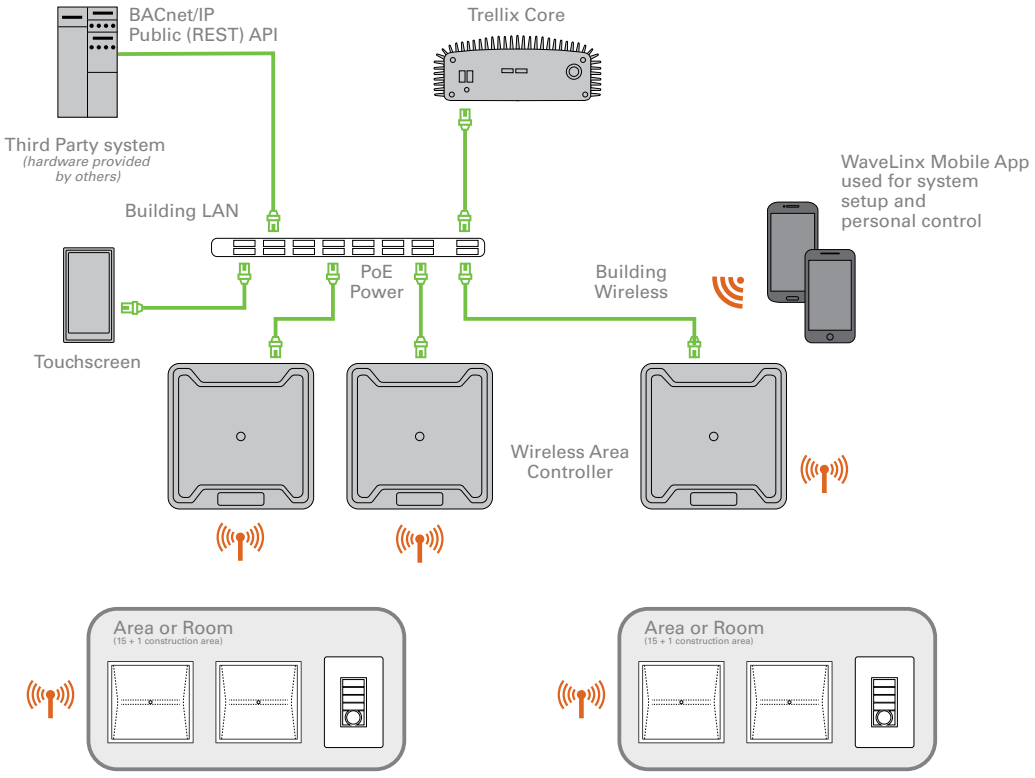
Area
- Read Name & Scene
- Write Scene
- Read energy calculations

Zone
- Read/Write Zone light level

Endpoint (Device)
- Read/Write endpoint light level

Third parties can also communicate to Trellix via Public API (REST). A subset of the HTTP methods are supported by the REST API. The supported methods are GET and POST (note: PUT and DELETE actions not currently supported).
Please refer to the Trellix Manual for more details.

WaveLinx demand response integration



WaveLinx integrates with Demand Response systems via the BMS BACnet system. The BMS system will support Automatic Demand Response standard protocols and can send a Demand Response signal to the WaveLinx system via BACnet.

Each WaveLinx area can have a different Demand Response value assigned to it to reduce the light level when the demand response mode is active. This can be programmed and tested using the WaveLinx Mobile Application.

How demand response works.

When demand response is active:

- The Wireless Area Controller will receive the message from the BMS BACnet via Trellix
- The WaveLinx mobile app will display a "DR" icon at the top of any Area where Demand Response is active
- Lighting in the area will be reduced by the demand response value in the area
- Light levels will equal: lighting target (scene value) minus daylighting minus demand response

When demand response is inactive:

- The Demand Response mode will be removed and the indicator icon in the mobile app will be clear
- Light level will not change until the next target level change via daylight, occupancy, wallstation pushbutton

This provided you a more accurate demand reduction than just applying a scene value when demand response is active (caution: some systems simply trigger a scene value when demand response is active, which may actually increase the light level).

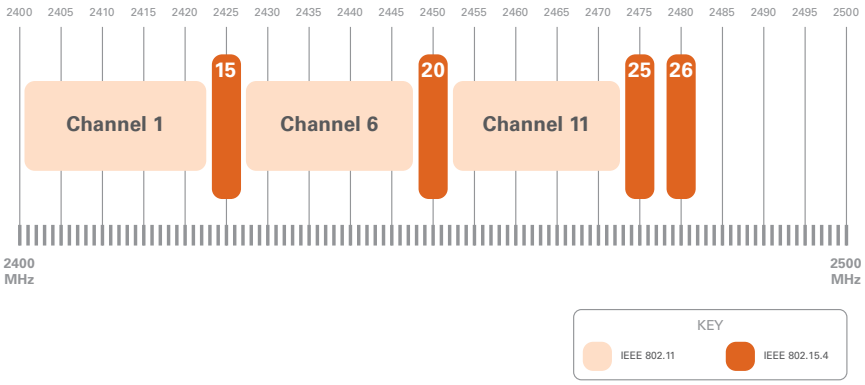
Wireless coexisting communication information

Coexisting with Wi-Fi

The WaveLinx Connected Lighting system employs three techniques to either eliminate or drastically impact on Wi-Fi networks in the building: reduce its impact on Wi-Fi networks in the building.

- **Channel selection:**
  This technique involves identifying WaveLinx IEEE 802.15.4 communication channels that do not overlap with the current Wi-Fi deployment (shown)
- **Low airtime consumption:**
  WaveLinx is designed to reduce wireless communications during steady state operation, greatly reducing the probability of collision with Wi-Fi traffic

IEEE 802.11 and 802.15.4 2.4GHz
Commonly used channels (North America)



Channel Selection

WaveLinx uses IEEE 802.15.4 channels, which are within the same 2.4 GHz frequency band that IEEE 802.11 Wi-Fi operates within. Since devices communicating on the same channel can cause interference, the devices need to be set on channels that do not overlap.

If we overlay the most frequently used channels used by IEEE 802.15.4 (WaveLinx) and IEEE 802.11 (Wi-Fi) on the chart below, you can see there is no overlap.

Wi-Fi uses channels 1, 6 and 11 by default, and IEEE 802.15.4 devices should be set to use channels 14,15,19,20,24,25, and 26 by default which fall within the gaps of the Wi-Fi channels. For IEEE 802.15.4 channels 15 and 20 are typical and allow us to prevent overlap that can lead to potential signal interference. Channels 25 and 26 are typically not used in North America because they are too close to a restricted RF band.

Ultimately this means that IEEE 802.11 Wi-Fi and IEEE 802.15.4 wireless devices can co-exist in the same space without interference if they are properly set with the correct channels.

Low Airtime Consumption

WaveLinx recognizes that it is not always possible to select non-overlapping channels. Many Wi-Fi access points aggressively use all available spectrum to maximize performance. To coexist with such solutions, WaveLinx is designed to send two messages every five minutes per sensor. The following example shows the airtime consumption for a 50,000 square foot installation.

- Airtime Consumption = # sensors*msgs_per_sensor*airtime_per_msg/5mins*100%
- 50,000 square feet = 500 sensors
- 1.5 ms of airtime per message
- Airtime Consumption = 500 * 2 * 1.5ms/5mins * 100%
- Typical Airtime Consumption = 0.5%

With such low airtime consumption, the WaveLinx system will easily coexist with Wi-Fi networks whether or not non- overlapping channels are used.

Interference Tolerance

In addition to ensuring that there is no impact on Wi-Fi installations, the WaveLinx Connected Lighting system must be tolerant of interference by other Wi-Fi and IEEE 802.15.4 networks. The selection of non-overlapping channels serves to avoid the potential problem.

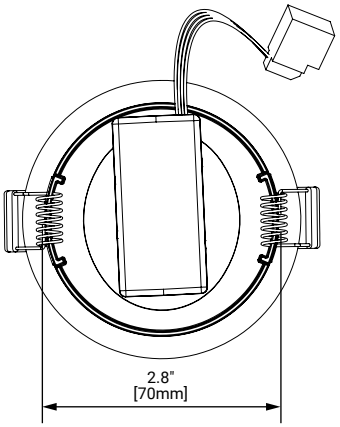
In addition, WaveLinx is designed to be loss tolerant. The WaveLinx communications increase transmission reliability through the use of acknowledgments and packet retransmission. As a result, when a packet is lost, the loss is detected and corrected through retransmission. Additionally, WaveLinx is designed to perform lighting control without requiring network communication at all. Lighting control will continue to operate in the event of a complete wireless failure.

Wireless Tilemount Sensor Kit - WTA

Provides daylight dimming and control for connected luminaires that do not support the WaveLinx integrated sensor.

Tilemount Installation

Sensor for Tilemount installation

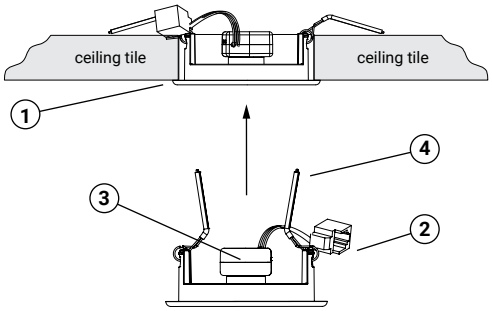


Step 1:
Cut 2-7/8" (73mm) to 3" (76mm) diameter hole in ceiling tile.

Step 2:
Connect plenum cable connectors.

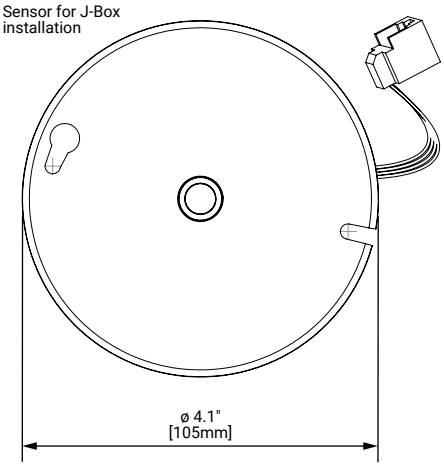
Step 3:
Snap sensor body into ceiling trim.

Step 4:
Squeeze trim springs and insert through hole.



J-Box Installation

Sensor for J-Box installation

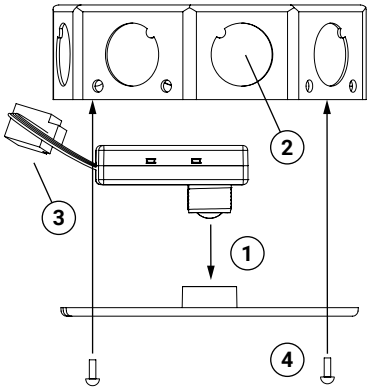


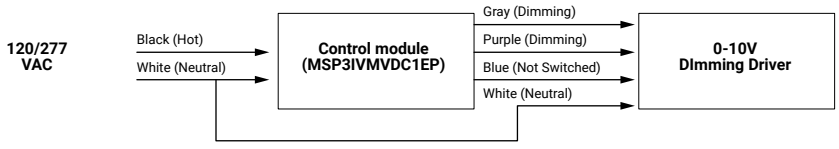
Step 1:
Snap sensor body into cover plate.

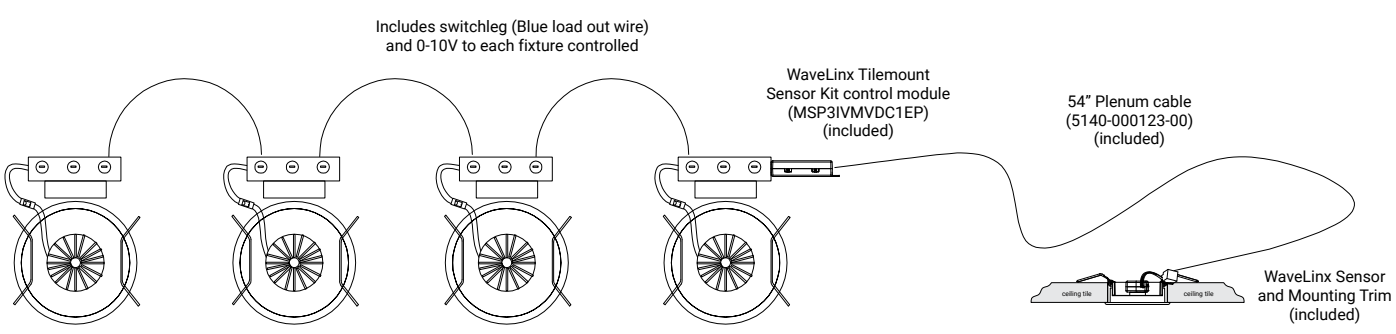
Step 2:
Pull plenum sensor cable through junction box knockout.

Step 3:
Connect plenum cable connectors.

Step 4:
Secure sensor kit to junction box.





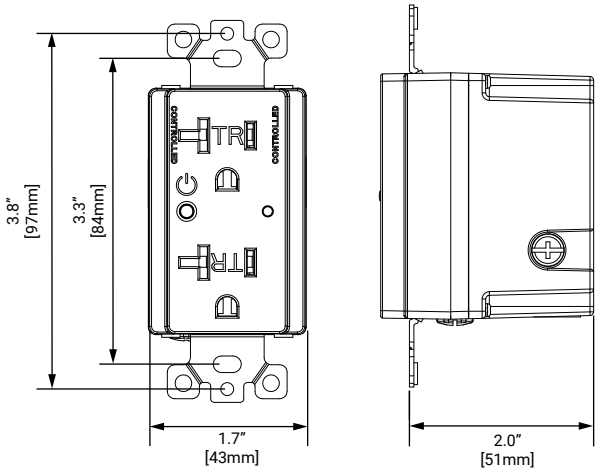


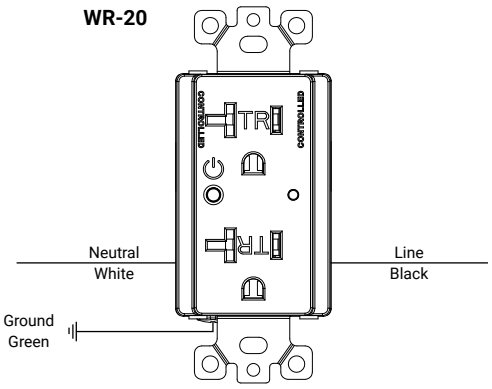
120/277 VAC 3A downlights with 0-10V control

Receptacle - WR-20

Wireless receptacle enables energy savings by turning OFF the top outlet when the area is unoccupied.

