Controls Connected Systems

Lighting Controls and Connected Lighting

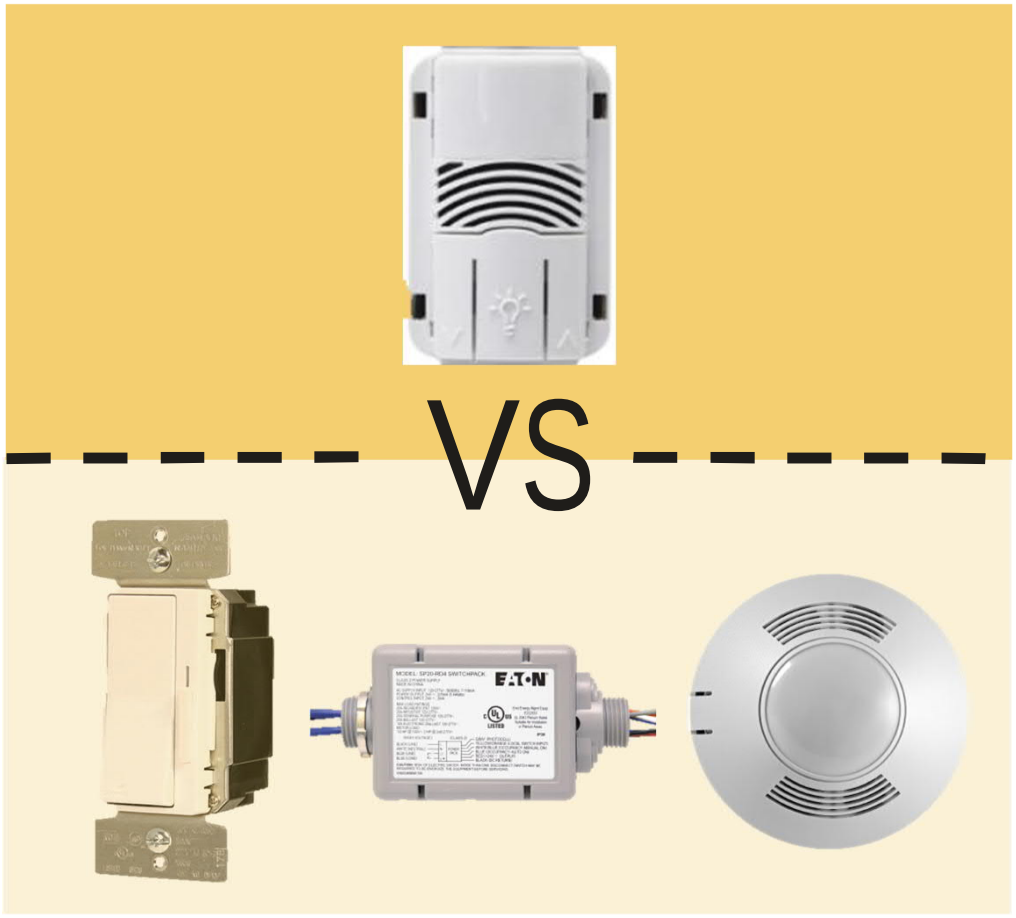
2020

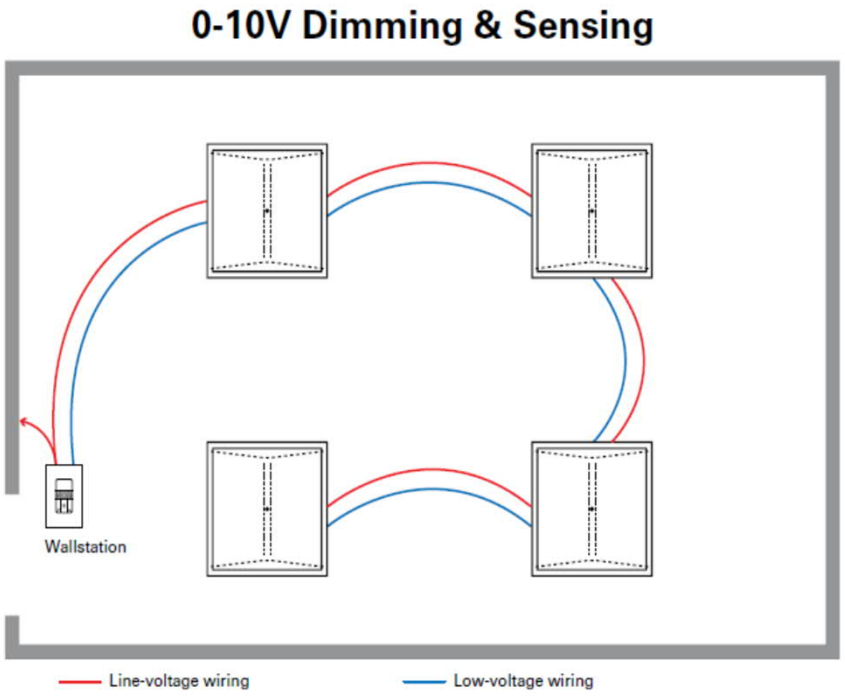
The Most Basic of Controls

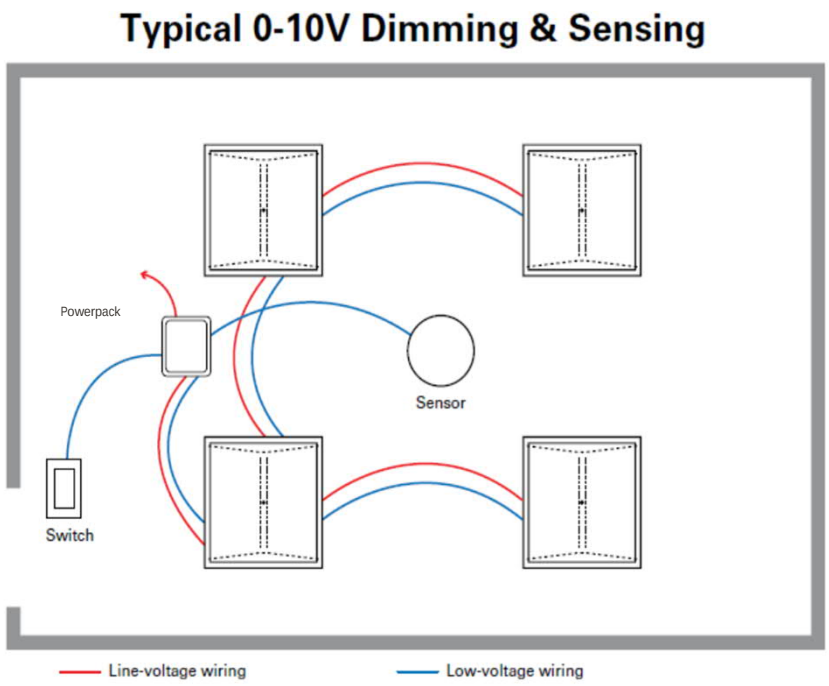
Wallbox Controls

A low cost solution for basic rooms.

Sensor, Powerpack and 0-10V dimmer in one device







Greengate Wallbox

Product: $80

Wiring: $100

Total: $180

Switch, PowerPack, Sensor

Product: $200

Wiring: $200

Total: $400

MLAZGAR ASSOCIATES

Sensor, Powerpack and 0-10V dimmer in one device

- **0-10V Dimming**
  - LED and FLR ballasts
- **Manual dimming**
- **PIR and Ultrasonic**
- **Open loop daylight harvesting**
- **180 degree field of view**
  - 900 sq ft of major motion
  - 324 sq ft of minor motion
- **Adjustable low-level and high-level trim**
- **Neutral required**
- **120-277v**

The Next Step in Controls

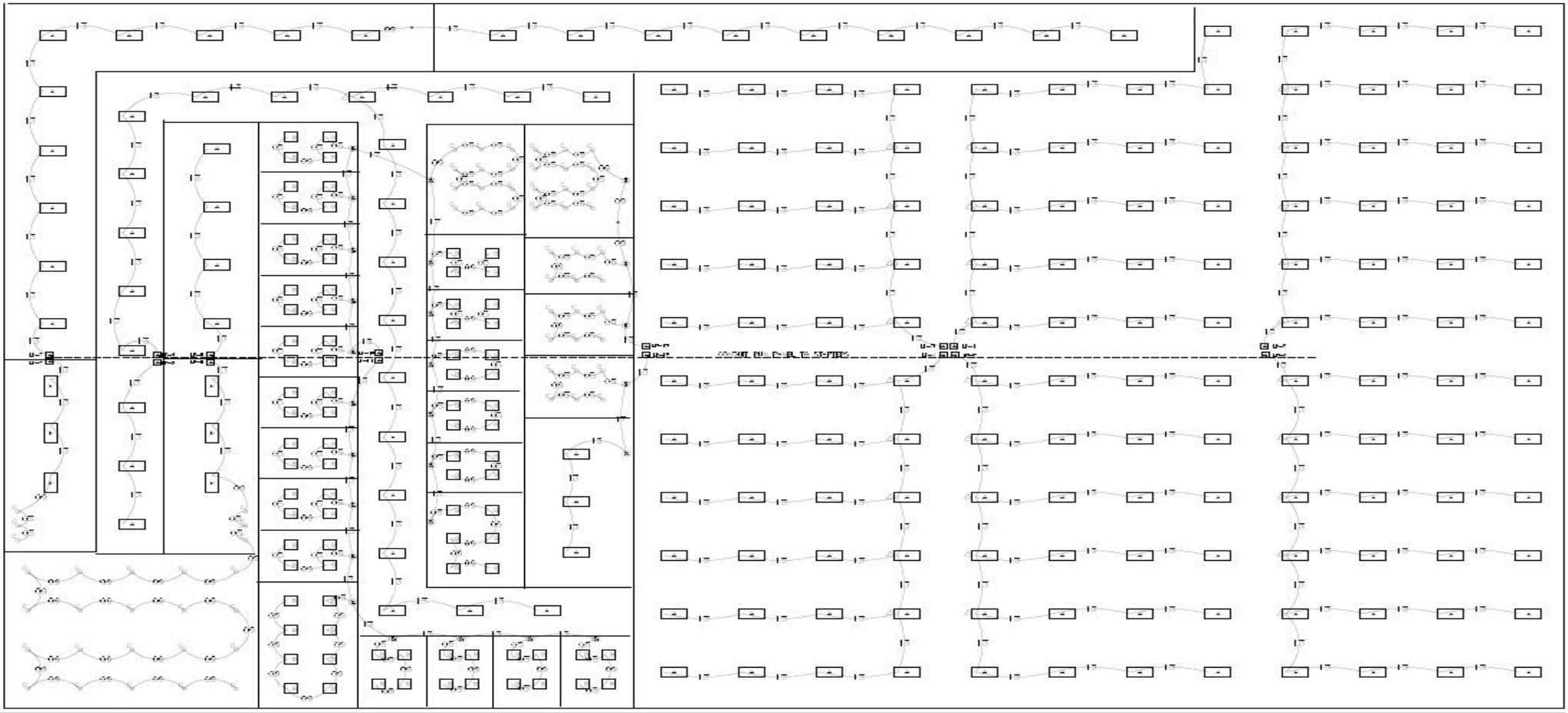
Relay Panels

A solution for jobs that have regular schedules.

Greengate

LiteKeeper (Stand Alone Relay Panels)

Relay Panel Design



Lower Product Cost **LOTS OF LABOR AND WIRE! (Except for retro & Outdoor.)**

Relay Panel Design

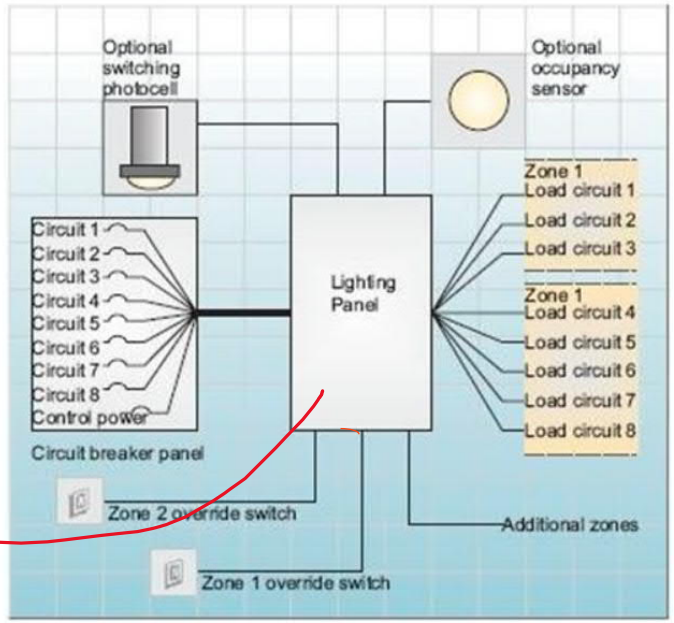


Image courtesy of New Buildings Institute.

Most likely a 48 relay panel would be necessary for this space.

Lower Product Cost **LOTS OF LABOR AND WIRE! (Except for retro & Outdoor.)**

LiteKeeper

LK4

LK8

LK16
LK32

Small retail locations, site lighting

Retail, site lighting, libraries, tenant spaces, etc...

LiteKeeper stand-alone controllers available in multiple panel sizes.

Occupancy Options

LiteKeeper and ControlKeeper panels can connect to any Greengate low voltage occupancy sensors.