WR-20



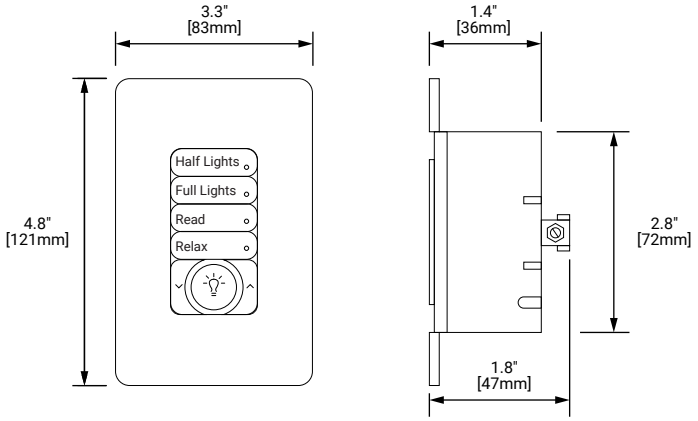


Disclaimer:

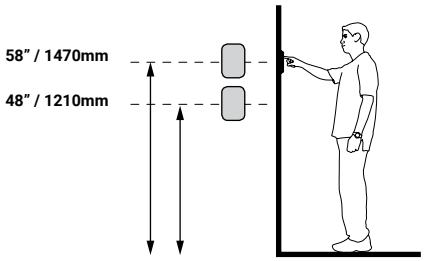
The information contained in this document is provided for general purposes only. Conditions in the field may vary from the assumptions on which the diagrams and information contained herein were based and we make no warranties or representations about the accuracy, completeness or suitability of the information herein for any specific site. The installation of the lighting, wiring, control, and other products contained in this document should only be performed by a qualified professional.

Wallstation - line voltage

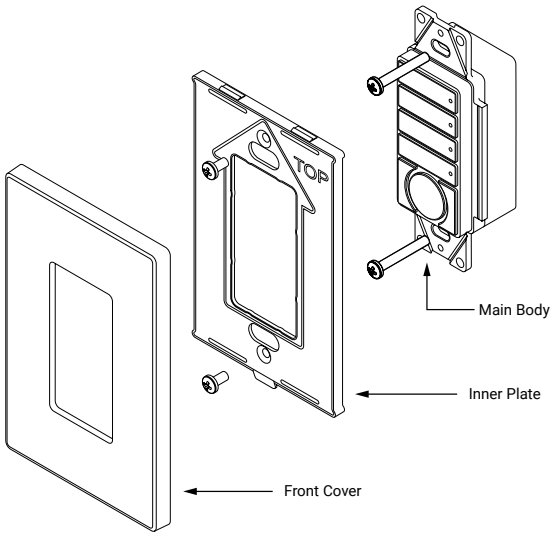
120-277VAC (neutral required) multi-scene, single area dimming wallstation which provides customized light level for each area.



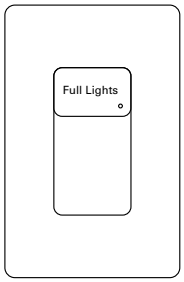
Mounting Height



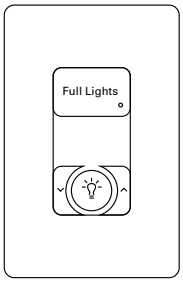
Installation



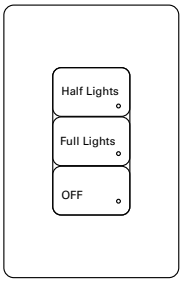
Pre-Programmed Buttons



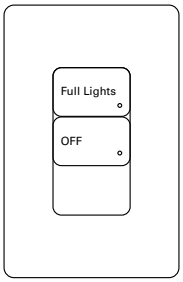
W1L-*
(* = W,V,G,B)



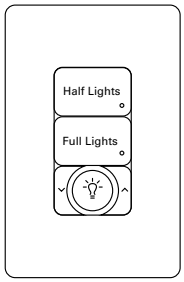
W1L-RL-*
(* = W,V,G,B)



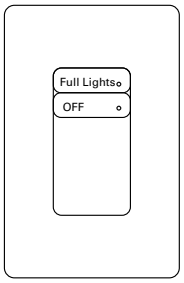
W3L-*
(* = W,V,G,B)



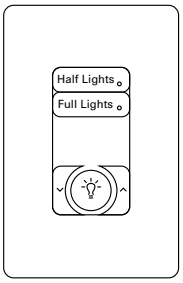
W2L-*
(* = W,V,G,B)



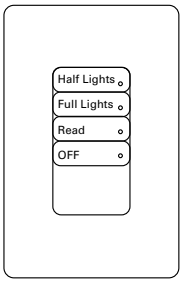
W2L-RL-*
(* = W,V,G,B)



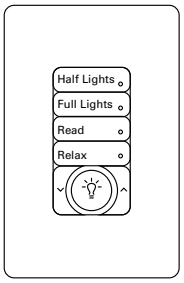
W2S-*
(* = W,V,G,B)



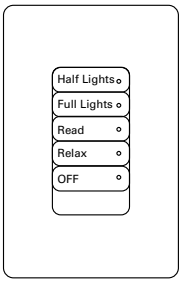
W2S-RL-*
(* = W,V,G,B)



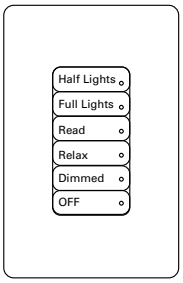
W4S-*
(* = W,V,G,B)



W4S-RL-*
(* = W,V,G,B)



W5S-*
(* = W,V,G,B)



W6S-*
(* = W,V,G,B)

Default engraving & light levels

Half Lights	Scene 3 = 50%
Full Lights	Scene 1 = 100%
Read	Scene 2 = 70%
Relax	Scene 4 = 30%
Dimmed	Scene 5 = 10%
Night	Scene 6 = 1%
Off	Scene 0 = Off

ON/OFF Raise/Lower buttons

Lowers Area light level



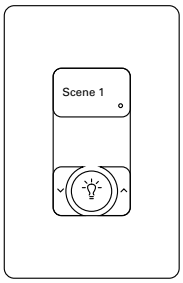
Raise Area light level

Toggles
Scene 1 &
Scene 0

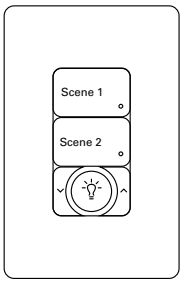
Button programming options via WaveLinx Mobile Application

Scene Selection
Scene Toggle
Zone Toggle
Zone Level
Raise
Lower
HR Release
No Action

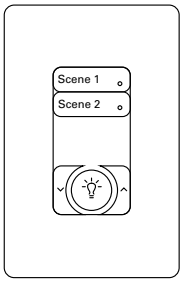
Field Programmable Buttons



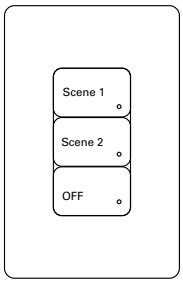
W1L-RL-S-1*
(* = W,V,G,B)



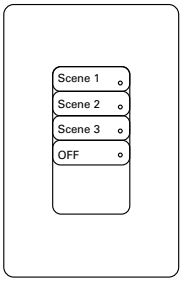
W2L-RL-S2-*
(* = W,V,G,B)



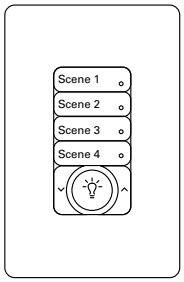
W2S-RL-S2-*
(* = W,V,G,B)



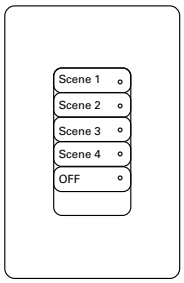
W3L-S2-*
(* = W,V,G,B)



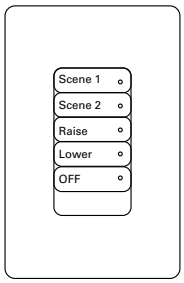
W4S-S3-*
(* = W,V,G,B)



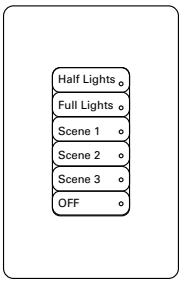
W4S-RL-S4-*
(* = W,V,G,B)



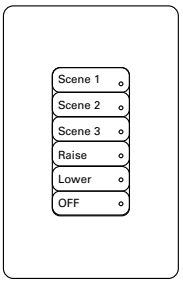
W5S-S4-*
(* = W,V,G,B)



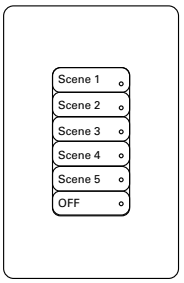
W5S-S2D-*
(* = W,V,G,B)



W6S-S3-*
(* = W,V,G,B)



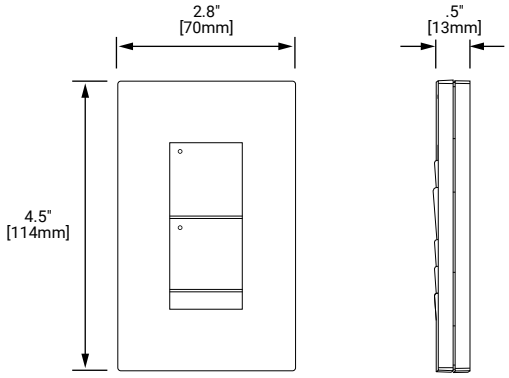
W6S-S3D-*
(* = W,V,G,B)



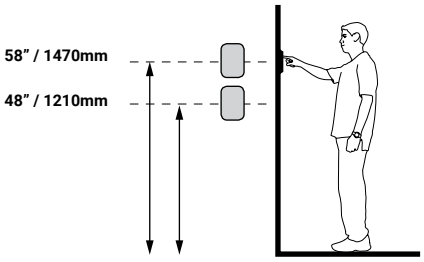
W6S-S5-*
(* = W,V,G,B)

Wallstation - battery

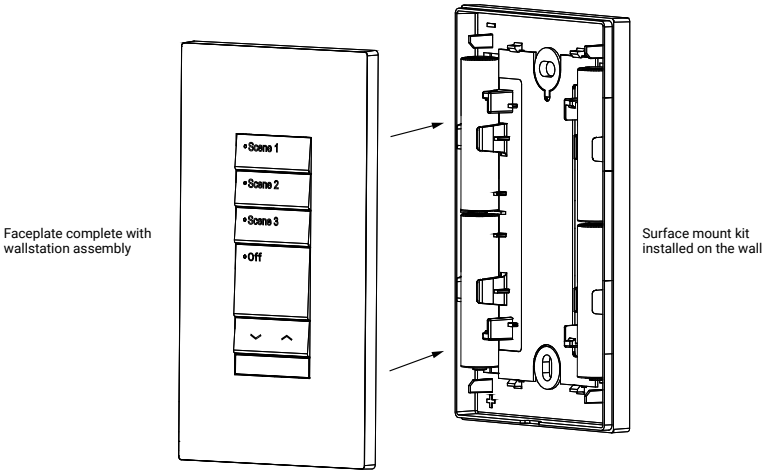
Battery powered surface mounted multi-scene, single area dimming wallstation.



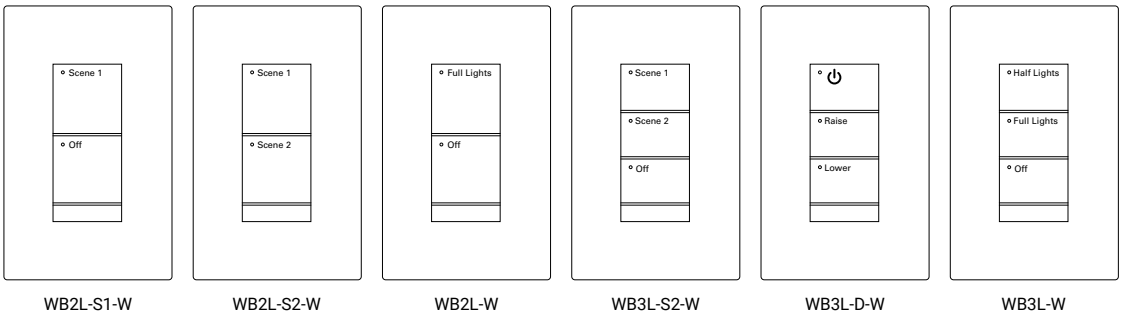
Mounting Height



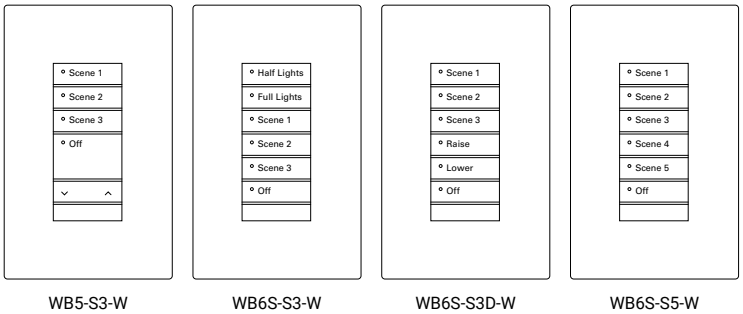
Installation



Field Programmable Buttons



WB2L-S1-W | WB2L-S2-W | WB2L-W | WB3L-S2-W | WB3L-D-W | WB3L-W

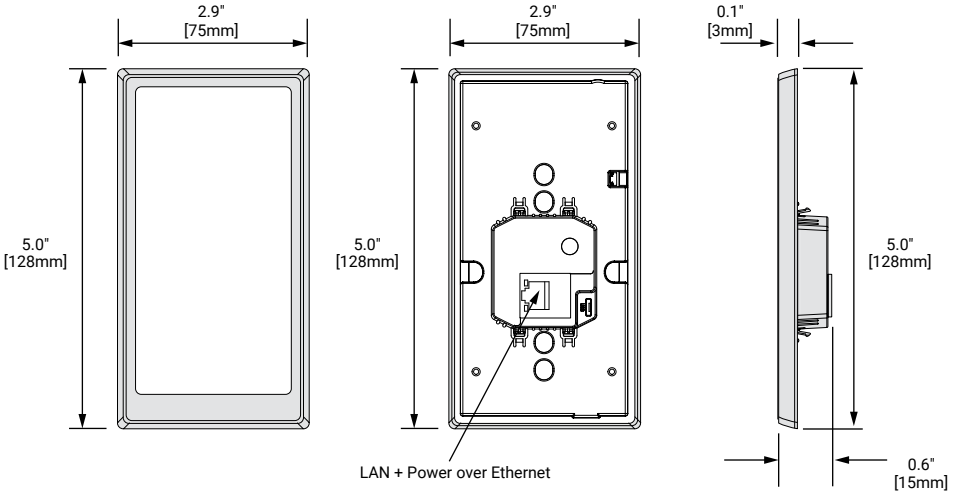


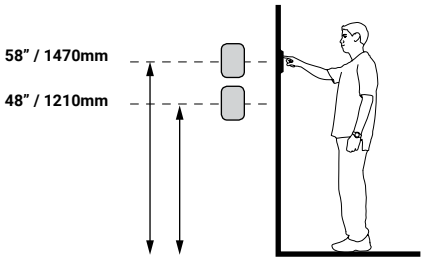
WB5-S3-W | WB6S-S3-W | WB6S-S3D-W | WB6S-S5-W