- ✓ Automatic shut-off
- ✓ Occupancy Mode
- ✓ Vacancy Mode
- ✓ Partial On Mode/Partial Off Mode
- ✓ Enable/disable potential

Daylight switching

LiteKeeper panels feature daylight switching (ON/OFF) with the addition of PPS-5 exterior photosensors

Greengate

ControlKeeper (Network Relay Panels)

ControlKeeper

Distributed Switching | Distributed Dimming | Centralized Switching

CK2

CK4

CK4A

CKT

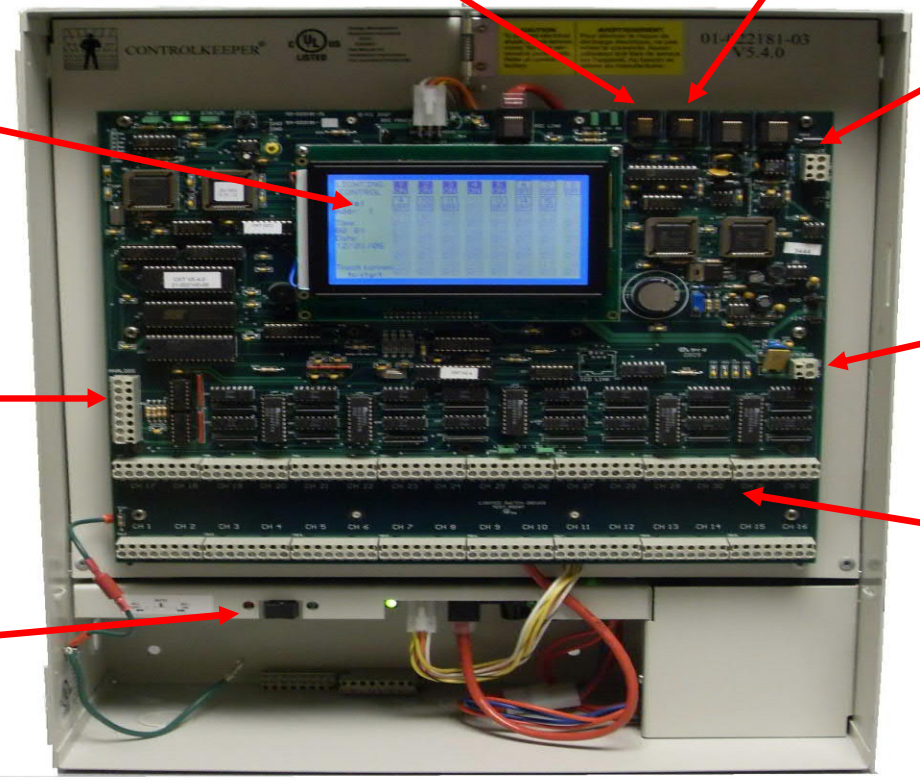
Interior- ON/OFF
Offices/Classrooms

Daylighting - Dimming
Offices/Classrooms

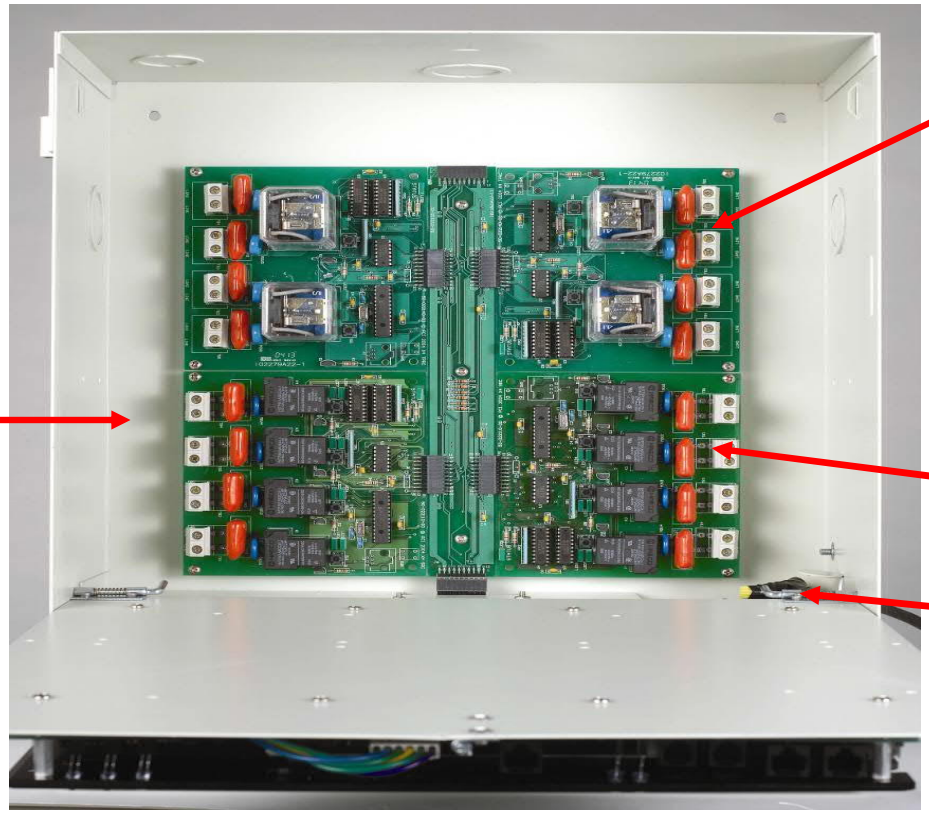
Common areas;
halls, library, parking, meeting rooms, gym, etc.

ControlKeeper networked controllers available in both distributed smaller panel size and centralized larger panel size options

ControlKeeper



ControlKeeper



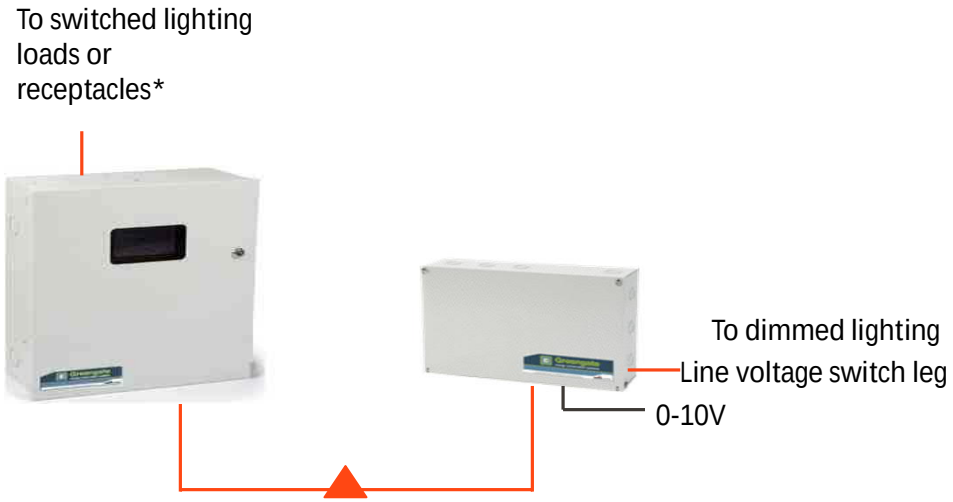
Line voltage section

20A Two Pole relays optional

Single pole relays

Multi-tapped power transformer

ControlKeeper
Connection overview



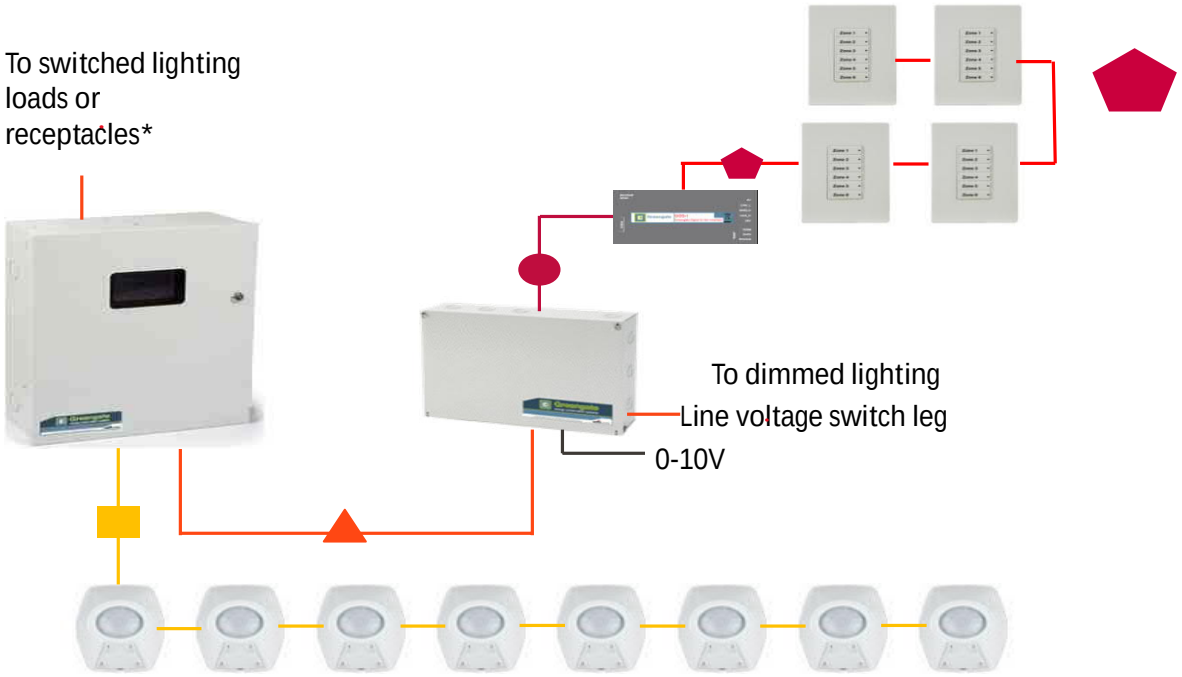
* Requires Latching Relays

RS-485 Panel Network

- Belden 9841
- Max. panels 254 per network
- Daisy chain required
- Max. 4000 ft. without repeater
- Repeater required every 32 panels or 4000 ft.

Repeater

ControlKeeper
Connection overview



* Requires Latching Relays

GDS Station Network

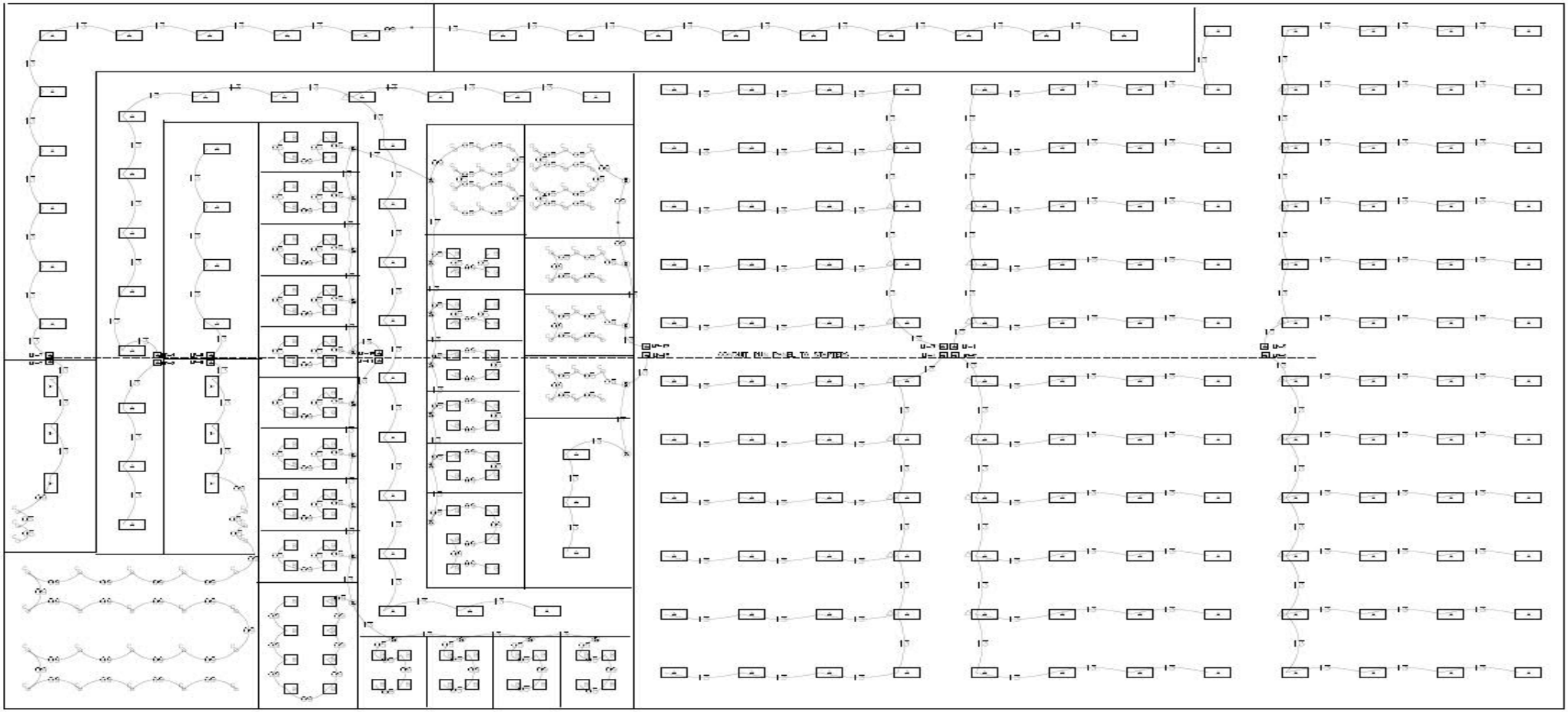
- Belden 1502R, 1502P
- Max. 1000 ft. on network
- Daisy chain required

More Modern Design

Room Controllers

A solution for local relay & dimming control.

Room Controller Design



Greatly reduced “home runs” of wire.

Room Controller Lighting Control System

Lighting control room-based system.

Room Controller Benefits

- **Contractor Benefits**
- Reduce material cost
- Simplified wiring
- Save time

- **Distributor Benefits**
- Convenient Starter Kits
- Reduce inventory requirements
- Immediate code compliance

Minimize Installation & Setup Time: Controller

Devices are automatically recognized and work immediately with standard out-of-the-box functionality.

- LED Luminaire
- Fluorescent Luminaire w/ Ballast
- Luminaire Dimming
- UL924 (Energy Back-up Circuit)

- Demand Response
- Tuning Control
- Remote Signal Control
- Lumen Maintenance Control

Zone Wallstation

Manually Switched ON/OFF

Daylight Sensor

Daylighting Control

Occ Sensor

Vacancy Sensor Manual On/Auto Off

Occupancy Sensor

Scene Wallstation

Manual Dimmer

Personal Remote

Manual Dimmer

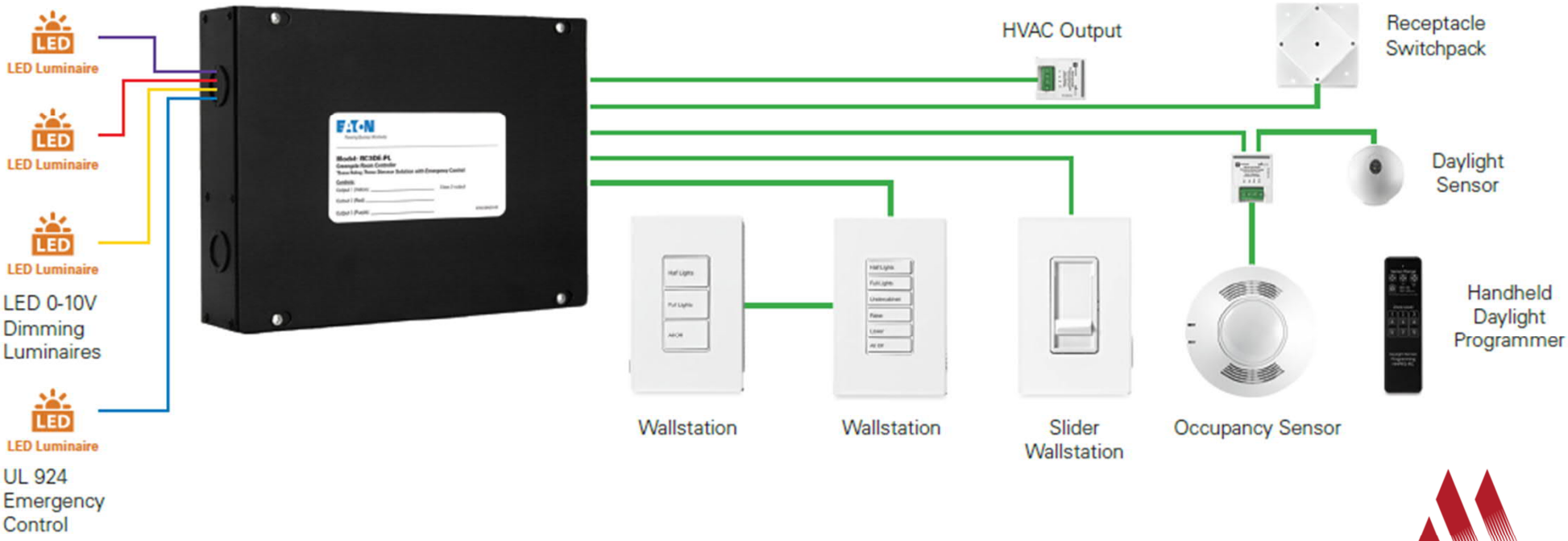
Receptacle Control

Receptacle Control

Improved Performance and Setup Time

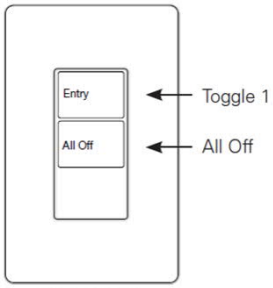
Room Controller Stand Alone Daylight and Emergency

RC3DE-PL with receptacle and emergency control

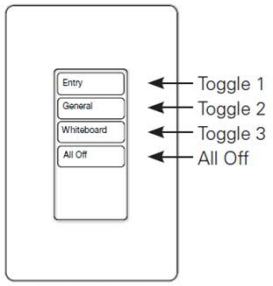


Room Controller Wallstations

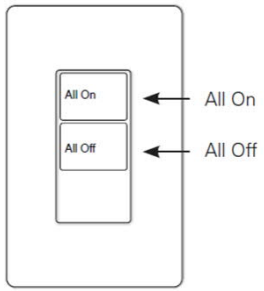
Room Controller buttons include predefined actions to control lighting. We have packaged those buttons in wallstations for immediate use and functionality.



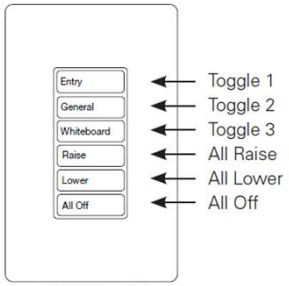
RC-2TLB-ES1



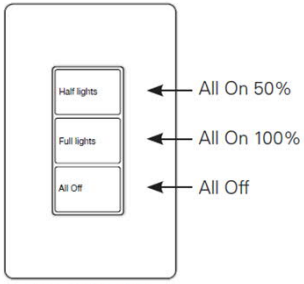
RC-4TSB-TS5



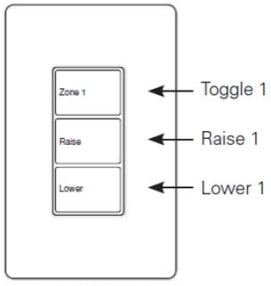
RC-2TLB-OS4



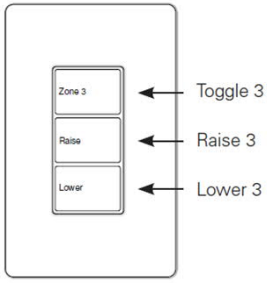
RC-6TSB-TS6



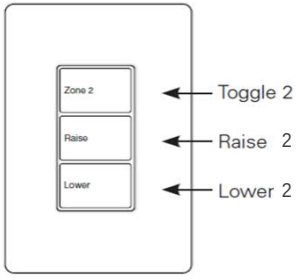
RC-3TLB-OS1



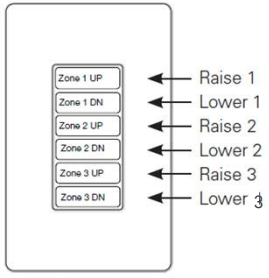
RC-3TLB-Z1D



RC-3TLB-Z3D



RC-3TLB-Z2D



RC-6TSB-ZAD

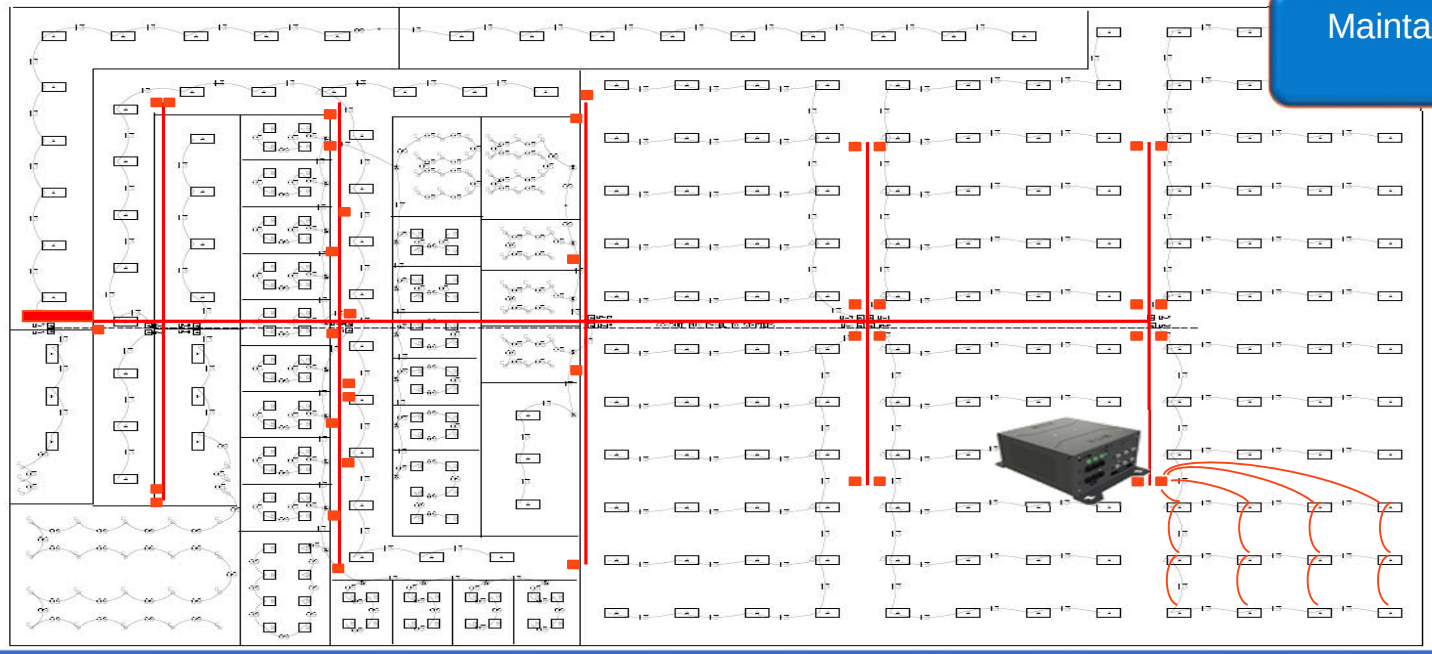
Cutting Edge Controls

DVLP (Think of remote drivers in a box.)

A solution for low voltage fixtures. POE alternative.

DLVP Controls Design

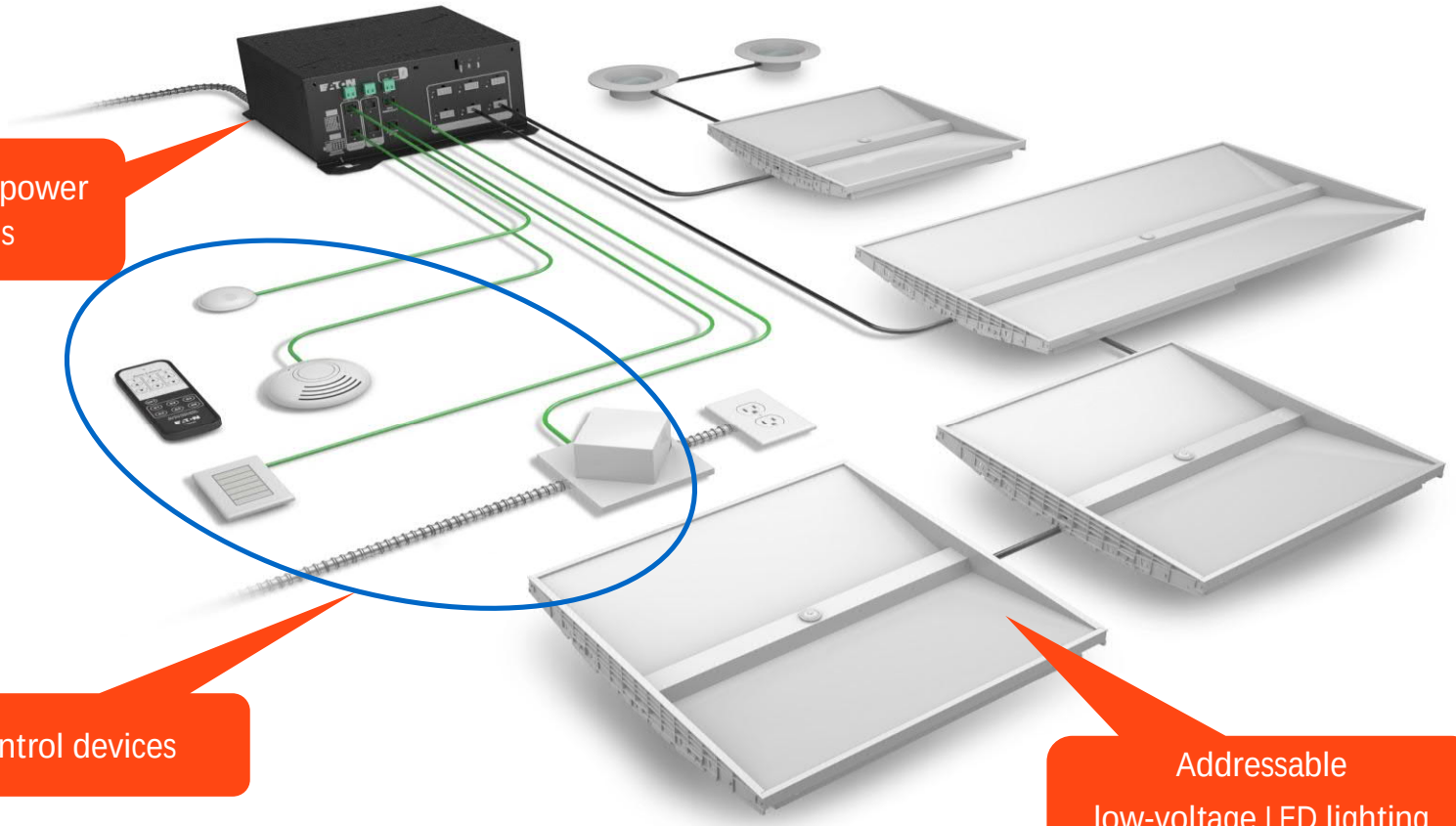
- Leverage AC line voltage infrastructure for transmission
- Utilize Class 2 DC for load connectivity



Maintain system electrical efficiency

~10-20% Lower Installed Cost **~25-40% Labor Reduction**

DLVP system components



Low-voltage power modules

Control devices

Addressable low-voltage LED lighting Fixtures

Available DLVP LED Fixtures

Corelite Bridge

1x4, 2x2 and 2x4 fixtures available

- *Available with or without integrated sensors*
- *7W and 14W emergency battery packs available*

Metalux SkyRidge

1x2, 1x4, 2x2 and 2x4 fixtures available

- *Available with or without integrated sensors*
- *7W and 14W emergency battery packs available*

Portfolio LD4B, LDSQ4B, LD6B, and LDSQ6B

Round and square recessed downlight

- *Requires Portfolio accessory kit*

Metalux Encounter

1x2, 1x4, 2x2 and 2x4 fixtures available

- *Available with or without integrated sensors*
- *7W and 14W emergency battery packs available*

Metalux FRLED

2x2 and 2x4 fixtures available

- *Integrated sensors currently unavailable for this model*
- *7W and 14W emergency battery packs available*

Halo Commercial PD6

6" LED downlighting

- *Available with or without integrated sensors*
- *Emergency options available*

Metalux ArcLine

1x4, 2x2 and 2x4 fixtures available

- *Available with or without integrated sensors*
- *7W and 14W emergency battery packs available*

Metalux GRLED

1x4, 2x2 and 2x4 fixtures available

- *Integrated sensors currently unavailable for this model*
- *7W and 14W emergency battery packs available*

Portfolio LDSQA4A and LDSQA6A

LED square adjustable accent/slope

- *Requires Portfolio accessory kit*

Metalux Cruze

Metalux Cruze SE

1x4, 2x2 and 2x4 fixtures available

- *Available with or without integrated sensors*
- *7W and 14W emergency battery packs availab*

Halo Commercial PR8

8" LED downlighting with seleCCTable™

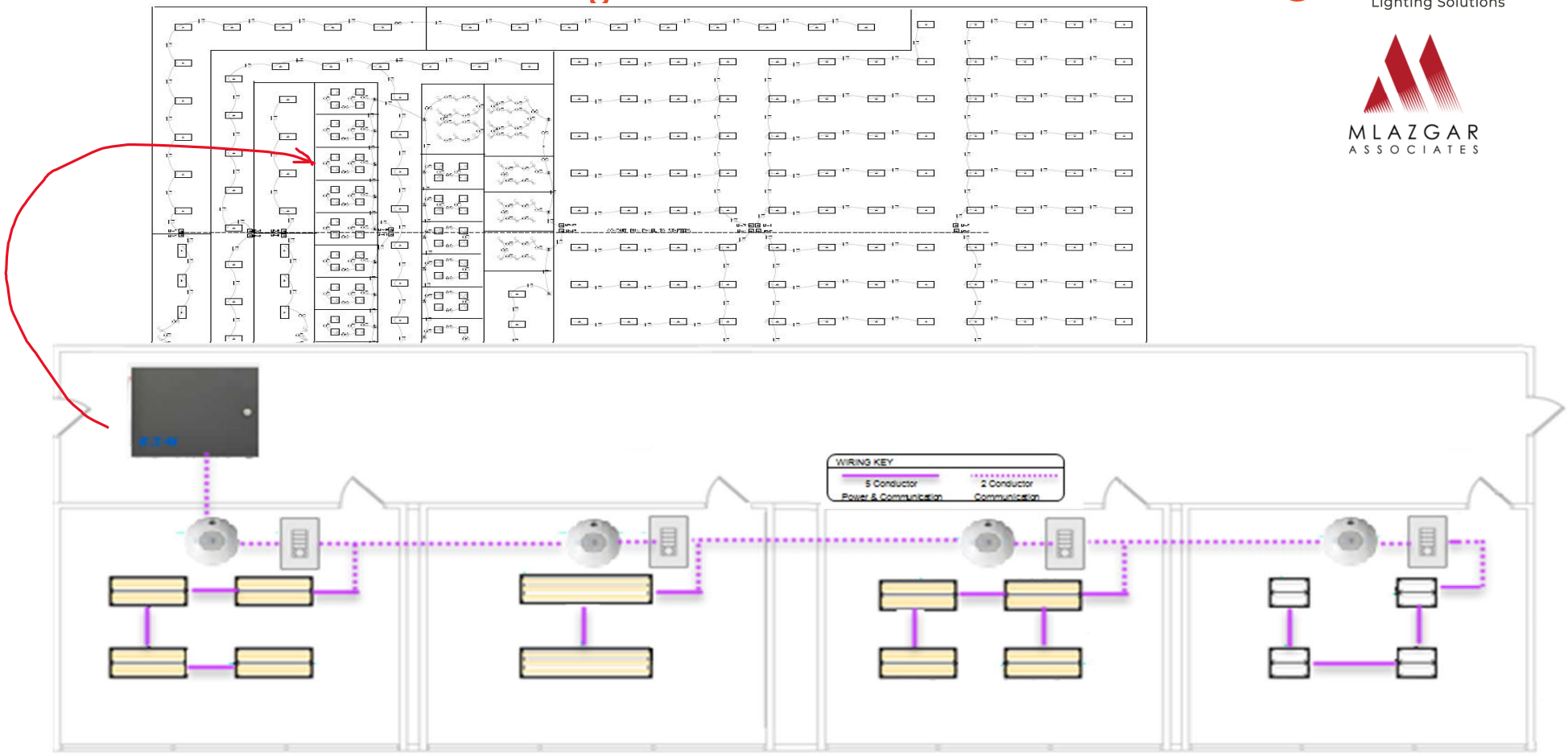
- *Available with or without integrated sensors*
- *7W and 14W emergency battery packs available (not available with PR8S)*

Wired Distributed Controls

WaveLinx Wired

A solution for costly CAT5e wiring issues.