Touchscreen

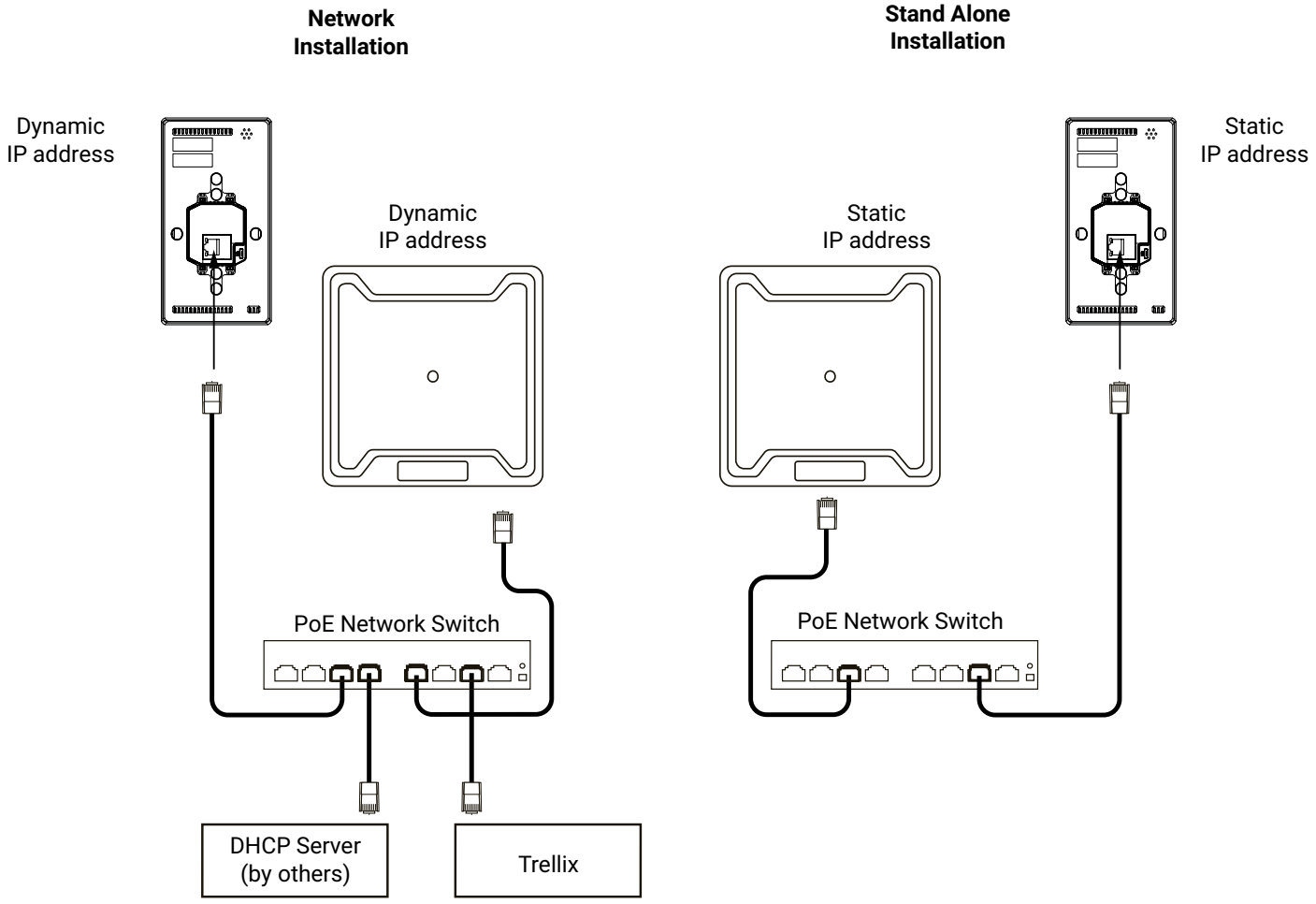
Provides an elegant and discreet light control for any WaveLinx controlled area.

Mounting Height



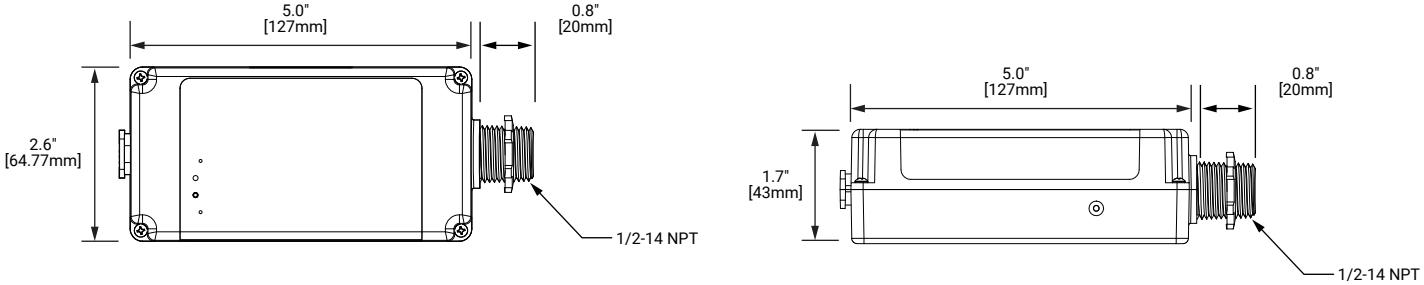


Installation

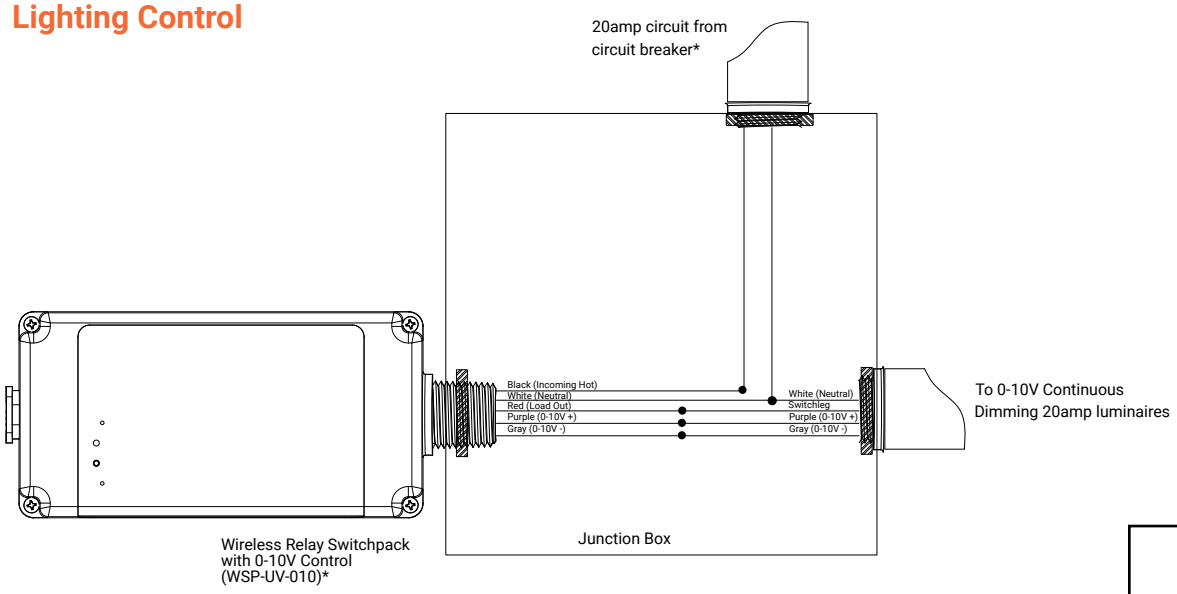


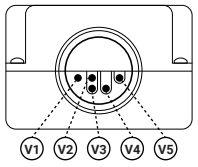
Relay switchpack for lighting control

Relay switchpack with 0-10V control.



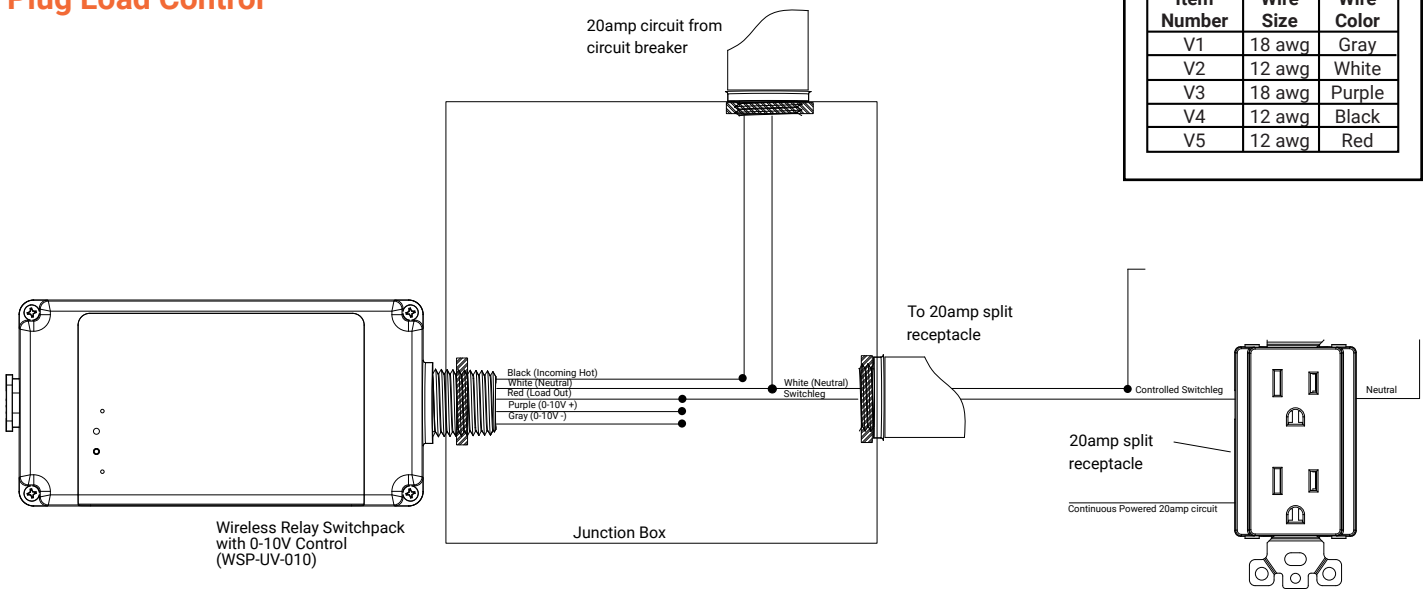
Lighting Control





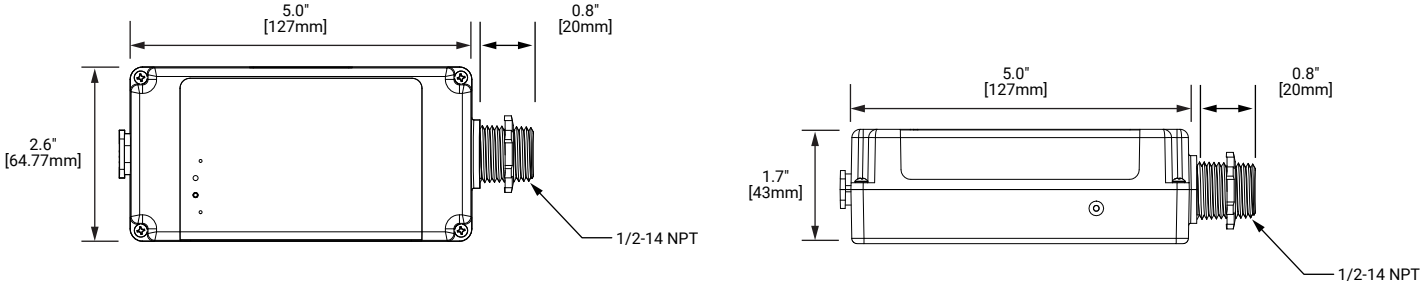
Item Number	Wire Size	Wire Color
V1	18 awg	Gray
V2	12 awg	White
V3	18 awg	Purple
V4	12 awg	Black
V5	12 awg	Red

Plug Load Control

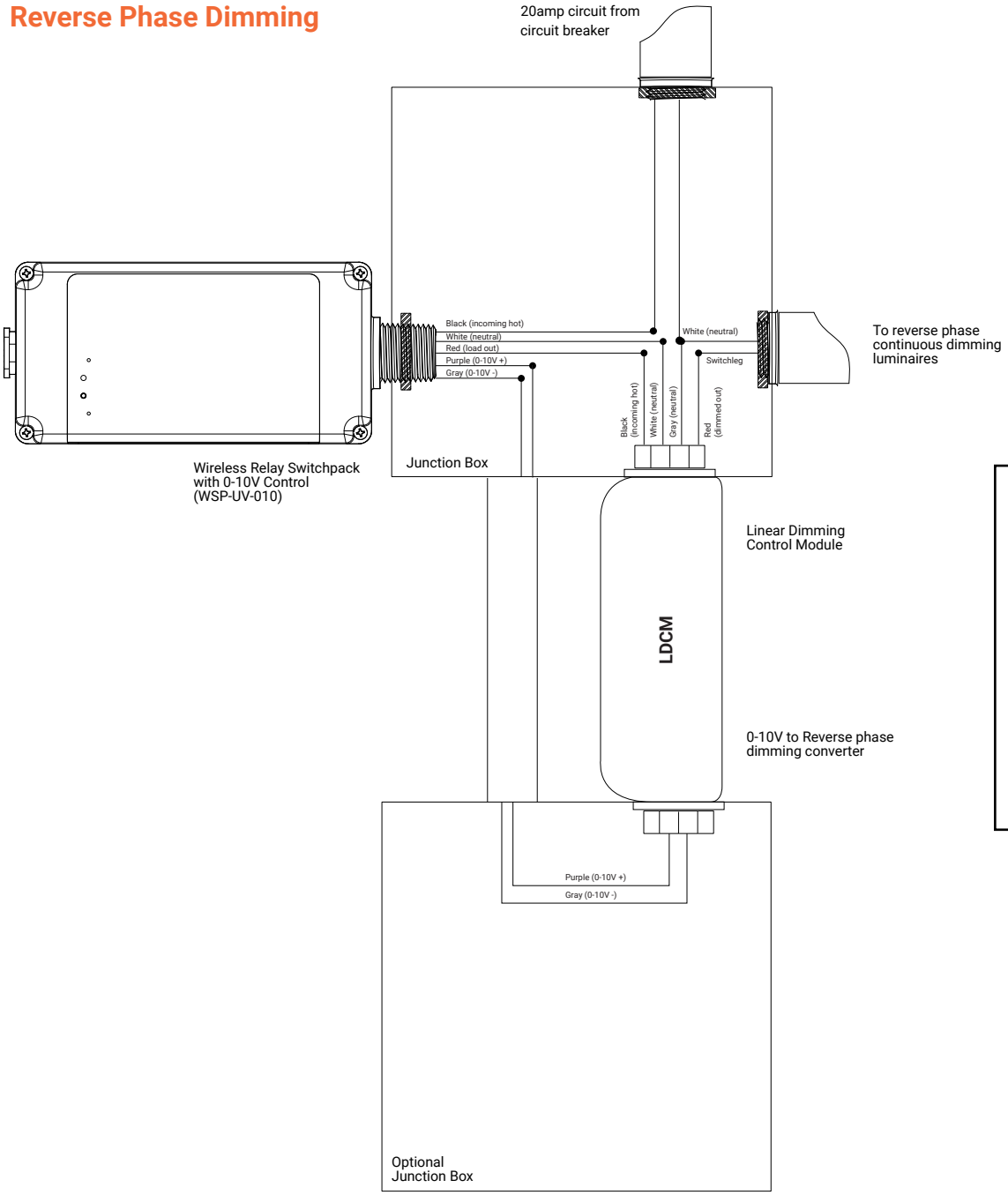


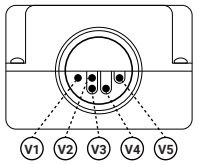
Relay switchpack with LDCM

0-10V to Reverse phase dimming.