Distributed Controls Design



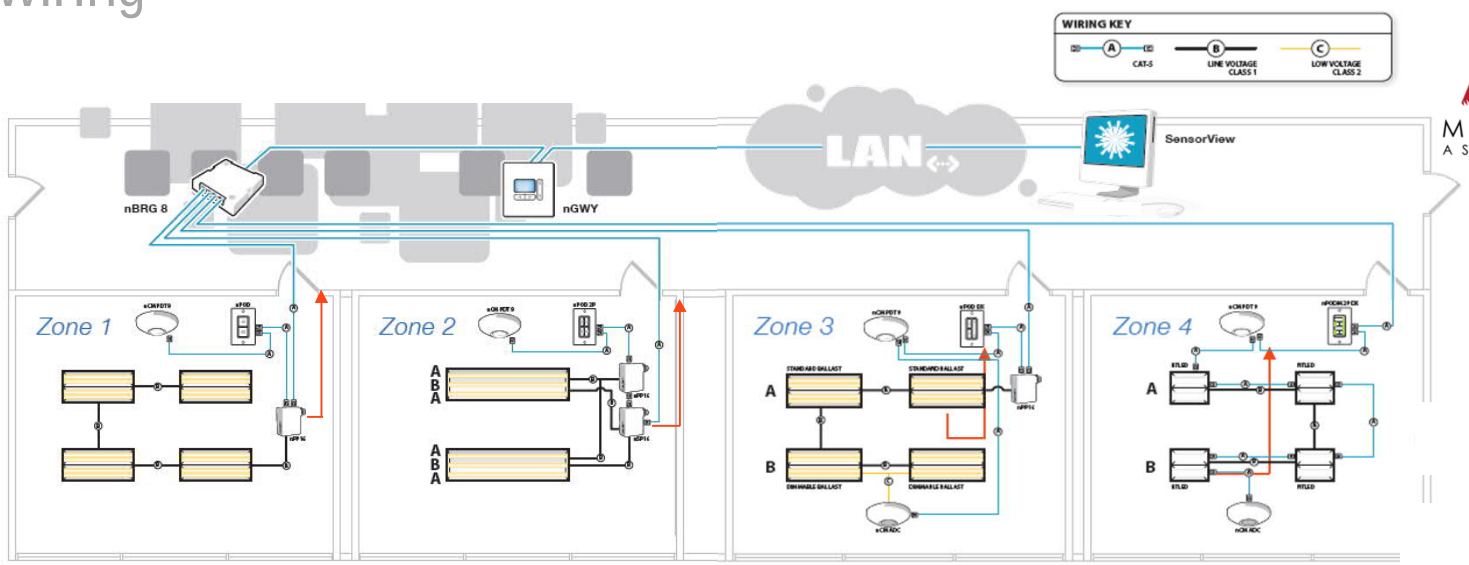
Greatly reduced “home runs” of wire. Nearly unlimited control.

iLumin Plus vs Competitor “A”

Its all in the wiring

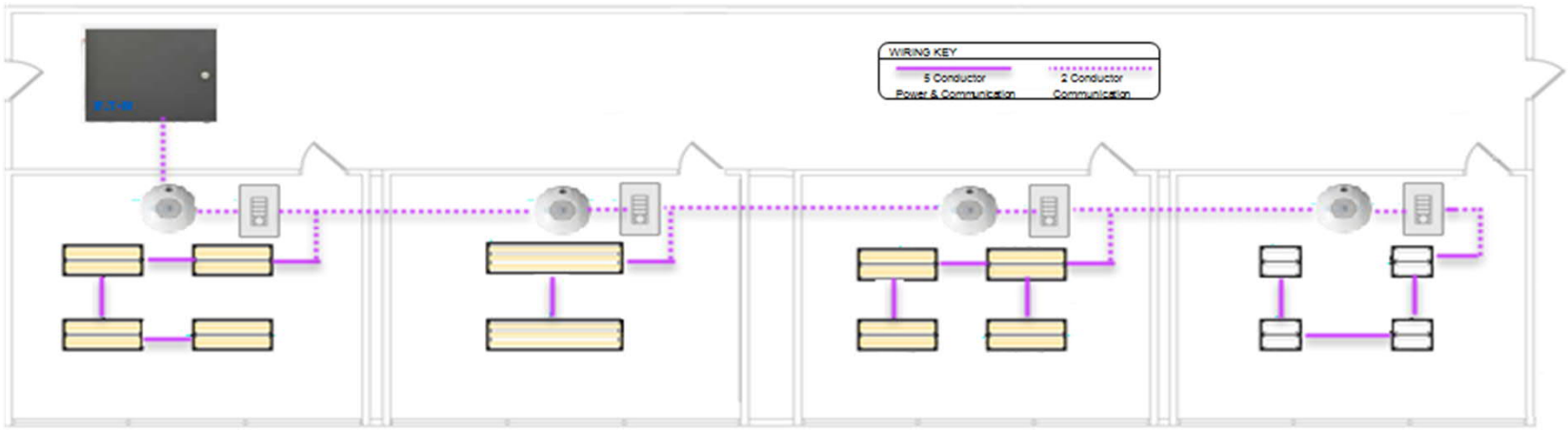
Competitor

TOO MANY CAT5e connections & points of failure!!!



iLumin Plus

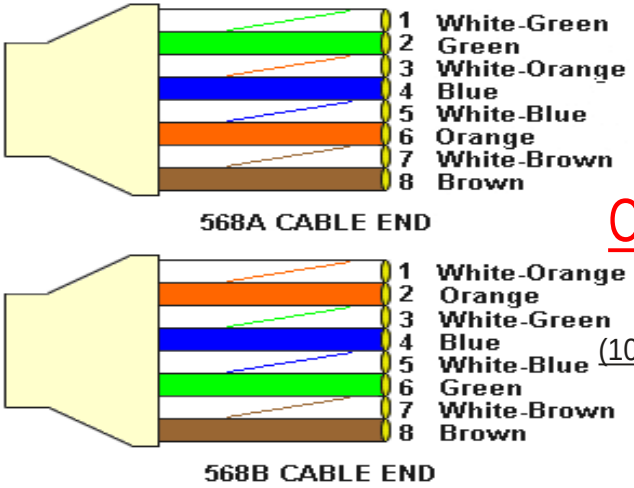
Simplified.



Competitor “A” -vs- iLumin Plus

Its all in the wiring

Competitor “A” that uses Cat 5



16 CONNECTIONS Per device!

(1000 devices = 16,000+ points of failure)

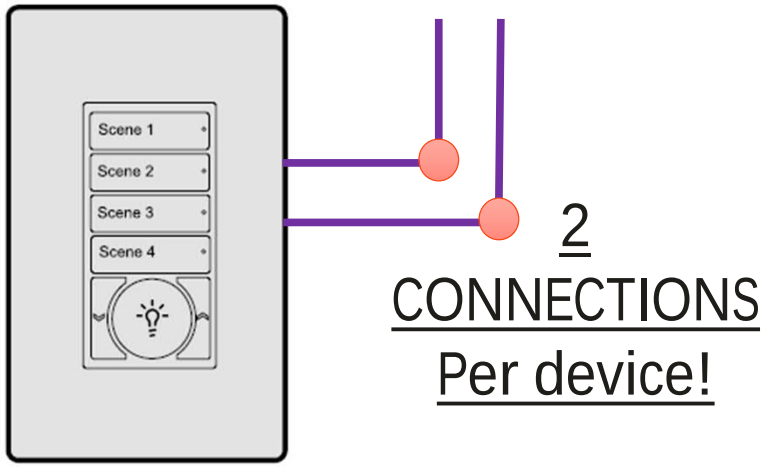
Pros

- Simple plug in connection

Cons

- Must be daisy chained
- Must be run separate from power wires.
- Two different configurations 568A & 568B
- All terminations required to be tested and documented
- Faulty terminations found during commissioning, will cost extra!

iLumin Plus 2 - wire bus



2 CONNECTIONS Per device!

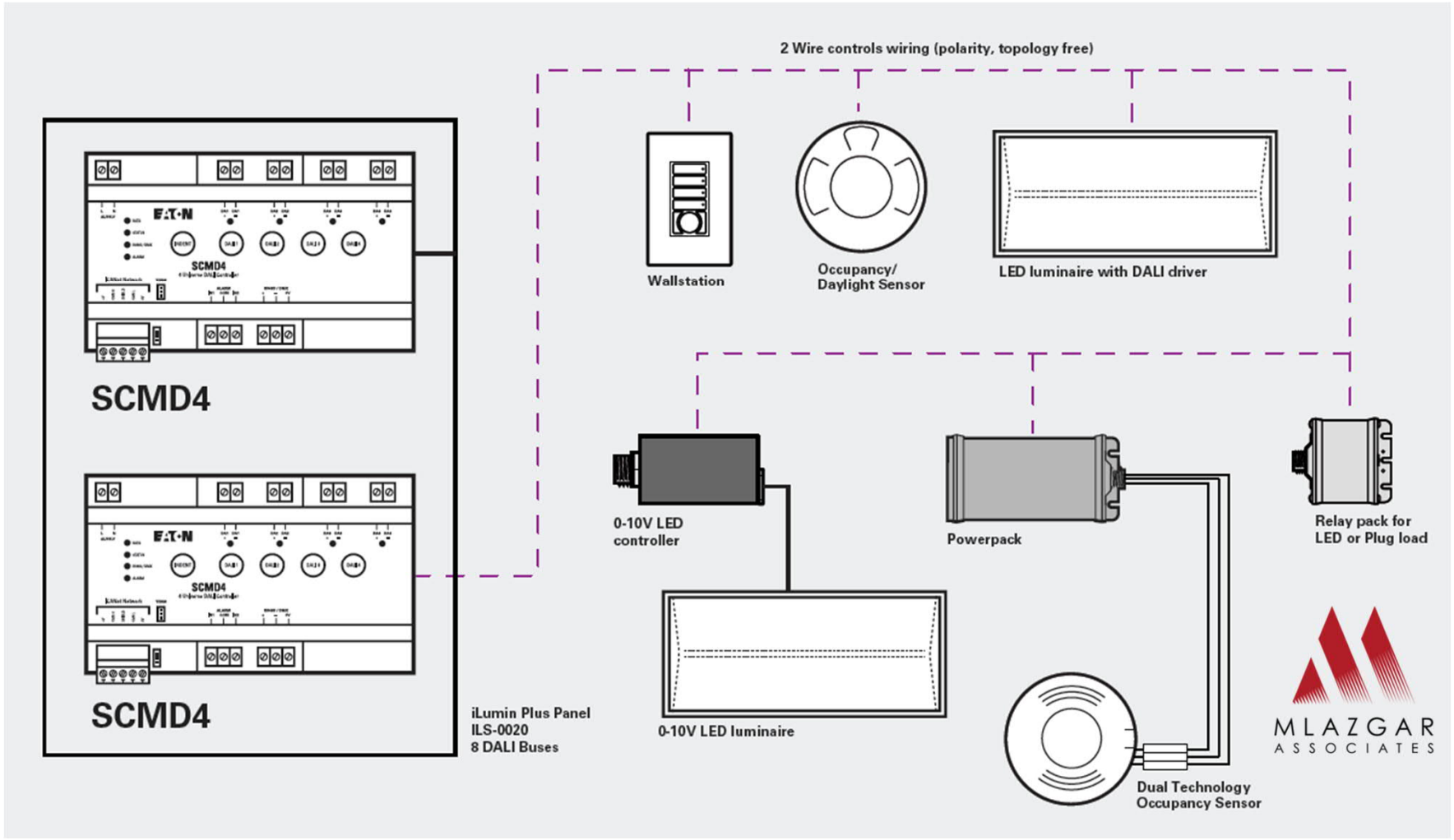
Pros

- Standard wire nut connection
- 14-18 ga wire, (readily available)
- Topology free, polarity free
- Daisy chain, T-tap, Star, or Parallel.

Cons

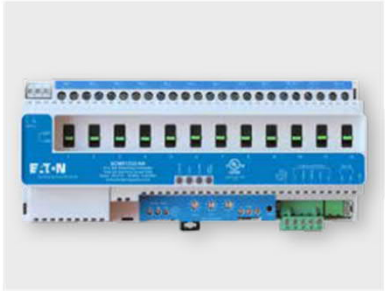
- 64 addresses per bus

iLumin Plus
Simple 2 wire bus makes design easy



iLumin Plus Modules – Controllers

Modules in the Area Controllers



SCMR1220-NA

This feed through relay unit provides outstanding features and performance in a truly competitive and compact package. Each channel is rated for up to 20A and is designed to switch heavy loads including LEDs. Recommend using only 16A per channel due to the overall module max of 192A.

Features

- 12 - 20A feed through relays
- (120/277VAC 50/60Hz)
- Switches resistive, inductive and capacitive lighting loads
- Manual override of loads
- DALI interface (12 address DALI end device)
- DMX512-A interface
- Two ALARM Inputs

SCMH1200-NA

The SCMH1200-NA controls twelve 0-10V outputs that can be programmed to be controlled independent or aligned with relays from the SCMR1220-NA . Each channel may be configured to provide 1-10V or 0-10V control of luminaires.

Features

- 12 channel 1-10V, 0-10V control device
- iCANnetTM network terminal connections
- Forces 0-10V loads to full bright on power failure
- DALI interface (12 address DALI end device)

SCMD4

The SCMD4 is a 4 bus ballast controller enabling dimming and switching of up to 64 individual addressable devices including luminaires. The compact design of SCMD4 delivers system flexibility as well as reducing installation costs and space used.

Features

- Simplified 2 wire control bus for input devices
- Includes ability to control and test DALI emergency luminaires
- Up to 64 devices per bus
- Easy installer test button per bus
- DMX512-A Interface

EG2 (DIN Rail)

The Ethernet Gateway provides a connection between the lighting control network and the building Ethernet LAN. This allows a user to control and configure the iLumin Plus system using iCANsoft over the building LAN or via the internet rather than by connecting directly to an IL Series panel. Where a wireless LAN is in place (or by connecting a wireless router to the Ethernet Gateway) the user can access the network with a Wi-Fi enabled PC running iCANsoft.

Features

- Connects to the building LAN
- Enables internet and Wi-Fi LAN access into the lighting control network
- Required for iLumin App via mobile devices (iPhone®/ iPad®)
- Provides access for API integration via ASCII control strings
- Required for BMSPro 2 BACnet integration

CR1-RJ

The CR1-RJ is included in every medium and large size IL panel. It Provides access to the iLumin Plus network from a laptop.

Features

- Simple PC network connection
- Powered from the iLumin Plus network

iLumin Plus Area Controllers
Suggested configurations

ILS-0010
Typical 2 wire area controller
Supports 256, 2 wire devices
(approx. 20 Classrooms)

ILS-1100
Typical 0-10V area controller
Supports 12 0-10V Zones
(approx. 3-4 Classrooms)

ILS-0020
Expanded 2 wire area controller
Supports 512, 2 wire devices
(Great for office environment)

14.6" W X 12.2" H X 3.6" D
(up to 2 modules)

ILM-2111
Typical medium area controller
24 relays, 12 0-10V zones and
Supports 256 2 wire devices
(Great for open office with surrounding private offices)

25.7" W X 25.3" H X 6.1" D
(up to 4 modules)

- 2 wire simple control bus
- Low cost installation
- Multiple integration options
  - BACnet
  - DMX
  - Ethernet/ AV

iLumin Plus Accessories
Input devices

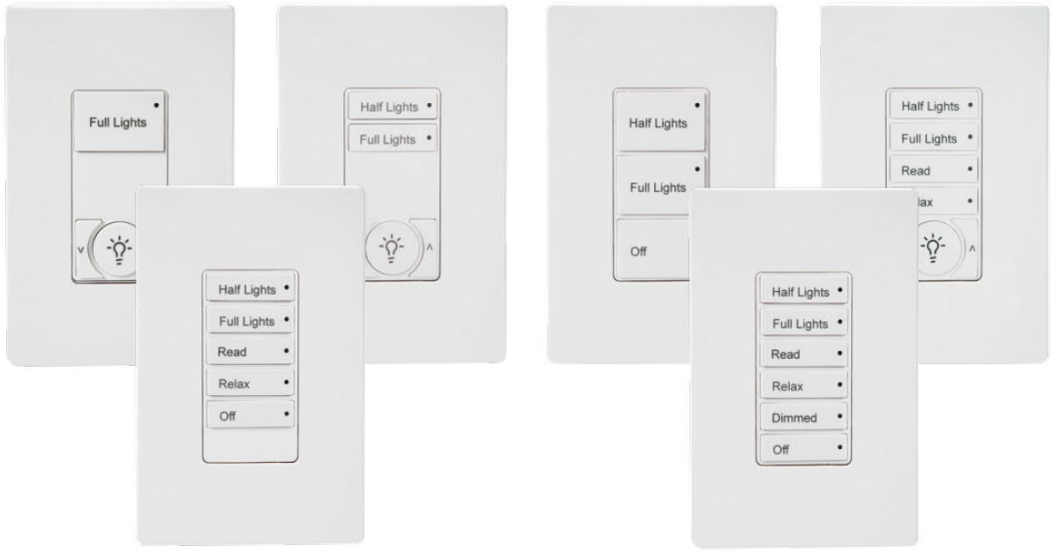
Input Devices

Wallstation

- *Intuitive user control*
- *All device settings programmable*
- *Uses 2 wire polarity, topology free control bus*
- *Requires SCMD4*

(See spec sheet for full list of catalog numbers)

FDW-#TLB-RL-W
FDW-#TSB-RL-W



iLumin Plus Accessories
Automatic Controls

Automatic Controls		
	**Multi-Sensor** • *Daylight and occupancy detection* • *All device settings programmable* • *Uses 2 wire polarity, topology free control bus* • *Requires SCMD4*	**FLT-MTS6-DALI** **FLT-MTS12-DALI**

	**Greengate Low Voltage Sensor**
	• *Occupancy sensors*
	• *MicroSet self-adjusting technology*
	• *Standard low voltage input*
	• *Works with the following:*
	  • *Sensor Powerpack*
	  • *UIG*
	  • *UIM (Mini-UIG)*
		OAC-DT-2000-R
		OAC-DT-1000-R
		OAC-DT-500-R
		OAWC-DT-120W-R
		OAWC-P-120W-R

	**Sensor Powerpack** • *Supports up to five (5) Greengate occupancy sensors* • *Plenum rated* • *Device identification buzzer* • *Requires SCMD4* • *Uses 2 wire polarity, topology free control bus*	**FLT-SP-MV-DC2** **FLT-SP-240-DC2** **FLT-SP-347-DC2**
	**Astronomical Time Clock** • *255 events* • *8 sequences with up to 30 steps per sequence* • *Scene selection and programming* • *Channel level raise and lower*	**TC1**

iLumin Plus Accessories
End devices

End Devices		
	**0-10V to Reverse Phase** • *Dims ELV with 0-10V control* • *Auto voltage sensing* • *Plenum rated* • *Simple reverse phase control* • *Requires a 0-10V channel from the SCMH1200-NA*	**LDCM-PL-120-277-010V-GR**
	**0-10V Fixture Control** • *Permits control of standard 0-10V luminaires* • *Available in class 1 and class 2* • *UL924 listed* • *Uses 2 wire polarity, topology free control bus*	**FLT-DAC-DALI-DC1** **FLT-DAC-DALI-DC2**
	**Relay** • *Universal 120V-347V* • *Power loss automatically closes relay* • *Plug load rated* • *Uses 2 wire polarity, topology free control bus*	**FLT-HPRS-DALI**

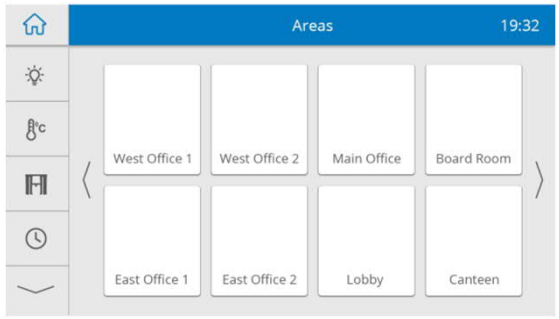
iLumin Plus Touchscreens

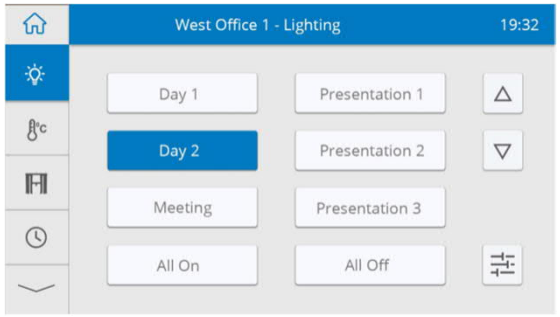
Touchscreens 5.5” & 8”

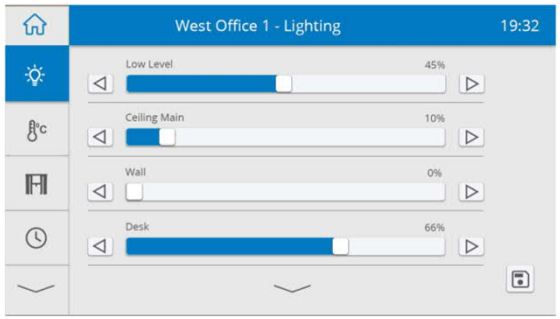
5.5” TSE

8” TSE

- PoE powered
- Flush to wall, no special box
- Software designer







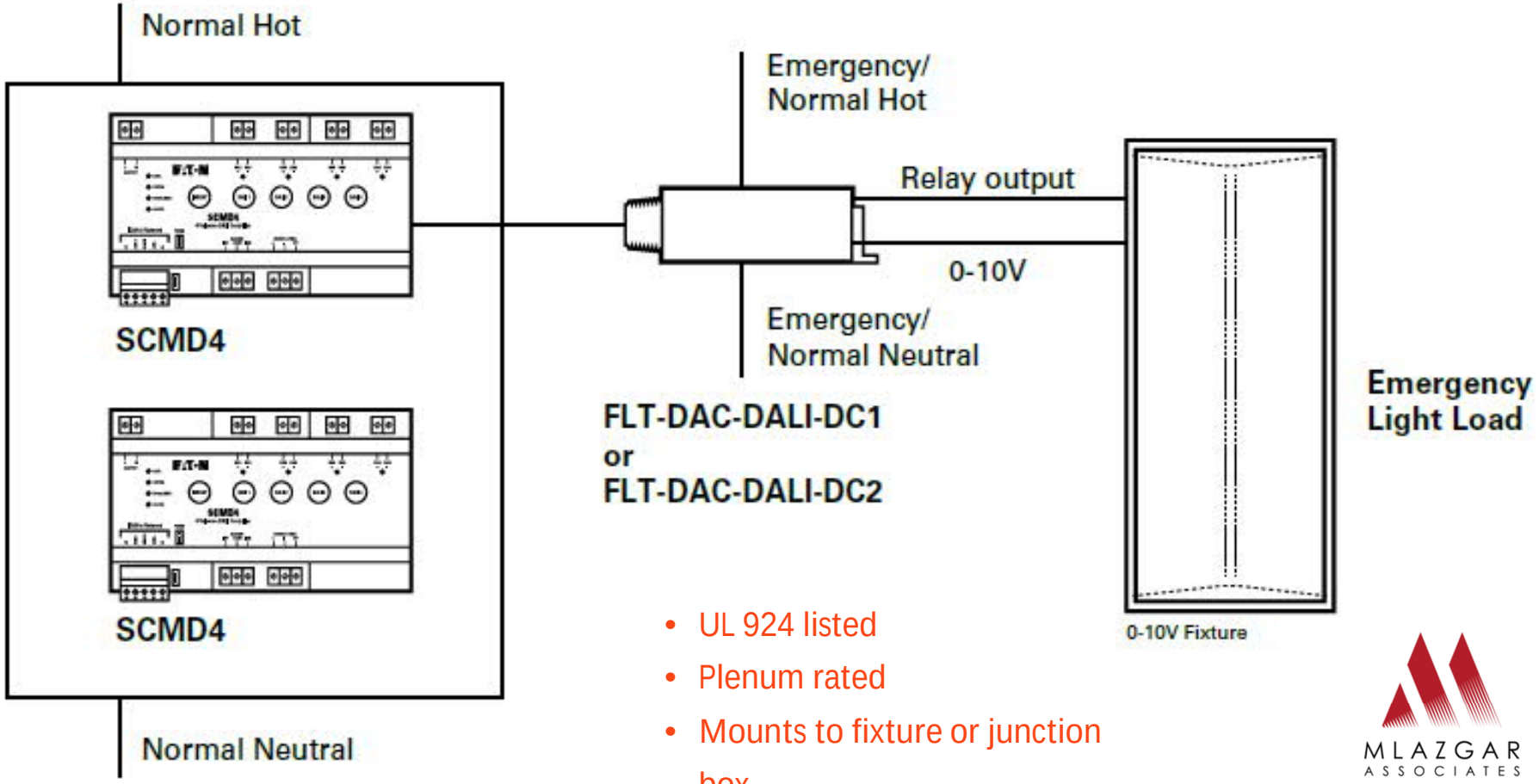
TSI-1

- Network powered
- Connects up to 25 TSE’s
- Communicates to ILP system

Touchscreen capabilities

- Multiple areas
- Multiple scenes per area
- Zone control per scene

How iLumin Plus handles emergency lighting –
DAC (Individual fixtures-Best option)



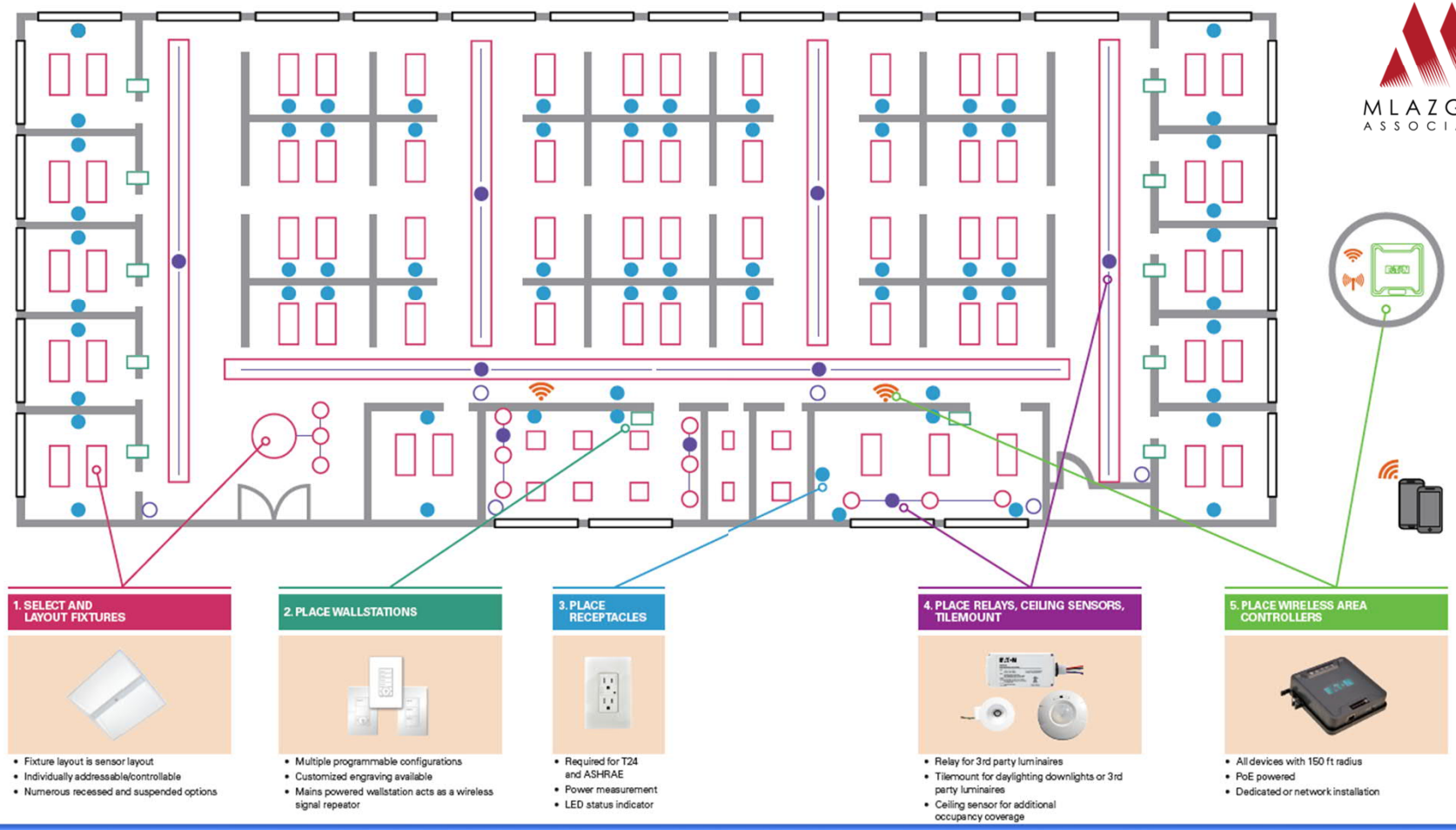
- UL 924 listed
- Plenum rated
- Mounts to fixture or junction box

Wireless Distributed Controls

WaveLinx Wireless

The present and future of controls!

WaveLinx Wireless Controls Design



Almost zero low voltage wires or low voltage labor!

WaveLinx Connected Lighting System

Indoor | Outdoor | Industrial

Connected. Scalable. Smart.

MLAZGAR ASSOCIATES

COOPER Lighting Solutions

WaveLinxConnect.com

Introducing WaveLinx

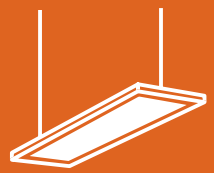
WAVELINX

CONNECTEDLIGHTING SYSTEM

Take compliance, network security and energy savings into your own hands.

Automatic code compliance. 7-Tier network security features.
Integrated wireless sensors to collect and transmit key building data. And, the ability to control your system from a mobile app and the ability to exchange data with third party applications.

It's simple: WaveLinx just works.