Reverse Phase Dimming



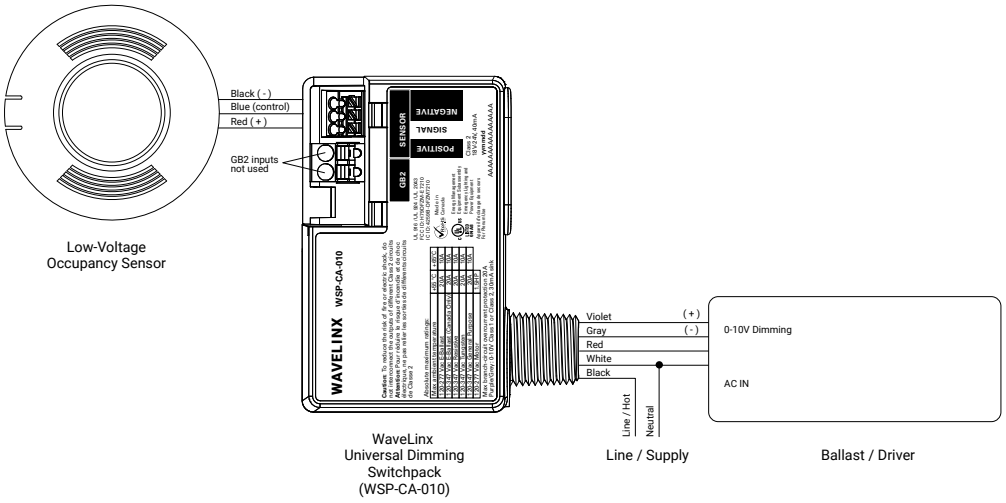


Item Number	Wire Size	Wire Color
V1	18 awg	Gray
V2	12 awg	White
V3	18 awg	Purple
V4	12 awg	Black
V5	12 awg	Red

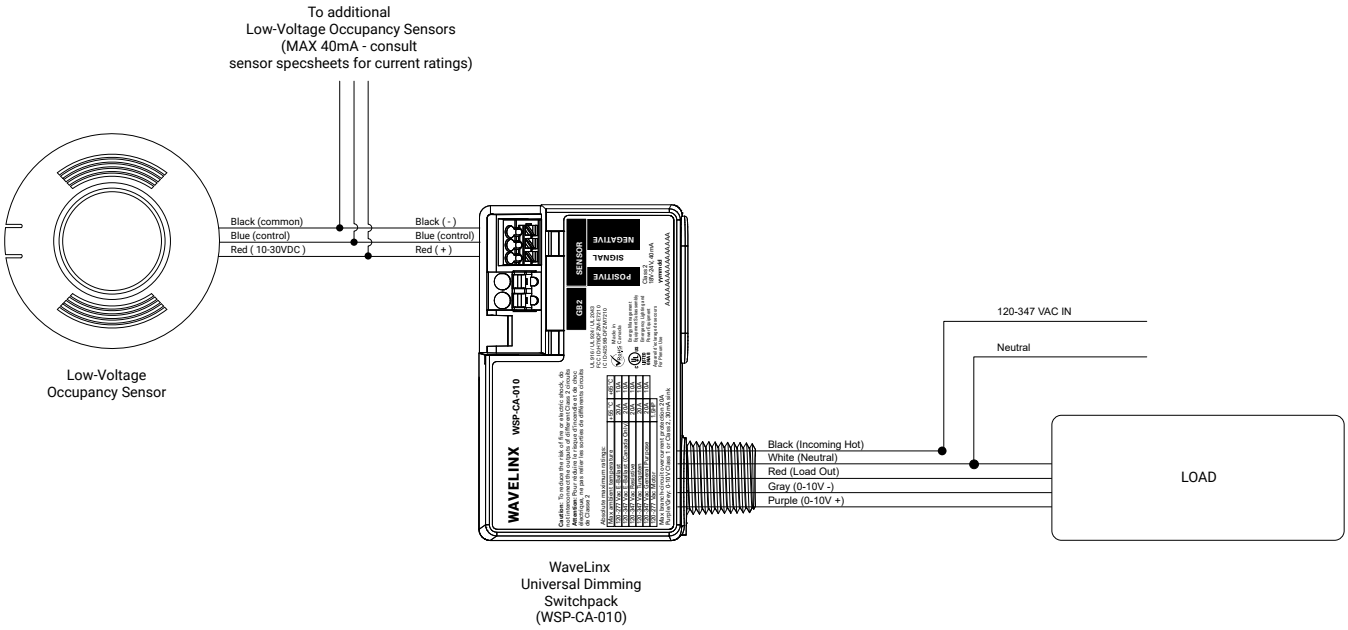
Universal switchpack for lighting control

Wireless 0-10V dimming switchpack for 120-347V lighting applications

Contact Closure - Single Sensor



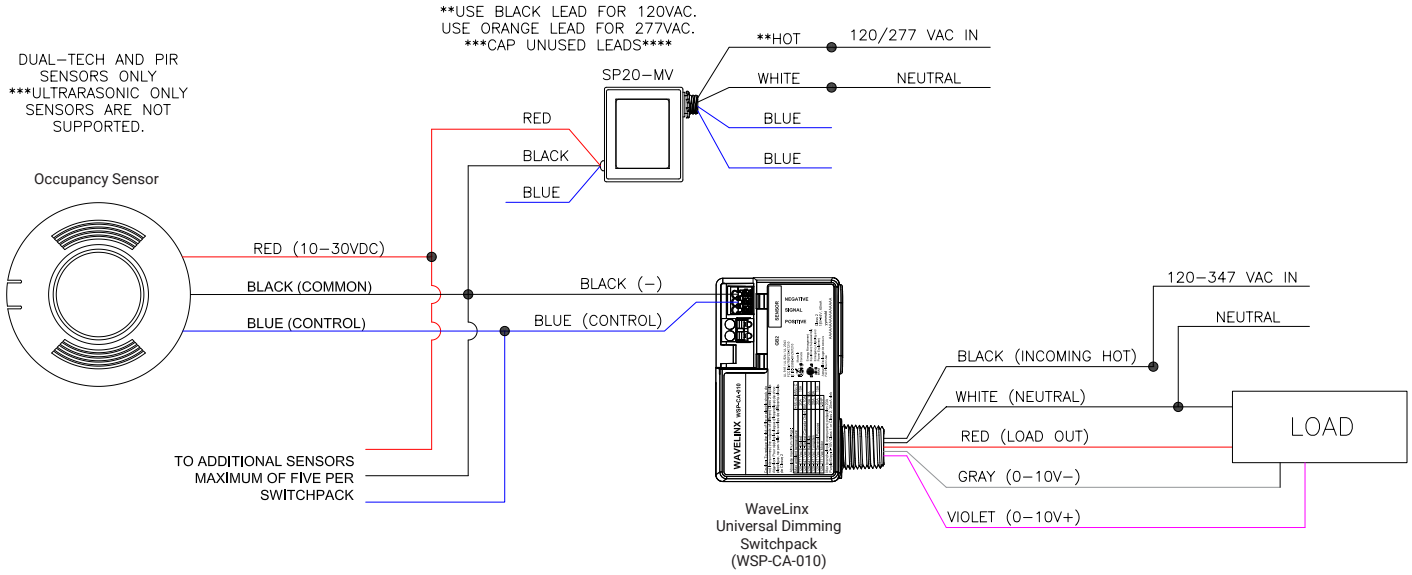
Contact Closure - Multiple Sensors



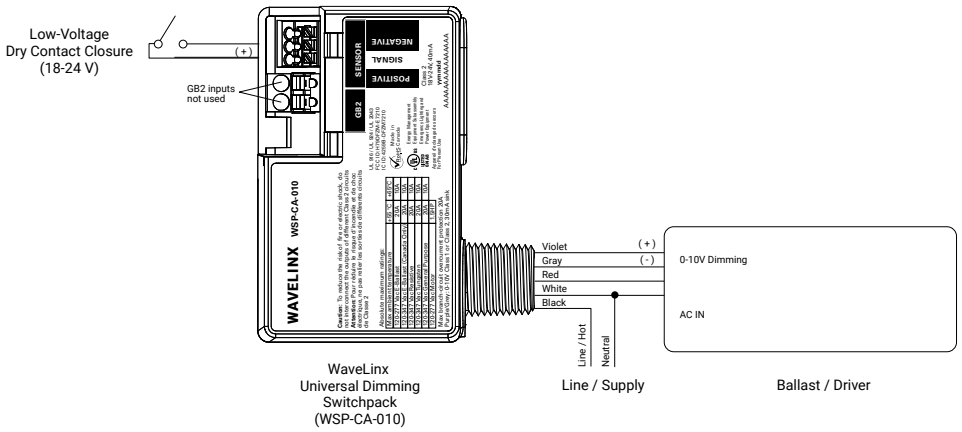
Universal switchpack for lighting control

Wireless 0-10V dimming switchpack for 120-347V lighting applications

Contact Closure - Sensors Externally Powered

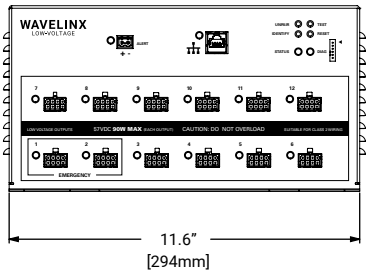


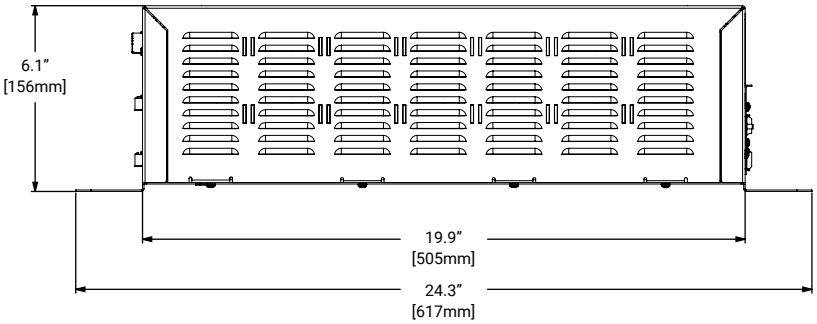
Low-Voltage Dry Contact Closure



WaveLinx low-voltage power module

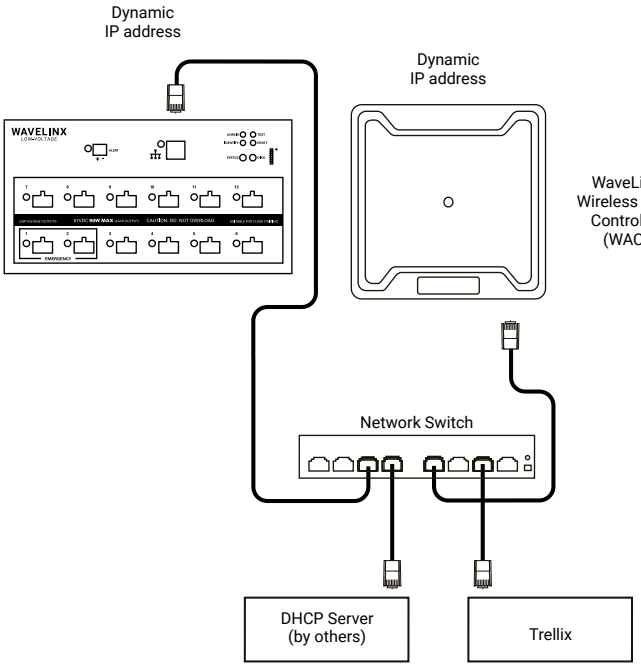
1200W Power Module Blends the benefits of low-voltage wiring with wireless control for speed and flexibility.