LIGHTING

Advanced LED fixtures

CONNECTIVITY

Communications & sensing technology

Physical devices & controllers

APPS / SOFTWARE

Data accumulation & analysis

Software applications

MLAZGAR ASSOCIATES

Industry-leading technology, in a simple package

Save on installation time and cost

Get off the job faster

Be smart building ready

Control it all, from your mobile device

Stay secure with unparalleled 7-tier network security features

Wireless. Code Compliant. Cost Effective.

Lighting fixture with integrated sensor

Highly efficient LED fixtures

+

Wireless Area Controller

Provides centralized coordination of multiple area control options

+

Wireless Wall Station/ Receptacle

Provides customized wireless control of each area

Mobile Applications

Provides personalized, local control from a tablet or smartphone

= up to **70%** **ENERGY SAVINGS**

ASHRAE 90.1 2016 - 70%

IECC 2018 - 55%

T24 2019 - 70%

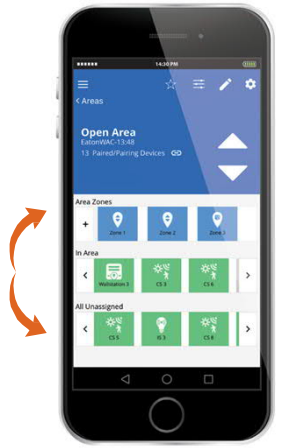
www.WaveLinxConnect.com

MLAZGAR ASSOCIATES

The sensor is factory wired and ready to meet code out-of-the-box

Automatic code compliance?

Yes, it's true

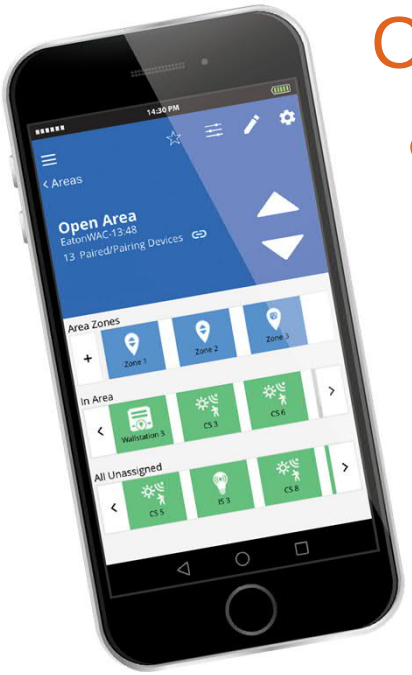


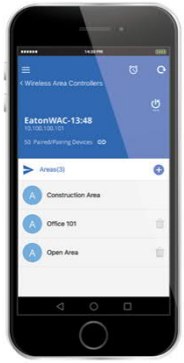
MLAZGAR ASSOCIATES

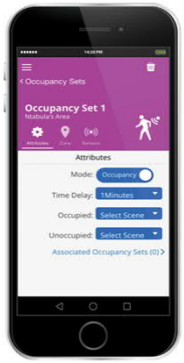
Control and efficiency, at your fingertips

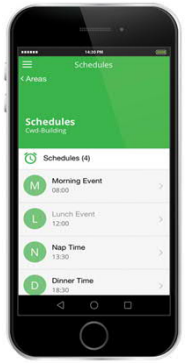
Next-level convenience and control: configure zones, customize settings, and save energy from one secure mobile app.

- Easy, automatic code commissioning provides a sequence of operations that meets the strictest codes
- Adjust automatic settings, with the ability to configure each setting yourself
- View occupancy/daylight data from sensors, and further savings by implementing demand response









WaveLinx mobile app settings

- Manual Dimmer
- Occupancy Sensor
- Lumen Maintenance Control
- Daylighting Control
- Receptacle Control
- Tuning Control
- Scheduling
- Manually Switched ON/OFF
- Demand Response

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WaveLinx – Mobile App

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
- Wall station scene control
- Dominant button is 50% light level
- Other buttons are scenes
- Demand Response ready

CONTROL DEVICES

Precise control. Wireless communication.

Wireless Area Controller

The Wireless Area Controller (WAC-POE) is the main component of the WaveLinx Wireless Connected Lighting System. The WAC coordinates between the WaveLinx Mobile App and various WaveLinx devices to create a smart building ecosystem that provides out of the box functionality and leverages our patent pending automatic code commissioning features.

catalog number:

WAC-POE - Wireless Area Controller without PoE injector

WPOE-120 - PoE injector accessory

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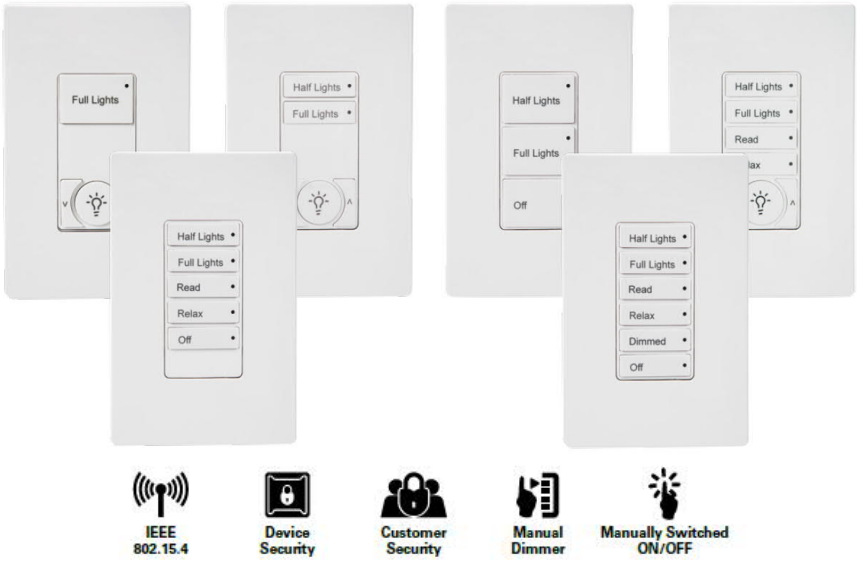
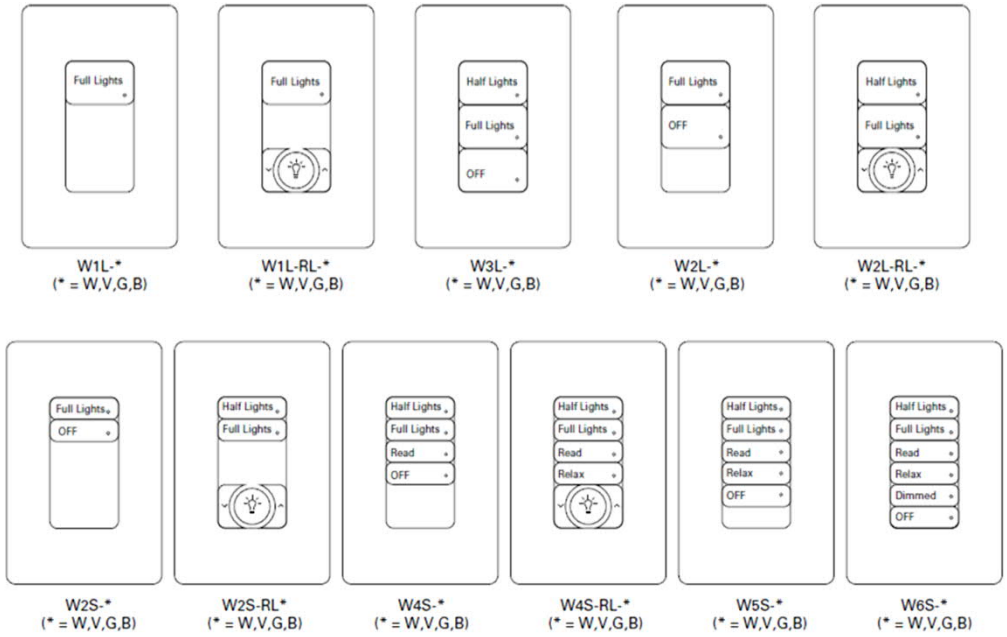
WaveLinx Control Devices – Wired Wallstations



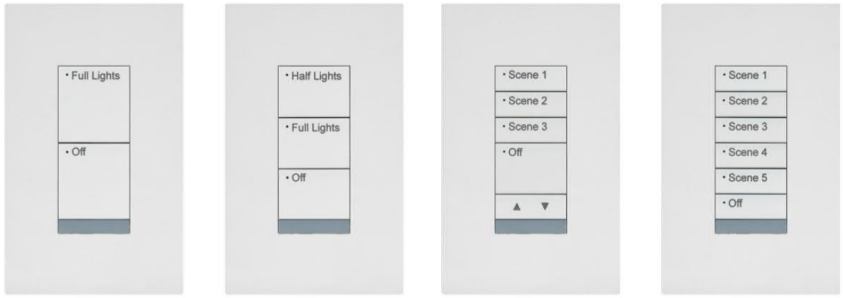
- 120-277VAC – No batteries required
- Fully programable area control
- Single and multi-gang installation
- Eleven (11) hardware configurations
- Four (4) color options

Manual Control



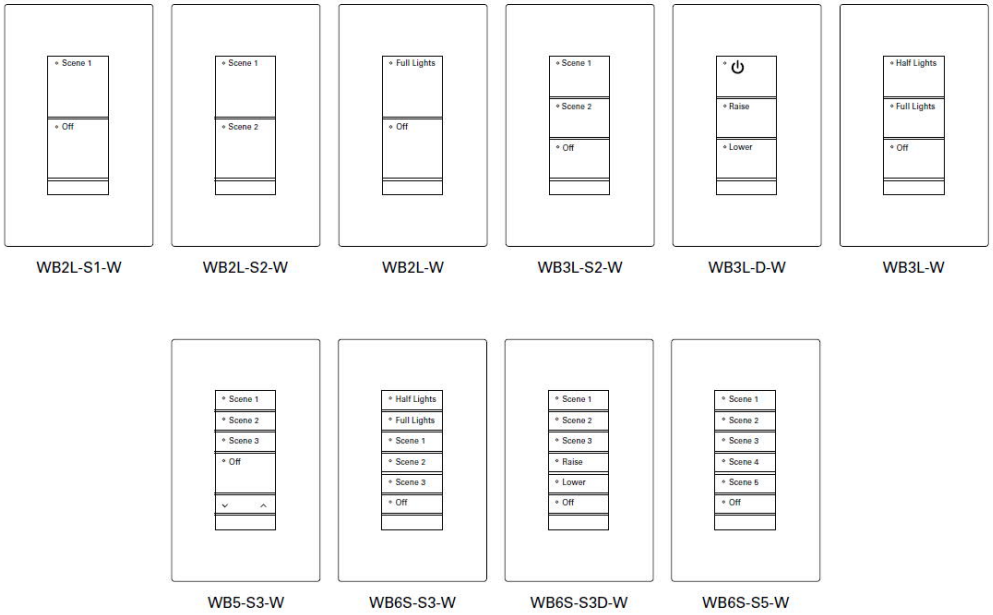
11 Button hardware options – fully programmable – no batteries

WaveLinx Control Devices – Battery Powered Wallstations



- Four (4) AAA alkaline batteries (up to 10 years)
- Fully programable area control
- Surface or single gang wall box mounted
- Four (4) hardware configurations

Manual Control

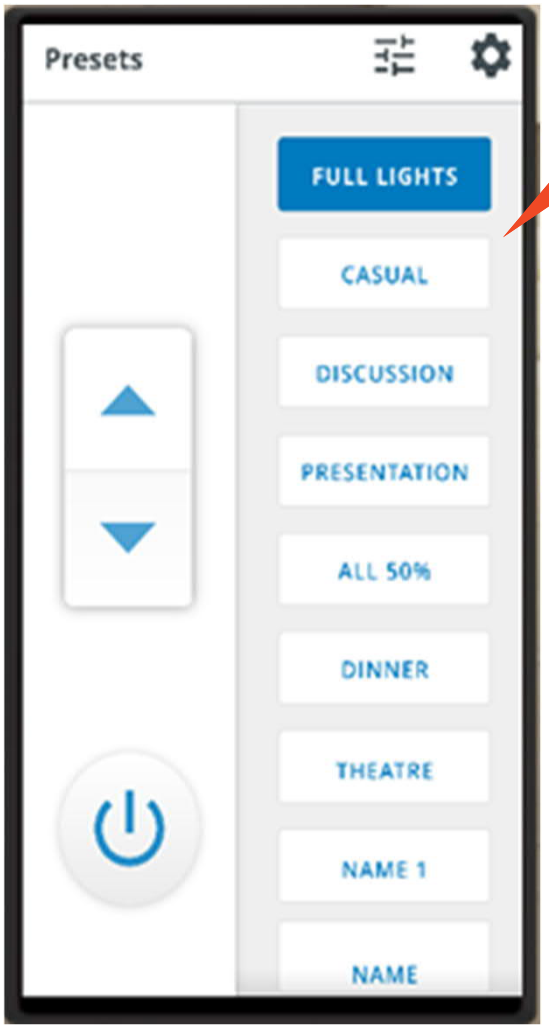


Four (4) button hardware options – fully programmable – no wiring required

WaveLinx Touchscreen

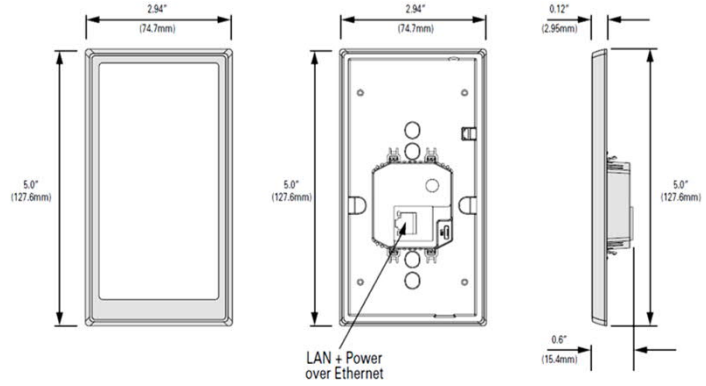
New Elegant and Discreet Touchscreen

- Area / Zone / Scene Control
- Favorite Area Selector
- Area selector
- Easy to configure



5.7” (diag) size

TSE57-WLX-B

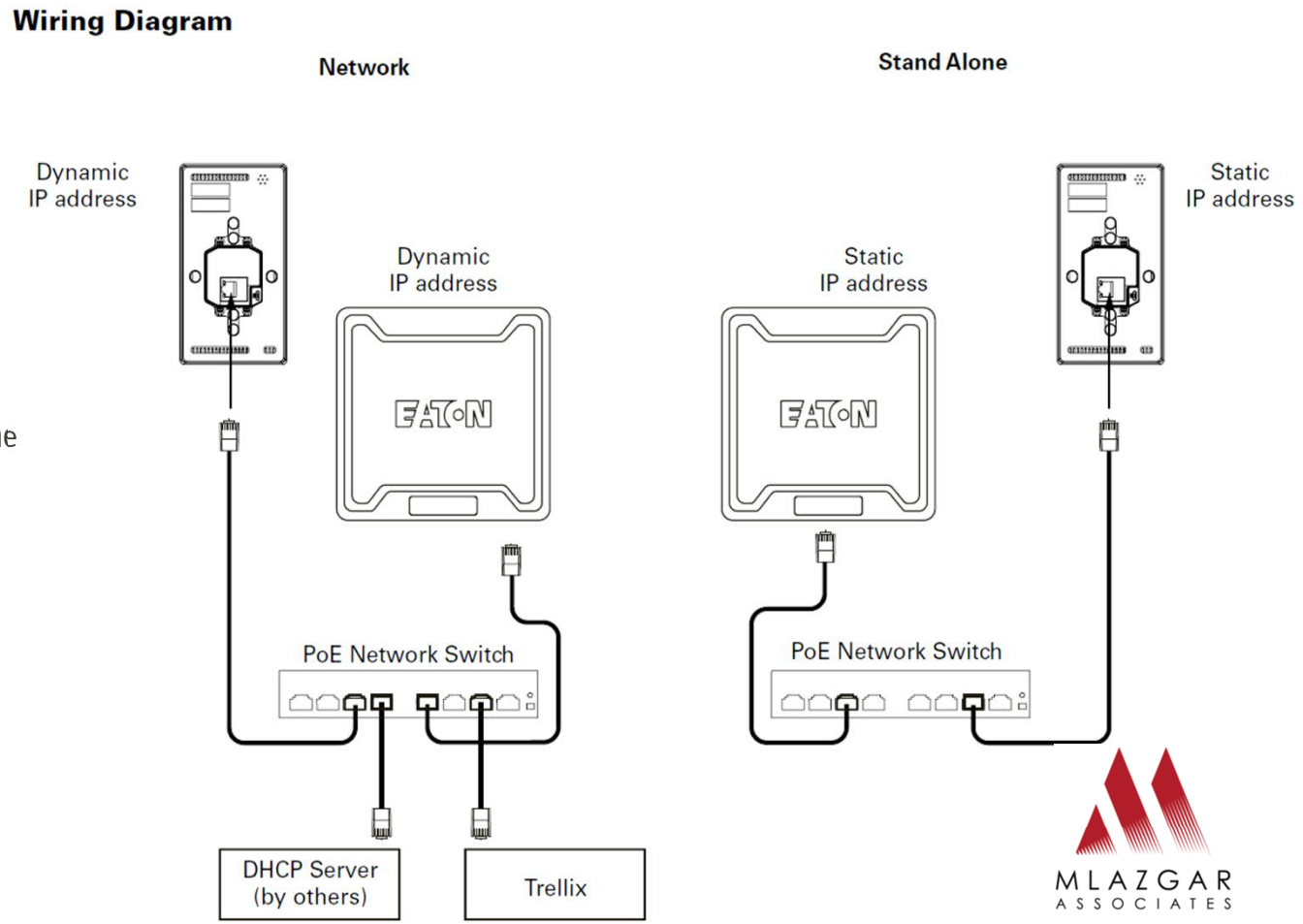


WaveLinx Touchscreen – Wiring

Design Considerations

Compatible with standalone or network applications

- A touchscreen can be associated to only one (1) WAC
- Each WAC can have up to 16 WaveLinx Touchscreens
- Area browsing option limited to the areas defined within the WAC



WaveLinx Control Devices – Receptacles

Plug Load Control

WR-15

WR-20

IEEE 802.15.4

Device Security

Customer Security

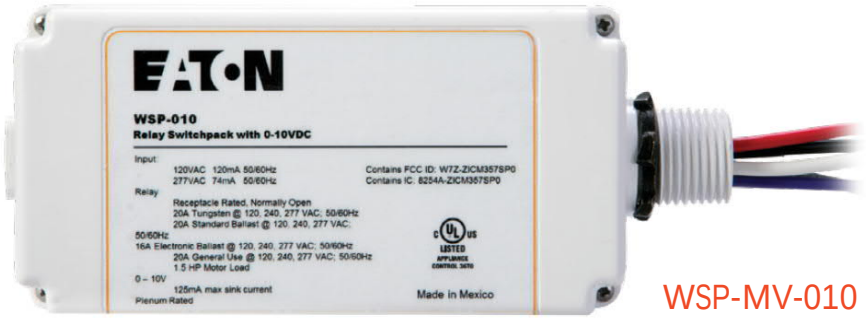
Receptacle Control

- Simplified plug-load control
- Loads up to 20A
- Drag and drop programming
- Energy calculations through Trellix

Simplified plug load control - wireless controlled receptacle, internal relay

WaveLinx Control Devices – Dimming Switchpacks

Dimming Switchpack



WSP-MV-010

IEEE 802.15.4 | Device Security | Customer Security | Receptacle Control

- 120-277VAC, 20 amp relay
- 0-10V continuous dimming control
- Installs to junction box through ½" KO
- Out of the box / default 70% light level
- Energy calculations through Trellix

347V Dimming Switchpack

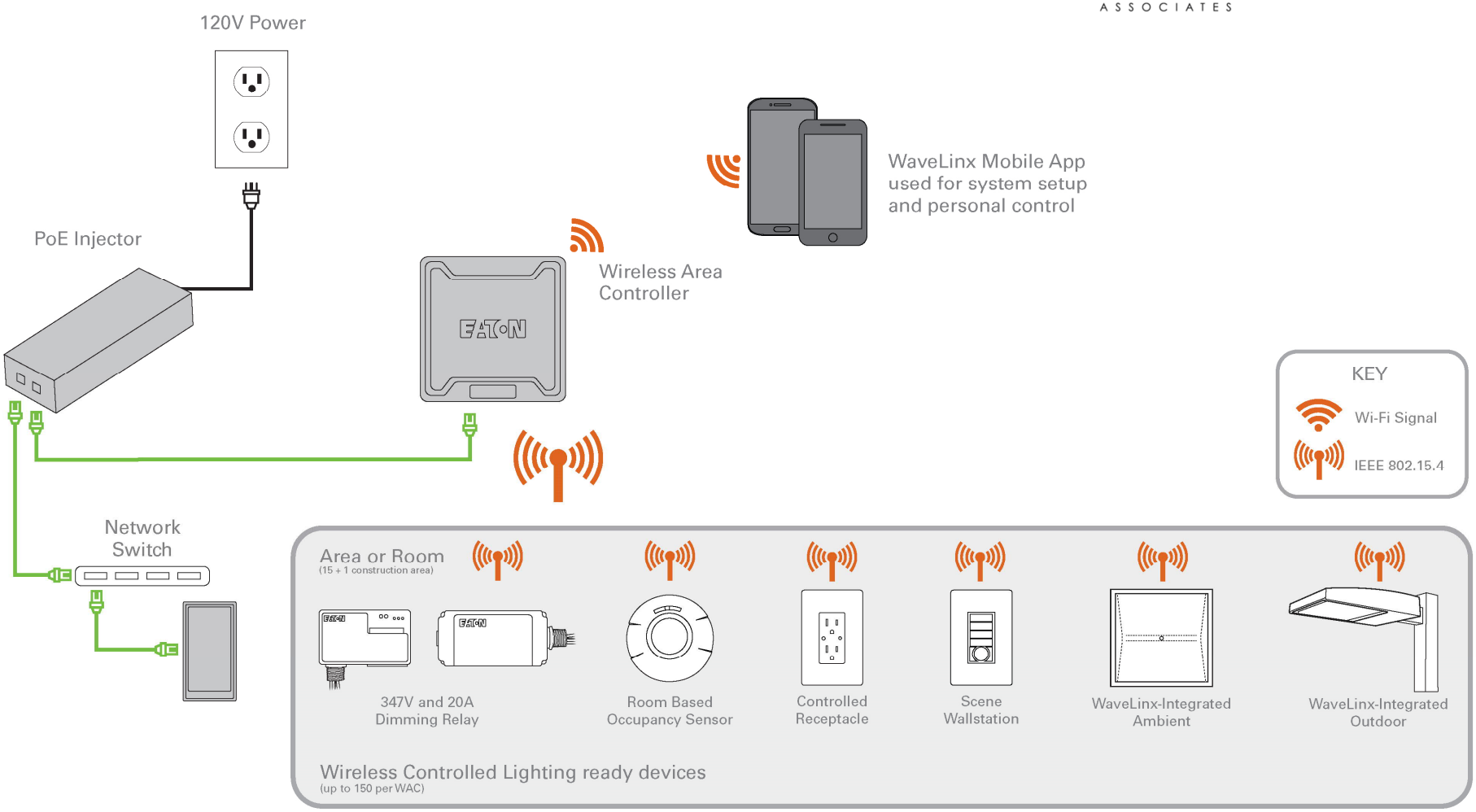
WSP-CA-010

IEEE 802.15.4 | Device Security | Customer Security | Receptacle Control

- 120-347VAC, 20 amp relay
- 0-10V continuous dimming control
- Installs to junction box through ½" KO
- Out of the box / default 70% light level
- Energy calculations through Trellix

Fixture agnostic– 20 amp relay with 0-10V continuous dimming

WaveLinx System Topology



WaveLinx Control Devices – Ambient Sensors

Integrated

WAA

IEEE 802.15.4 | Device Security | Customer Security | Daylighting Control | Occupancy Sensor

- Passive InfraRed (PIR) motion sensing
- Photocell closed-loop daylight sensing
- Bluetooth beacon for IoT*
- 8-12ft mounting heights

* - upgrade required

Room

CWPD-1500

IEEE 802.15.4 | Device Security | Customer Security | Daylighting Control | Occupancy Sensor | Battery Powered

- Surface or magnetic mounting
- Passive InfraRed (PIR) motion sensing
- Photocell open-loop daylight sensing
- 8-12ft mounting heights
- Two (2) AA alkaline batteries (up to 7 years)

Tile / Junction Box

WTA

IEEE 802.15.4 | Device Security | Customer Security | Daylighting Control | Occupancy Sensor

- Easily enable 0-10V luminaires
- 120-277VAC, 3 amp relay with 0-10V dimming
- PIR motion and closed loop photocell
- Tile and J-box mounting options included
- Bluetooth beacon for IoT*
- 8-12ft mounting heights

Flexible sensing options - Integrated ambient, standalone ceiling, tile mounted kit

WaveLinx Control Devices – Outdoor / Industrial Sensors

Outdoor NEMA 7

WOLC-7P-10A

IEEE 802.15.4 | Device Security | Customer Security | Daylighting Control

- Fits standard NEMA-7 receptacles
- Photocell open-loop daylight sensing
- Out of the box dusk to dawn operation
- Schedule, astro clock, manual control
- Energy calculations through Trellix

Outdoor Integrated

SWPD4 / SWPD5

IEEE 802.15.4 | Device Security | Customer Security | Daylighting Control | Occupancy Sensor

- Integrated, field installed, upgradable
- White, bronze, and black color options
- Out of the box functionality
- Motion sensing and closed loop daylighting
- Mounting heights to 40 feet
- Included configurable aisle shield
- Energy calculations through Trellix

Industrial Integrated

SWPD3

IEEE 802.15.4 | Device Security | Customer Security | Daylighting Control | Occupancy Sensor

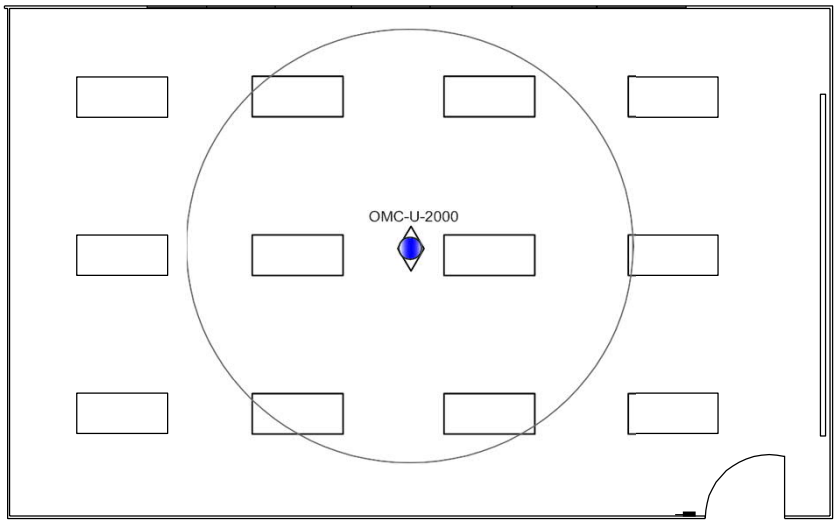
- Integrated, field installed, upgradable
- Out of the box functionality
- Motion sensing and closed loop daylighting
- Mounting heights to 40 feet
- Included configurable aisle shield
- Energy calculations through Trellix

Expanding WaveLinx applications beyond the office

Why Integrated Sensors?

- Large area sensors have limited minor motion coverage throughout the room.
- Placement of sensors near HVAC can cause false activations.
- Initial activation of lights upon entry is difficult in larger rooms.

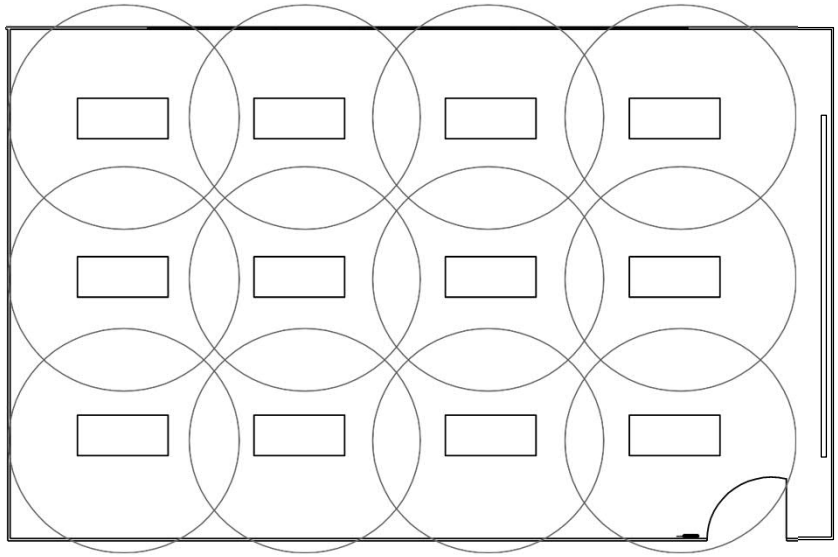
Room Based Sensors



Why Integrated Sensors? Better occupant experience

- No additional labor to install integrated sensors
- Sensors will not be false activated by HVAC.
- Minor motion coverage saturates the entire room allowing for shorter time delays, saving additional energy.
- Sensors can be grouped together and be associated with additional sensor groups.