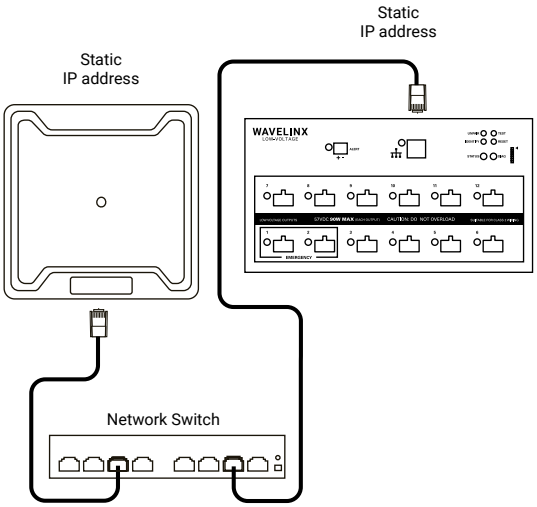


Installation

Network Installation



Stand Alone Installation

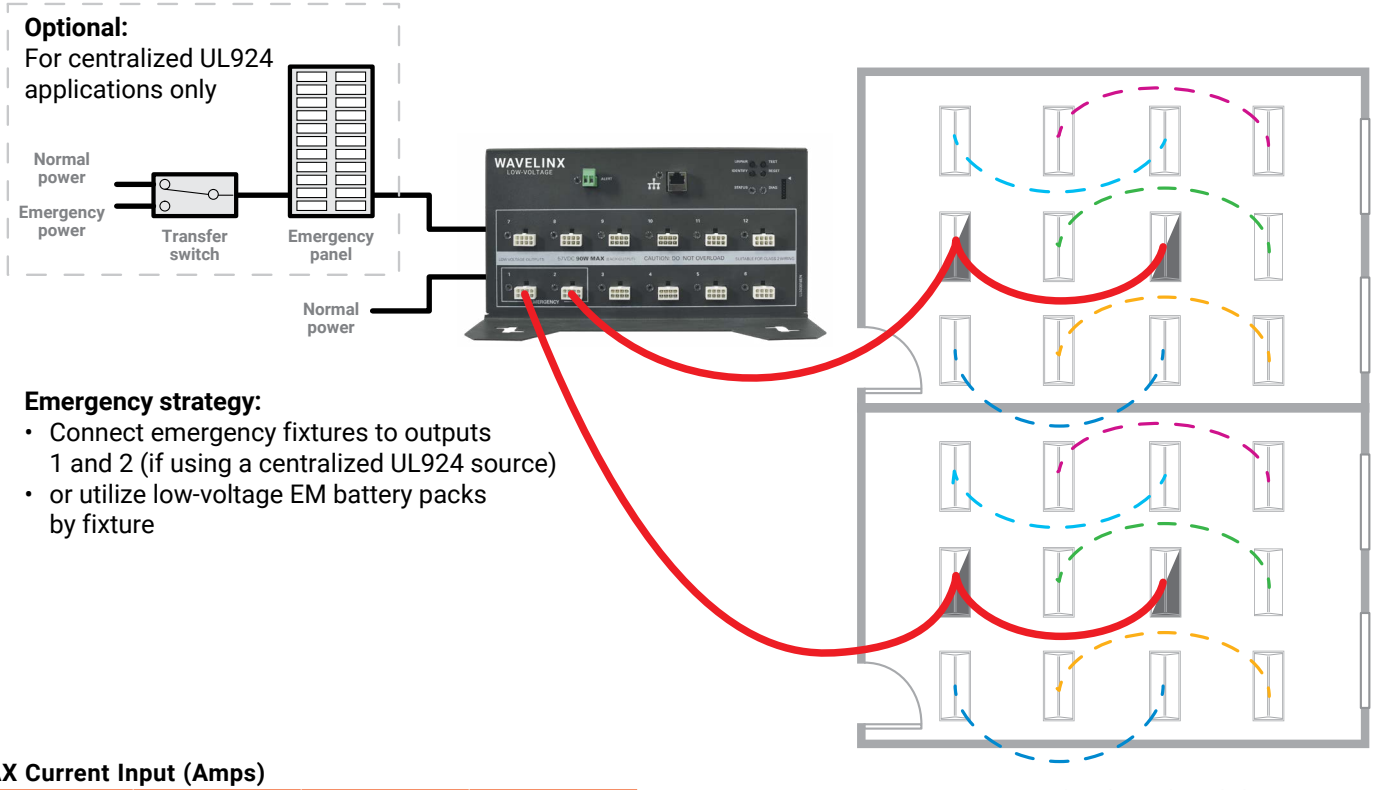


Combination of low-voltage and wireless devices per WaveLinx Wireless Area Controller (WAC)

- *MAX = 150*
- *Best Practice = 100*

WaveLinx low-voltage power module

Installation



Emergency strategy:

- Connect emergency fixtures to outputs 1 and 2 (if using a centralized UL924 source)
- or utilize low-voltage EM battery packs by fixture

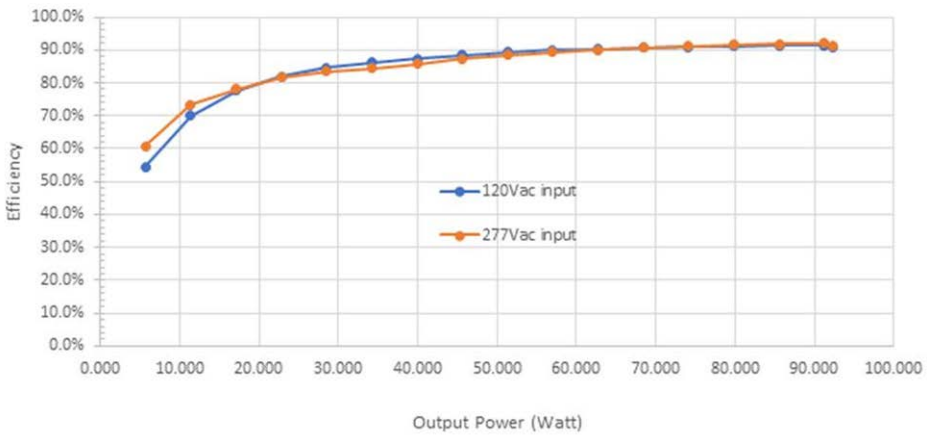
Note: Daisy-chain low-voltage lighting loads up to 90W per output

MAX Current Input (Amps)

	Normal Power Input		EM Power Input		Single Panel Input Only	
Model	120VAC	277VAC	120VAC	277VAC	120VAC	277VAC
LVPM-12-100-64-2E	9.0	4.0	1.8	0.8	10.8	4.8

Note: When normal power is de-energized and emergency panel is energized, lighting on low-voltage output circuit #1 and #2 go to 100% while other low-voltage output circuits are OFF / de-energized.

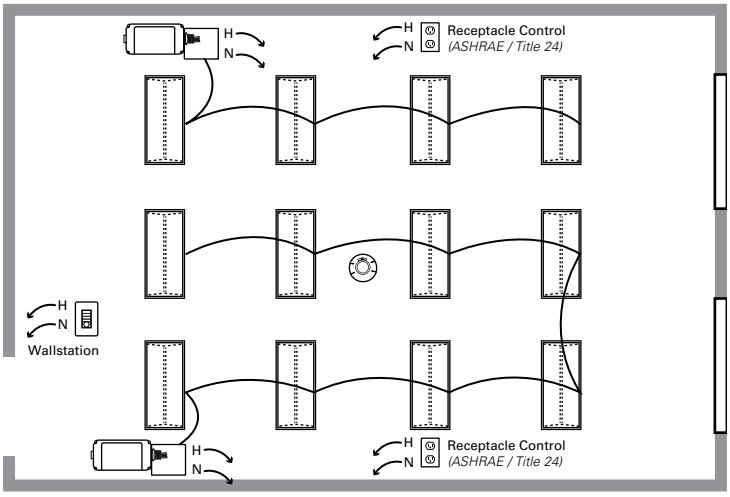
Low-Voltage Circuit Efficiency



Classroom

example 1

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Daylight dimming zones of no more than eight luminaires *(IECC only)*
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Programmable scenes
- Dominant button is 50% light level
- Scene raise / Scene lower
- All off

Additional Features

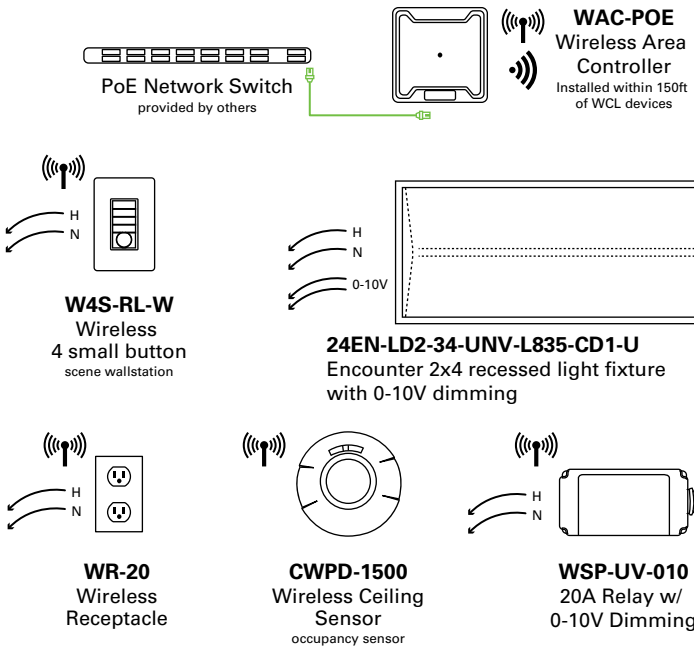
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or CEPC-2-D for entire switchpack circuit when emergency panels are deployed

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
2	WSP-UV-010	Universal Voltage Dimming Switchpack
1	CWPD-1500	WaveLinx ceiling sensor
1	W4S-RL-W	WaveLinx Wallstation
1	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
12	24EN-LD2-34-UNV-L835-CD1-U	Encounter 2x4

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

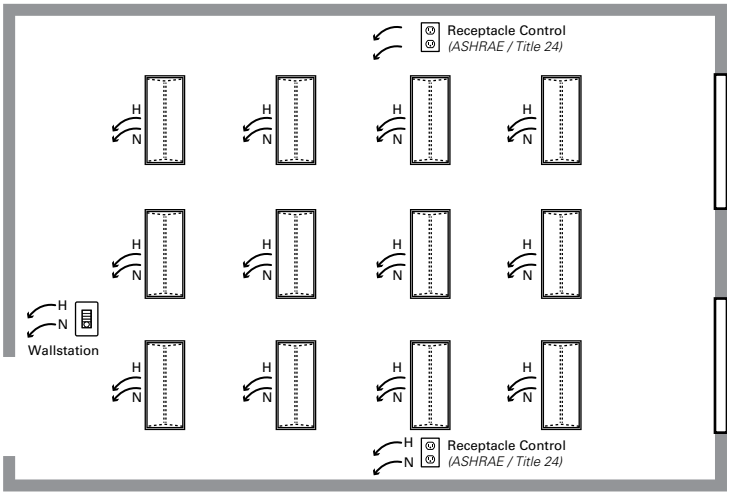


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Classroom

example 2

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy *(optional for IECC)*
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Programmable scenes
- Dominant button is 50% light level
- Scene raise / Scene lower
- All off

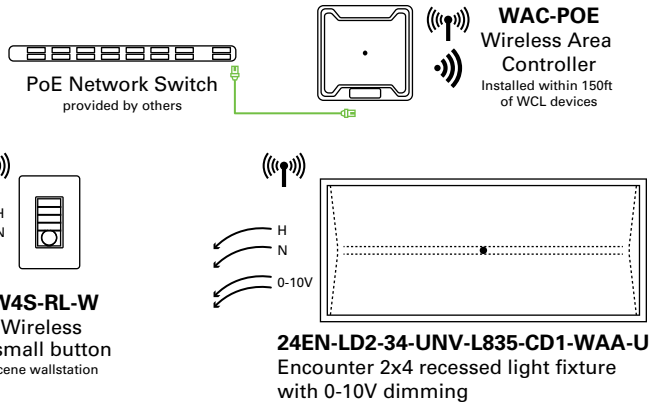
Additional Features

- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
1	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
12	24EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x4 with WaveLinx Sensor

Typical Wiring Detail



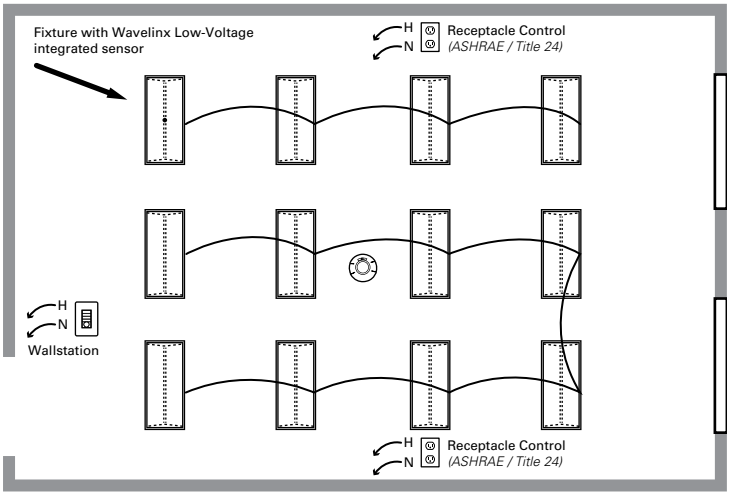
Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Classroom

example 3

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Optional Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces
- Not required in spaces without windows or that are less than 150W

Manual Controls

- Programmable scenes
- Dominant button is 50% light level
- Scene raise / Scene lower
- All off

Additional Features

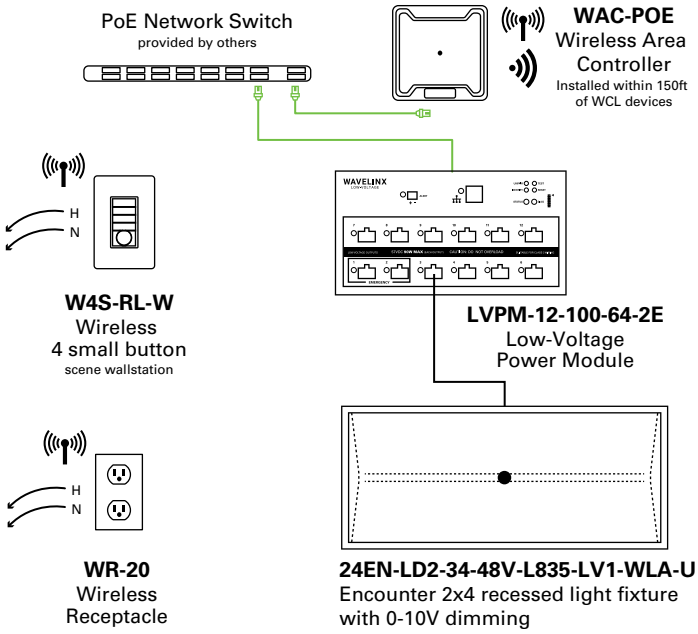
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or EM panel integration with LVPM
- Complies with Enhanced Digital Lighting Control section C406

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
2	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
12	24EN-LD2-34-48V-L835-LV1-WLA-U	Low-Voltage Encounter 2x4 with WaveLinx Sensor
1	LVPM-12-100-64-2E	WaveLinx 1200W Low-Voltage Power Module

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

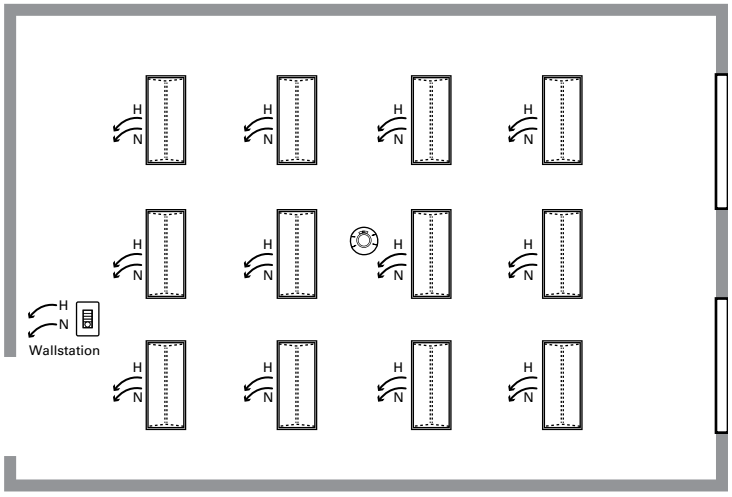


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Classroom

example 4

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Optional Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces
- Not required in spaces without windows or that are less than 150W

Manual Controls

- Programmable scenes
- Dominant button is 50% light level
- Scene raise / Scene lower
- All off

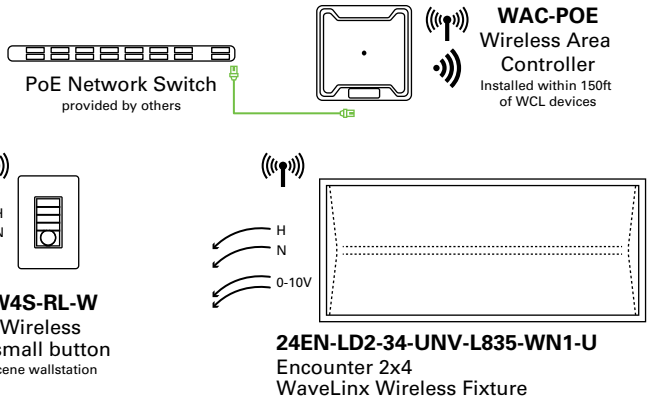
Additional Features

- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup
- Complies with Enhanced Digital Lighting Control section C406

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	CWPD-1500	WaveLinx ceiling sensor
1	W4S-RL-W	WaveLinx Wallstation
12	24EN-LD2-34-UNV-L835-WN1-U	Encounter 2x4 WaveLinx Wireless Fixture

Typical Wiring Detail



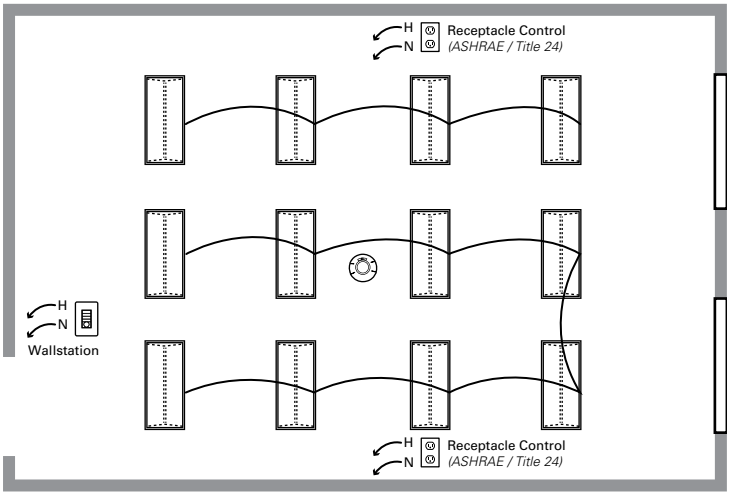
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Number of interior walls	2 walls	3 walls
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Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Classroom

example 5

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Optional Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces
- Not required in spaces without windows or that are less than 150W

Manual Controls

- Programmable scenes
- Dominant button is 50% light level
- Scene raise / Scene lower
- All off

Additional Features

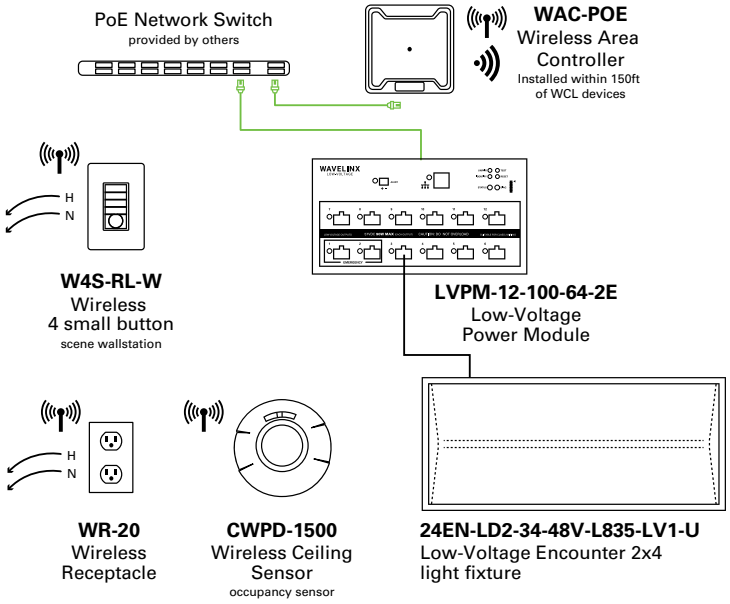
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or EM panel integration with LVPM
- Complies with Enhanced Digital Lighting Control section C406

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	CWPD-1500	WaveLinx ceiling sensor
1	W4S-RL-W	WaveLinx Wallstation
2	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
12	24EN-LD2-34-48V-L835-LV1-U	Low-Voltage Encounter 2x4
1	LVPM-12-100-64-2E	WaveLinx 1200W Low-Voltage Power Module

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

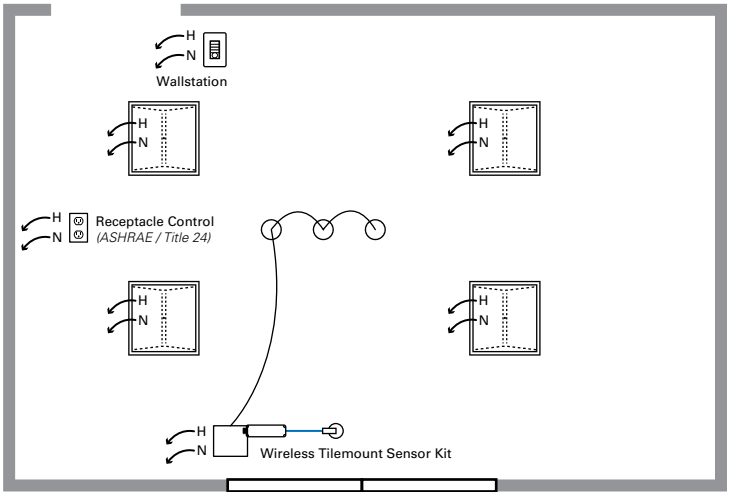


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Conference Room

example 1

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Top or dominant button half lights (sets lights to 50% or less)
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

Additional Features

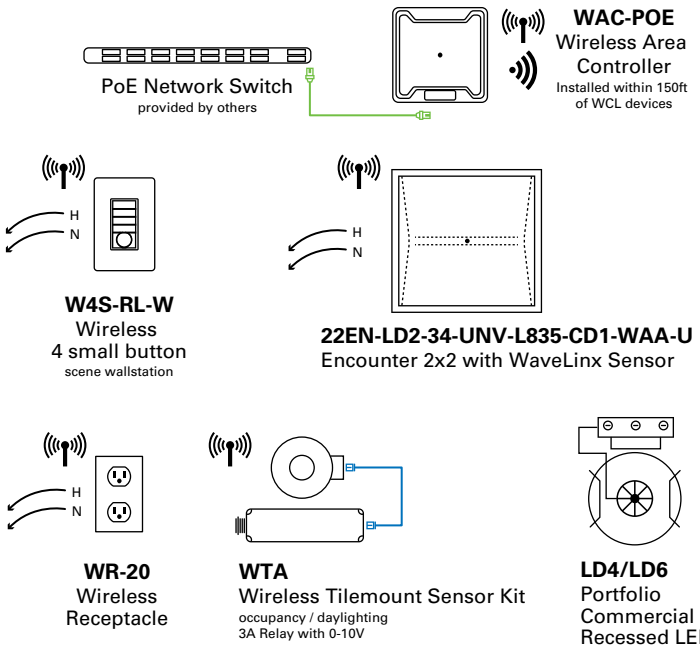
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
1	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
1	WTA	WaveLinx Tilemount Sensor Kit
3	LD4 or LD6	Portfolio Commercial Recessed LED
4	22EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x2 with WaveLinx Sensor

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

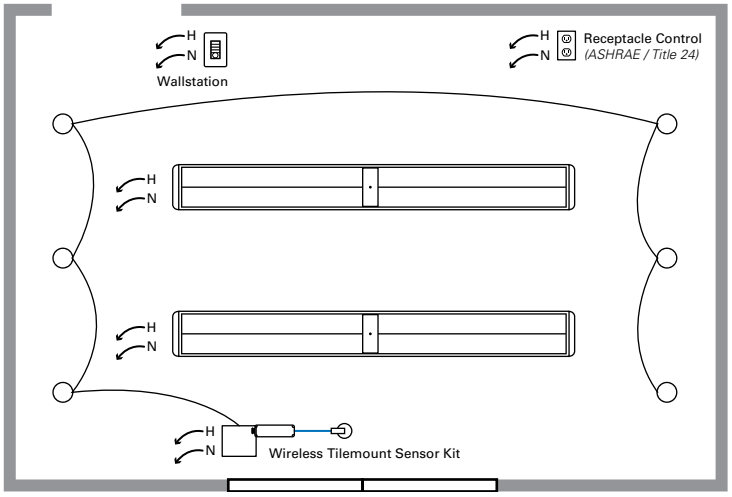


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Conference Room

example 2

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim
- Individually addressable luminaires *(IECC)*

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Programmable Scenes
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

Additional Features

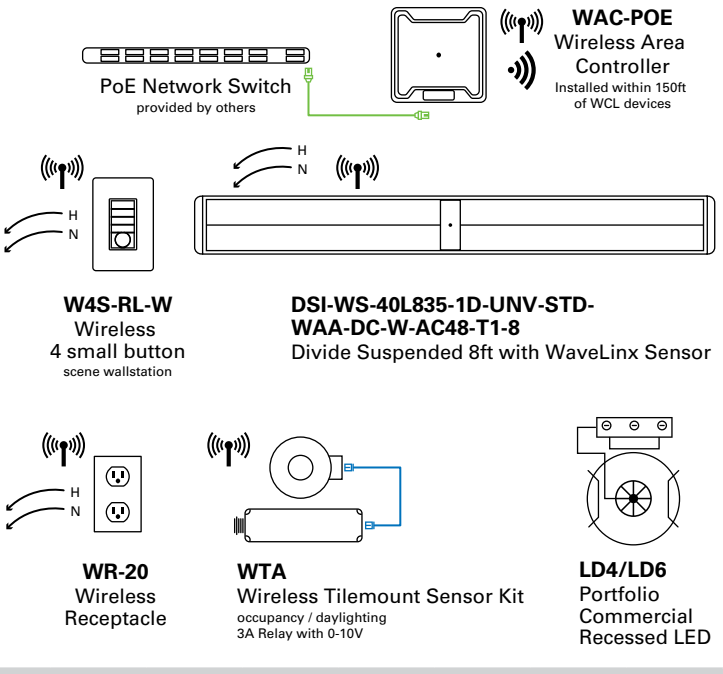
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
1	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
1	WTA	WaveLinx Tilemount Sensor Kit
6	LD4 or LD6	Portfolio Commercial Recessed LED
2	DSI-WS-40L835-1D-UNV-STD-WAA-DC-W-AC48-T1-8	Divide Suspended with WaveLinx Sensor

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

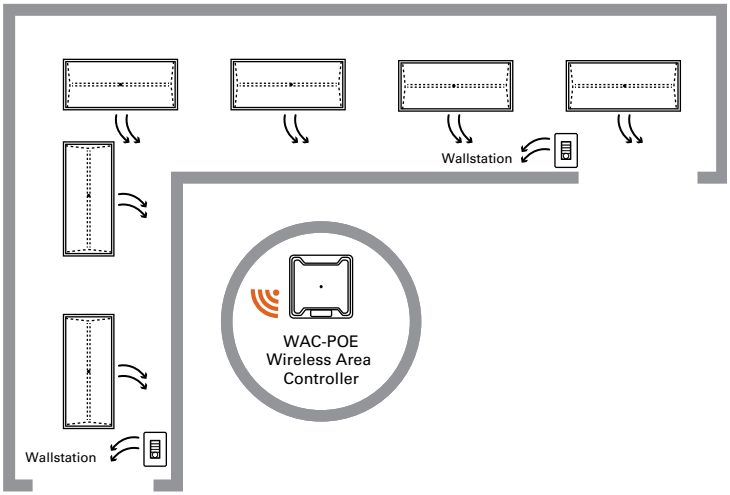


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Office Corridor

example

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		



Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Individually addressable luminaires *(IECC only)*
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Programmable scenes
- Dominant button is 50% light level
- Manual on/off
- Scene raise / Scene lower
- All off

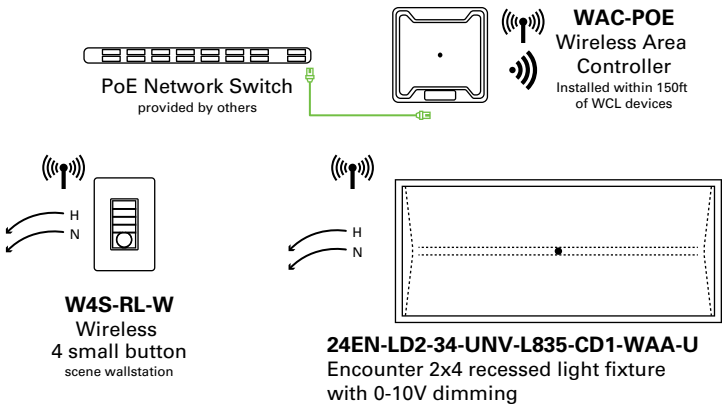
Additional Features

- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
2	W4S-RL-W	WaveLinx Wallstation
6	24EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x4 with WaveLinx Sensor

Typical Wiring Detail



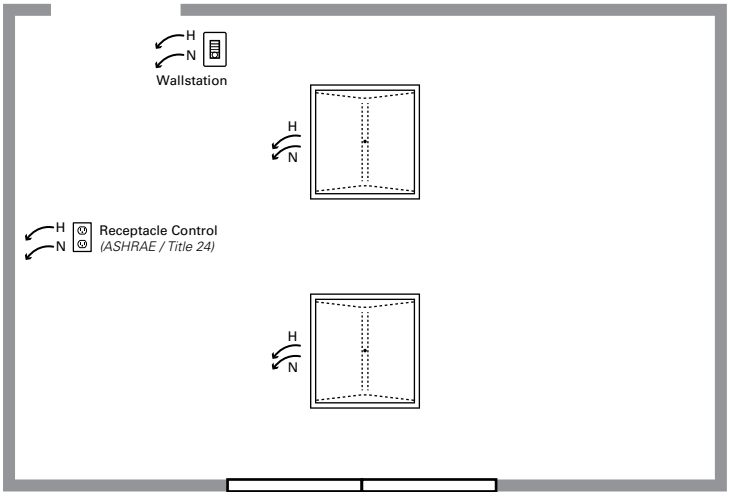
Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Private Office

example

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor offices without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Top or dominant button half lights (sets lights to 50% or less)
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

Additional Features

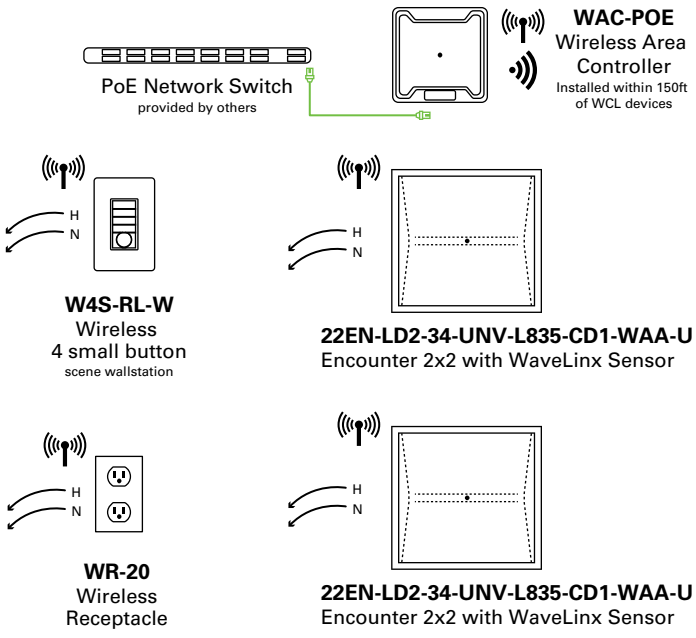
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
1	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
2	22EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x2 with WaveLinx Sensor

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

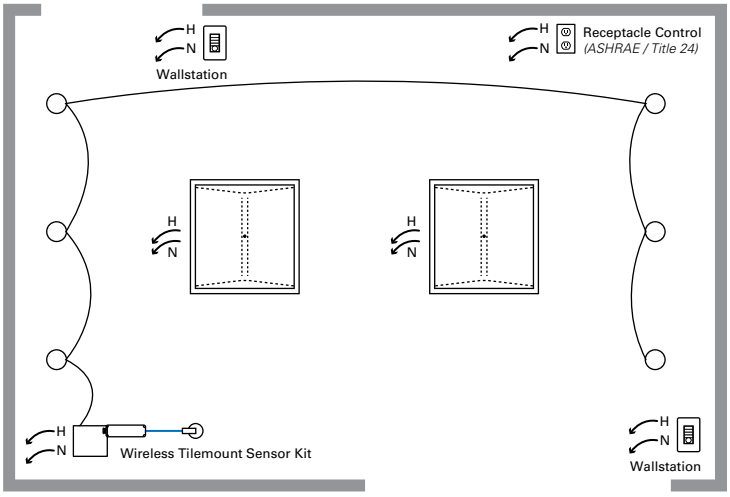


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Lobby

example

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor space without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Dominant button half lights (sets lights to 50% or less)
- Programmable scenes
- Scene raise / Scene lower
- All off

Additional Features

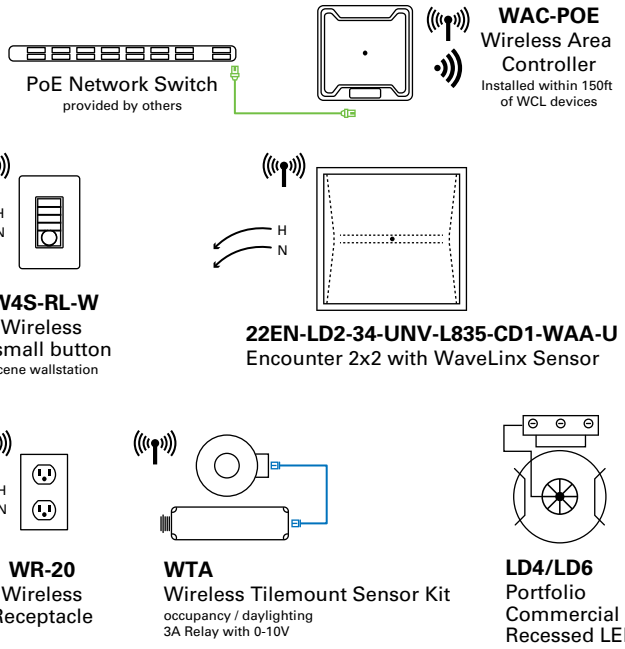
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
2	W4S-RL-W	WaveLinx Wallstation
1	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
1	WTA	WaveLinx Tilemount Daylight Sensor
6	LD4 OR LD6	Portfolio Commercial Recessed LED
2	22EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x2 with WaveLinx Sensor

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

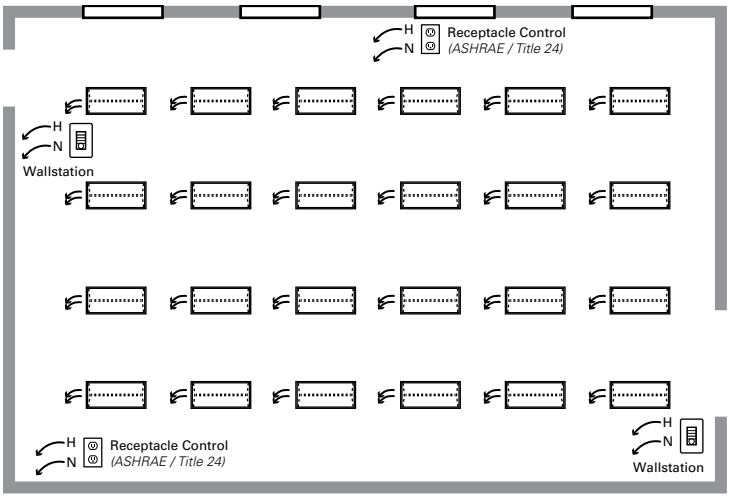


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Open Office

example 1

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Top or dominant button half lights (sets lights to 50% or less)
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

Additional Features

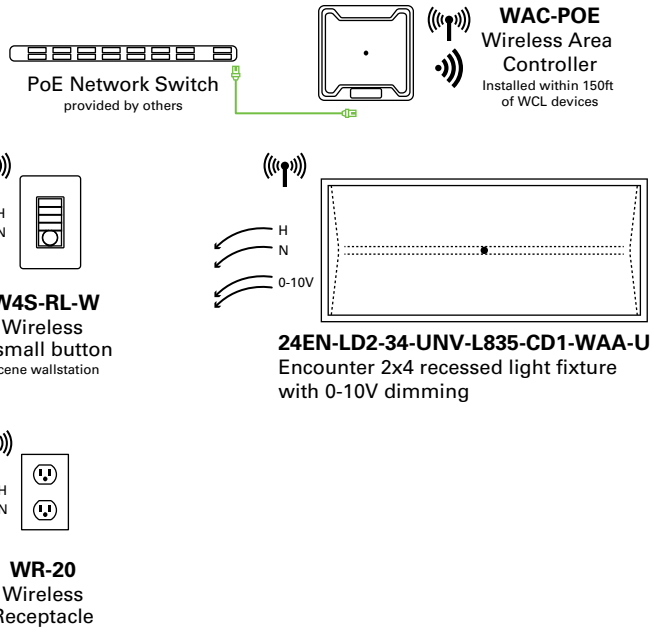
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
2	W4S-RL-W	WaveLinx Wallstation
2	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
24	24EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x4 with WaveLinx Sensor

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

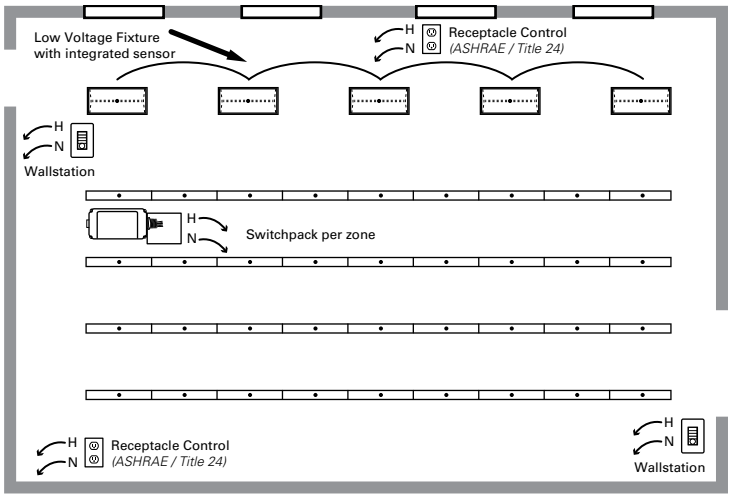


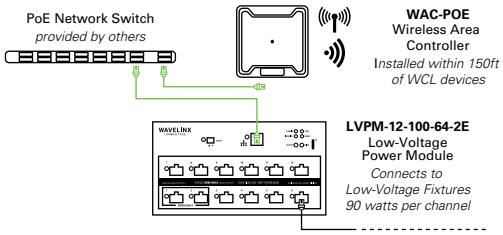
	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Open Office

example 2

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic auto on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Top or dominant button half lights (sets lights to 50% or less)
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

Additional Features

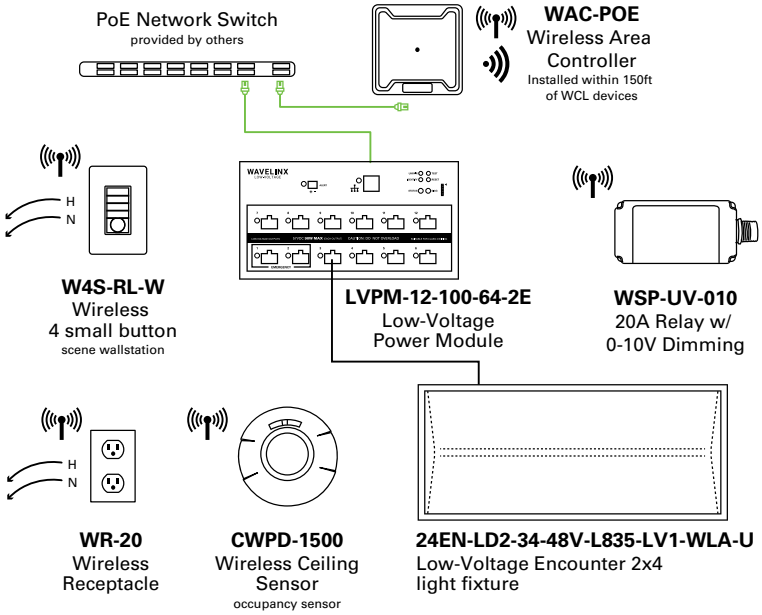
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or EM panel integration with LVPM
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
2	W4S-RL-W	WaveLinx Wallstation
2	WR-20	WaveLinx Receptacle *(ASHRAE / Title 24)*
5	24EN-LD2-34-48V-L835-LV1-WLA-U	Low-Voltage Encounter 2x4 with WaveLinx Sensor
4	WSP-UV-010	Universal Voltage Dimming Switchpack
1	LVPM-12-100-64-2E	WaveLinx 1200W Low-Voltage Power Module

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150ft LOS	300 ft
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

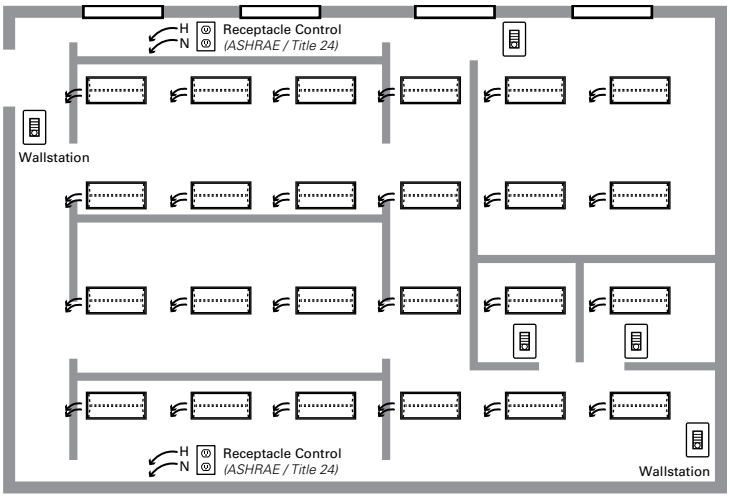


	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Restaurant

example

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Individually addressable luminaires *(IECC only)*
- Out of the box 75% high end trim

Occupancy

- Automatic on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy *(optional IECC)*
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Top or dominant button half lights (sets lights to 50% or less)
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

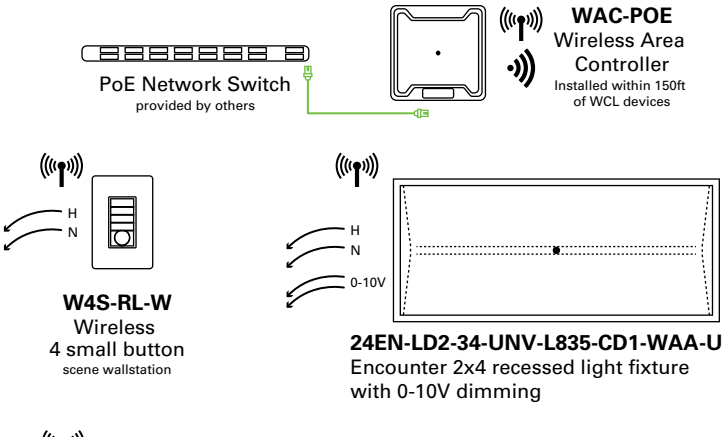
Additional Features

- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
5	W4S-RL-W	WaveLinx Wallstation
2	WR-20	WaveLinx Receptacles *(ASHRAE / Title 24)*
24	24EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x4 with WaveLinx Sensor

Typical Wiring Detail



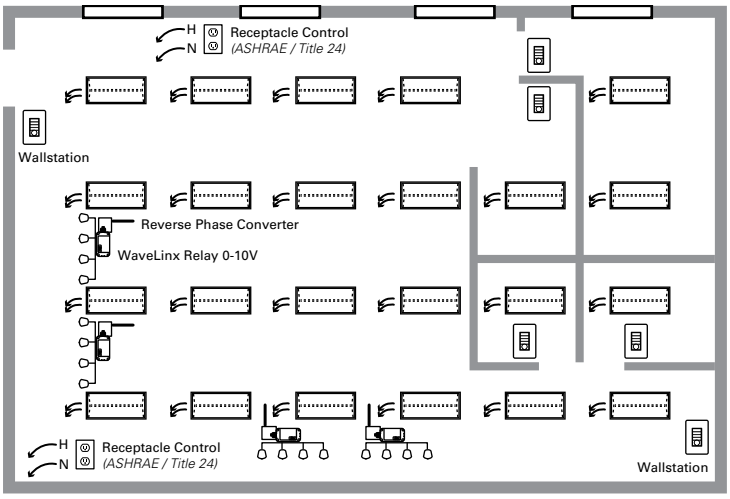
Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Retail

example

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•	•	•
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Up to 3 dimmable zones
- Out of the box 75% high end trim

Occupancy

- Automatic on to 50%
- Optional vacancy mode
- Optional auto on to scene
- Plug load turns on with occupancy *(optional IECC)*
- Automatic off of lighting and plug load on vacancy

Daylighting

- Continuous dimming to off
- Individual luminaire daylight dimming to approximately 500 lux
- Daylighting not required for indoor spaces without windows
- Not required in spaces without windows or that are less than 150W *(120W for ASHRAE / Title 24)*

Manual Controls

- Top or dominant button half lights (sets lights to 50% or less)
- Remaining buttons trigger scenes
- Scene raise / Scene lower
- All off

Additional Features

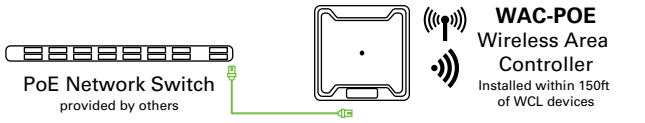
- Energy calculations (available through Trellix)
- Automatic demand response through wireless area controller
- Scheduling of partial off light levels from wireless area controller
- UL924 emergency control capabilities via luminaire battery backup or fixture integrated transfer device (consult fixture spec sheet)
- Complies with Enhanced Digital Lighting Control section C406 *(IECC)*

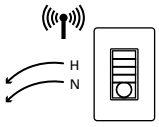
Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
6	W4S-RL-W	WaveLinx Wallstation
4	WSP-UV-010	WaveLinx Relay Switchpack with 0-10V dimming
2	WR-20	WaveLinx Receptacles *(ASHRAE / Title 24)*
4	LDCM-PL-120-277-010V-GR	Linear Dimming Control Modules
12	24EN-LD2-34-UNV-L835-CD1-WAA-U	Encounter 2x4 with WaveLinx Sensor

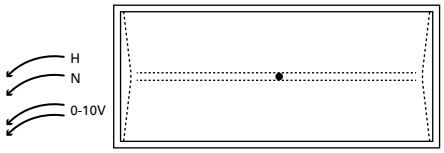
Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

Typical Wiring Detail

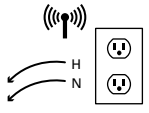




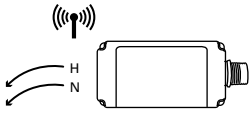
W4S-RL-W
Wireless
4 small button
scene wallstation



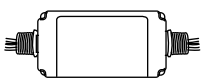
24EN-LD2-34-UNV-L835-CD1-WAA-U
Encounter 2x4 recessed light fixture
with 0-10V dimming



WR-20
Wireless
Receptacle



WSP-UV-010
20A Relay w/
0-10V Dimming



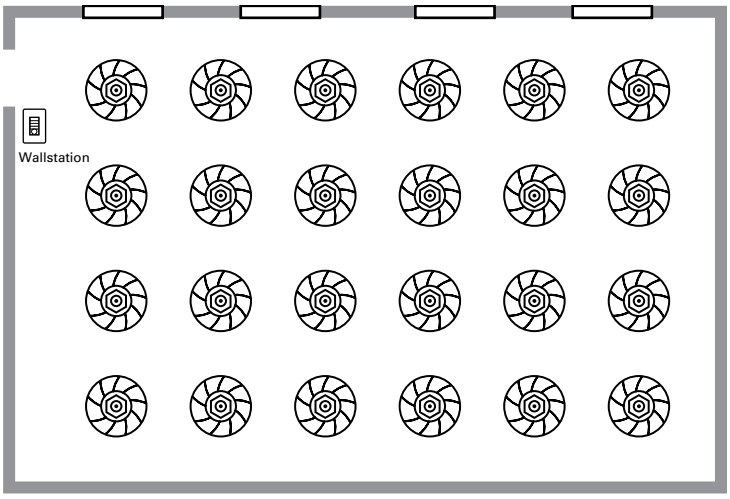
LDCM-PL-120-277-0-10V-GR
Linear Dimming
Control Module

	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.2.1.2		C405.2.3.2	C405.2.3.3	C405.2.1.3	C405.2.1.1.1	C405.2.2	C405.2.4		C405.2.6	C408.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		C406. 4
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Warehouse

example

	Manually Switched ON / OFF	Manual Dimmer	Manual ON / Auto OFF	Occupancy Sensor	Daylighting Control	Lumen Maintenance Control	Tuning Control	Receptacle Control	Demand Response
IECC 2018	•	•	•	•	•	•	•		
ASHRAE 90.1 - 2019	•	•	•	•	•	•	•	•	•
T24 2019	•	•	•	•	•	•	•		
NECB 2017	•	•	•	•	•	•	•		





Sequence of Operations

Lighting

- 0-10V lighting loads
- Each luminaire includes dimmable integrated sensor
- Control zones of no more than 4 luminaires *(IECC only)*
- Each luminaire supports occupied/unoccupied programmable light levels

Occupancy

- Automatic on to programmable level
- Programmable unoccupied light level

Daylighting

- Continuous dimming
- Individual luminaire daylight dimming
- Daylighting not required for indoor space

Manual Controls

- Programmable Zone/Scene control
- Optional Scene/Raise/Lower Control
- All Off

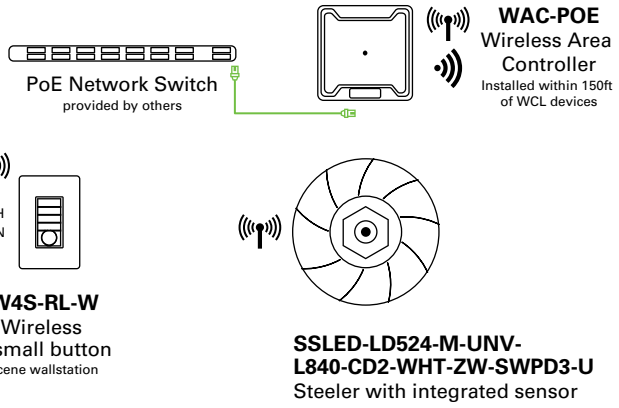
Additional Features

- Energy calculations (available through Trellix)
- Automatic demand response available from wireless area controller
- Scheduling of partial off light levels and times from wireless area controller
- UL924 emergency control capabilities available via luminaire battery backup or fixture integrated transfer device (see fixture spec sheet)

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
6	W4S-RL-W	WaveLinx Wallstation
24	SSLED-LD524-M-UNV-L840-CD2-WHT-SWPD3-U	Steeler with integrated sensor

Typical Wiring Detail

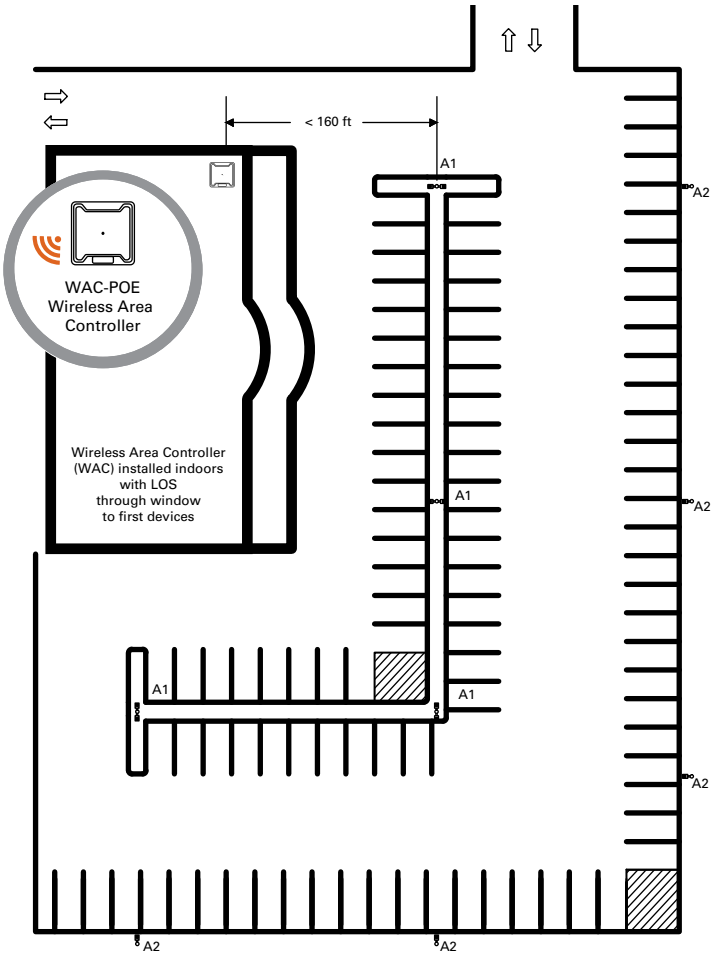


Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 ft	200 ft
Distance between WaveLinx devices	75 ft	150 ft
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

	Local Control	Manual ON	Partial ON	Bilevel Lighting	Daylight Side	Daylight Top	Partial OFF	Automatic OFF	Scheduled OFF	Receptacle Control	Energy Monitoring	Parking Garage	Functional Testing	Demand Response	Enhanced Digital
IECC 2018	C405.2.5	C405.2.5	C405.2.1.1		C405.2.3.2	C405.2.3.1	C405.2.1.2	C405.2.1.1	C405.2.2.1	C405.2.4		C405.2.5	C408.2.3		C406. 4
ASHRAE 90.1-2019	9.4.1 (a)	9.4.1.1 (b)	9.4.1.1 (c)	9.4.1.1 (d)	9.4.1.1 (e)	9.4.1.1 (f)	9.4.1.1 (g)	9.4.1.1 (h)	9.4.1.1 (i)	8.4.2	8.4.3.2	9.4.1.2	9.4.3		
T24 2019	130.1 (a)(b)	130.1 (a)(b)	130.1 (b)		130.1 (d)	130.1 (d)	130.1 (c).6	130.1 (c).5	130.1 (c)	130.5 (d)	130.5 (b)	130.1 (d)	130.4	130.1 (e) 130.1 (e)	
NECB 2017	4.2.2.1.(3)	4.2.2.1.(3), 4.2.2.1.(6)	4.2.2.1 (8)	4.2.2.1.(9)	4.2.2.1.(10)	4.2.2.1.(13)	4.2.4.1. (16-17)	4.2.2.1. (18-19)	4.2.2.1. (20-23)			4.2.2.2 4.2.2.4			

Exterior Lighting

example



	Occupancy Sensor	Daylighting Control	UL924 (Energy Back-Up Circuit)
IECC 2018		•	
ASHRAE 90.1 - 2019		•	
T24 2019	•	•	•
NECB 2017		•	•

Sequence of Operations

Lighting
- 0-10V lighting loads
- Each luminaire includes dimmable integrated sensor
- Each luminaire supports occupied/unoccupied programmable light levels

Occupancy
- Automatic auto on to 50%
- Automatic on to programmable level
- Programmable unoccupied light level

Daylighting
- Continuous dimming
- Individual luminaire daylight dimming
- Daylighting not required for indoor space

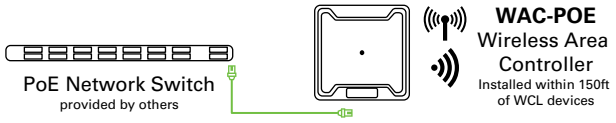
Manual Controls
- Programmable Zone/Scene control
- Optional Scene/Raise/Lower Control
- All Off

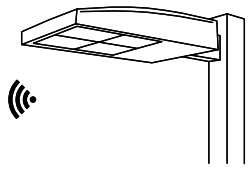
Additional Features
- Energy calculations (available through Trellix)
- Automatic demand response available from wireless area controller
- Scheduling of partial off light levels and times from wireless area controller
- UL924 emergency control capabilities available via luminaire battery backup

Bill of Material

Quantity	Catalog #	Description
1	WAC-POE	Wireless Area Controller
8	GLEON-AF-04-LED-E1-5MQ-BZ -SWPD5BZ	Galleon LED Area/Site Luminaire
5	GLEON-AF-04-LED-E1-T4W-BZ -SWPD5BZ	Galleon LED Area/Site Luminaire

Typical Wiring Detail





GLEON-AF-04-LED-E1-5MQ-BZ-ZW-SWPD5BZ
Galleon LED Area/Site Luminaire

Design Consideration	Best Practice	Maximum
Gateway / Wireless Area Controller range	150 ft LOS	300 ft LOS
Number of interior walls	LOS through a window to first nodes	
Distance from Wireless Area Controller to 1st WaveLinx device	160 ft	160 ft
Distance between WaveLinx devices	160 ft	160 ft
Number of hops from Wireless Area Controller	10 hops	10 hops
Number of areas per Wireless Area Controller	15 + 1 construction area	
Number of zones per area	3	16
Number of scenes per area	16	16

	Dimming	Automatic OFF	Scheduled OFF	Bilevel Lighting	Manual	Functional Testing
IECC 2018	C405.2.6	C405.2.6	C405.2.6	C405.2.6		
ASHRAE 90.1-2019	9.4.1.1 (e) (f)	9.4.1.1 (g) (h)	9.4.1.1 (i)	9.4.1.1 (d)	9.4.1.1 (a)	9.4.3
T24 2019	130.2 (c)	130.2 (c)	130.2 (c)	130.2 (c)		
NECB 2017	4.2.2.1.(3)(6)	4.2.2.1.(18-19)	4.2.2.1.(20-23)	4.2.2.1.(9)	4.2.2.1.(3)(6)	

WaveLinx

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Designers, electrical contractors and building owners/operators use the WaveLinx Connected Lighting System to comply with latest energy codes, maximize energy savings and improve occupant experience.

Lighting Brands
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Corelite
Ephesus
Fail-Safe
Halo
Halo Commercial
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io
Iris
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MWS
Neo-Ray
Portfolio
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