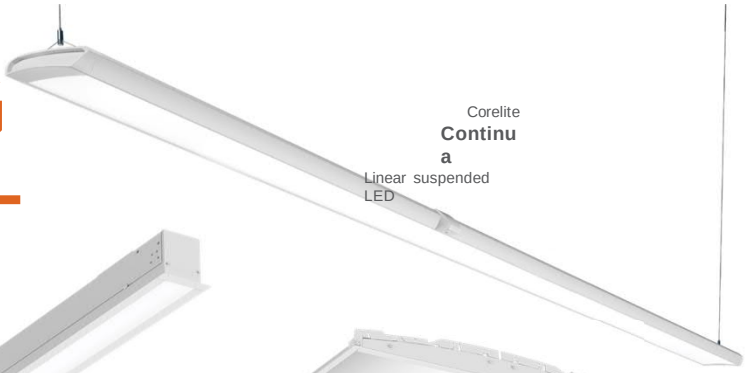
WaveLinx WCL



LIGHTING PRODUCT

WaveLinx wireless 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



Corelite **Continua** Linear suspended LED

Neo-Ray **Define Gen 2** Linear recessed LED

Corelite **Bridge** Architectural recessed WaveStream LED

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

Architectural lighting

Integrated sensors

Sensing | Daylighting | Individual | Grouping

Corelite **Divide** Suspended WaveStream LED

Corelite **Jaylum** Suspended LED

RSA **MRZ** Architectural recessed integral LED

www.WaveLinxConnect.com

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Ambient lighting

Integrated sensors
Sensing | Daylighting | Individual | Grouping

Metalux
WSL
Linear surface / suspended series WaveStream LED

Metalux
SkyRidge
Recessed ambient WaveStream LED

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

Metalux
Encounter
Recessed ambient WaveStream LED

Metalux
Cruze & Cruze Retrofit Kit
LED recessed ambient

Metalux
Arcline
Architectural recessed ambient

Metalux
FR
LED recessed ambient

Recessed lighting

Tile Mount Sensing

Halo
PD6
LED recessed downlight
(wireless control)

Portfolio
LDSQA4A
LED square adjustable accent/slope
(wireless control)

Portfolio
LD4A and LDSQ4A
Round and square recessed downlight
(wireless control)

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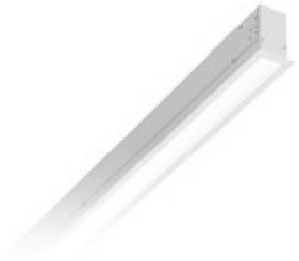
Architectural –
WaveLinx Integrated Luminaires



Neo-Ray
Define Gen 2
Linear recessed LED

Corelite
Bridge
Architectural recessed
WaveStream LED

Corelite
Continua
Linear suspended LED

RSA
MRZ
Architectural recessed
integral LED

Corelite
Divide
Suspended
WaveStream LED

Corelite
Jaylum
Suspended LED

Corelite
Iridium
Linear suspended
WaveStream LED

Metalux
Steeler
High bay
LED

Metalux
ILED
LED Linear
Bay

Industrial lighting

Integrated sensors
Sensing | Daylighting | Individual | Grouping | Motion

Metalux
VHB
High bay
LED

Metalux
Optimized
HB High bay
LED

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 2500 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:
ZW-SWPD3 - Fixture Mount High Bay Sensor, 15 - 40ft (4.5 - 12.2m)

Metalux
HBLED
High bay
LED

Metalux
Benchmar
k
High bay LED

Industrial fixture options are available in WaveLinx "ready" or fully integrated options

www.WaveLinxConnect.com

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ASSOCIATES

WaveLinx – Industrial Integrated Luminaires
(SWPD3)

Metalux
Optimized HB
High bay LED

Metalux
VHB
High bay LED

Metalux
HBLED
High bay LED

Metalux
ILED
LED Linear Bay

Metalux
Steeler
High bay LED

Metalux
Benchmark
High bay LED

Outdoor lighting

Sensing | Daylighting | Individual Grouping | Motion | Astronomic

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:
ZW-SWPD4xx - Outdoor Fixture Mount Low Bay Sensor, 7 - 15ft (2.1 - 4.5m)

ZW-SWPD5xx - Outdoor Fixture Mount High Bay Sensor, 15 - 40ft (4.5 - 12.2m)

xx - available in white (WH), bronze (BZ), and black (BK)

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

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

Galleon LED
Area and site, Wall, PC and Pend

Arbor LED
Area and site

Impact Elite Cylinder LED Wall

Prevail/Prevail XL
Area and site

Luxescape LED
Area and site

Outdoor fixture options are available in WaveLinx "ready" or fully integrated options

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WaveLinx Outdoor Integrated Luminaires
(SWPD4 / SWPD5)

Galleon LED
Area and site,
PC and Flood

Galleon LED
Wall

Impact Elite Cylinder LED
Wall

Arbor LED
Area and site

Prevail/Prevail XL
Area and site

Luxescape LED
Area and site

Ambient & Recessed – WaveLinx Integrated Luminaires

Metalux
SkyRidge
Recessed ambient
WaveStream LED

Metalux
Encounter
Recessed ambient
WaveStream LED

Metalux
Arcline
Architectural
recessed ambient

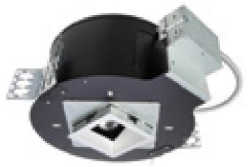
Metalux
Cruze &
Cruze Retrofit Kit
LED recessed ambient

Metalux
FR
LED recessed
ambient

Metalux
WSL
Linear surface / suspended series
WaveStream LED

Recessed lighting

Tile Mount Sensing



Portfolio
LDSQA4A
LED square adjustable
accent/slope
(wireless control)

Halo
PD6
LED recessed
downlight
(wireless control)

Portfolio
LD4A and LDSQ4A
Round and square
recessed downlight
(wireless control)

MLAZGAR ASSOCIATES

WaveLinx Wireless Fixture

Product Features

- No 0-10V wiring required
- WaveLinx mobile app
- Energy calculations available through Trellix
- No visible sensor

WaveLinx Wireless Fixture

Lighting fixtures

Choose from the bestselling, state-of-the-art LED lighting fixtures

Metalux
SkyRidge (SR)
1x2, 1x4, 2x2, 2x4
LED recessed ambient

Metalux
Cruze ST
1x4, 2x2, 2x4
(service from above)
LED recessed ambient

Metalux
RLN
1x4, 2x2, 2x4
LED recessed ambient

Metalux
Cruze SB
1x4, 2x2, 2x4
(service from below)
LED recessed ambient

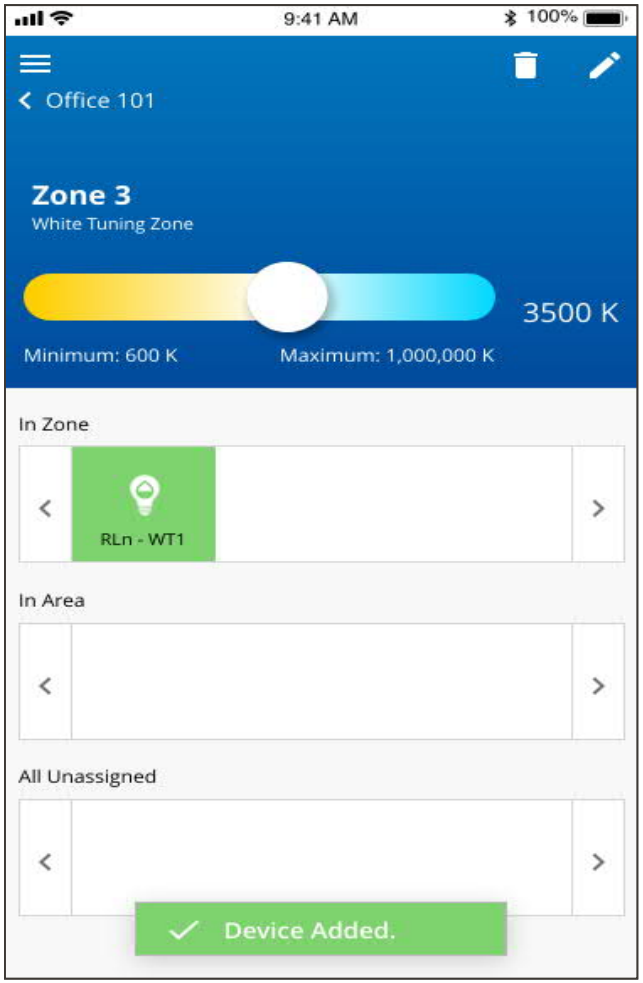
Metalux
Encounter (EN)
1x2, 1x4, 2x2, 2x4
LED recessed ambient

Metalux
Flat Panel (FPX)
1x4, 2x2, 2x4
Ultra-thin LED panel

Metalux
GRLED
1x4, 2x2, 2x4
LED recessed ambient

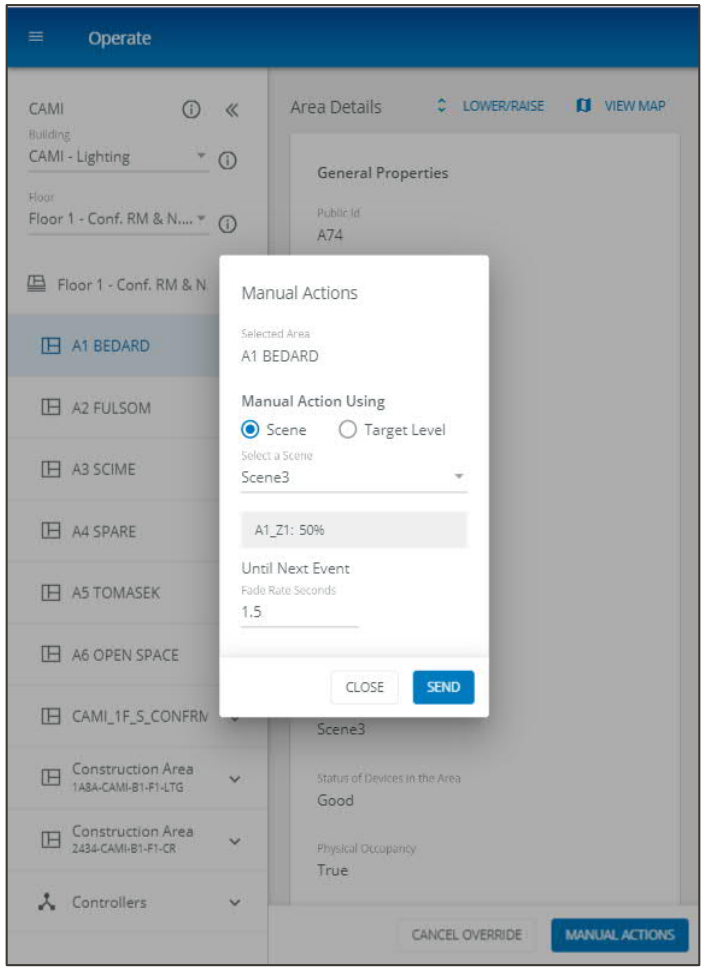
MLAZGAR ASSOCIATES

White Tuning with VividTune

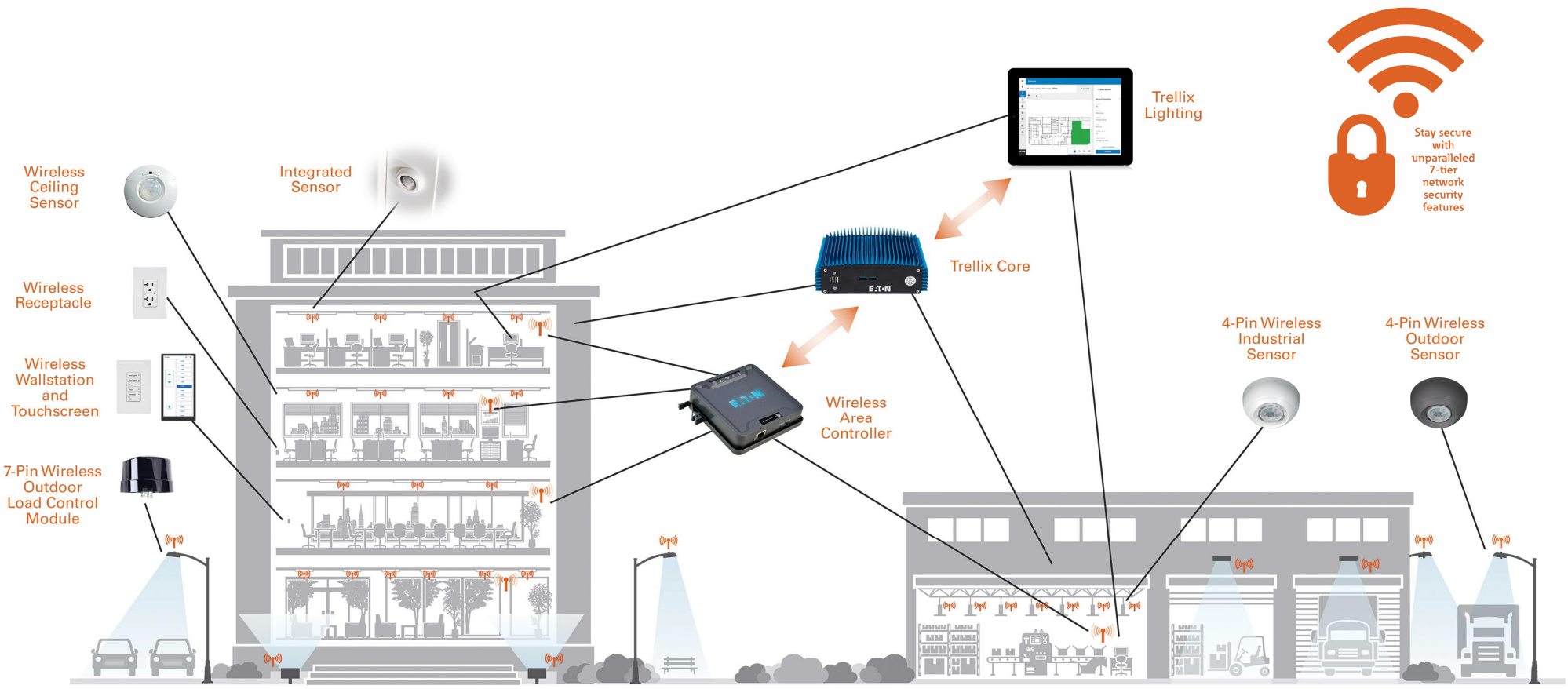


White tuning is here!

- Flexible Configuration
- High and low end trim for CCT
- Copy/Paste – Reduces the programming time by re-using an existing area's settings.

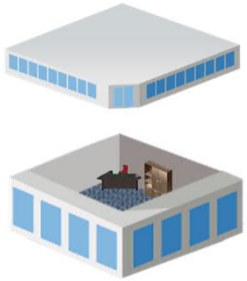


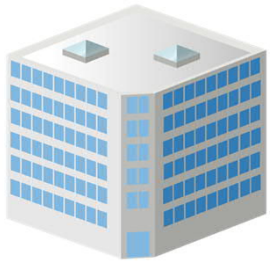
WaveLinx and Trellix System Overview

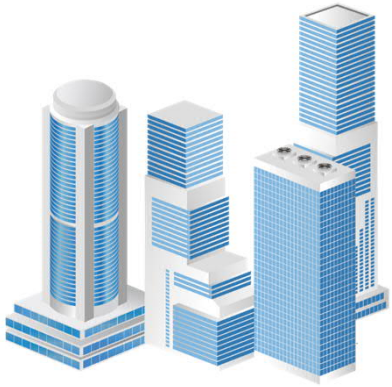


WaveLinx Scalability

Gateways	1 WAC	20 WACs	500 WACs
Devices	150	3,000	75,000
Software	Mobile app	Trellix Core Pro	Trellix Core Enterprise







WaveLinx easily expands from 1 to 75,000 devices

Control 150 devices for rooms and a single **floor**

Add Trellix and control over 3,000 devices for a **building**

Use a Trellix server (on-prem or virtual) and control over 75,000 devices for a **campus**

Trellix Core (physical and virtual hardware)

Trellix Core Pro

(up to 20 Wireless Area Controllers)

TRX-TCPRO2 (base software, BACnet, API for 250 nodes)

Trellix Core Enterprise

(up to 500 Wireless Area Controllers)

TRX-TCENT2 (base software, BACnet, API for 250 nodes)

Virtual Trellix Core Enterprise

(up to 500 Wireless Area Controllers)

TRX-TCVRT2 (base software, BACnet, API for 250 nodes)

Insight Manager is now Trellix Core!

Includes Operate with floorplan, Dashboard, Scheduling, Alarms, Building Hierarchy, Floorplan Editor, Device Hierarchy, System Management

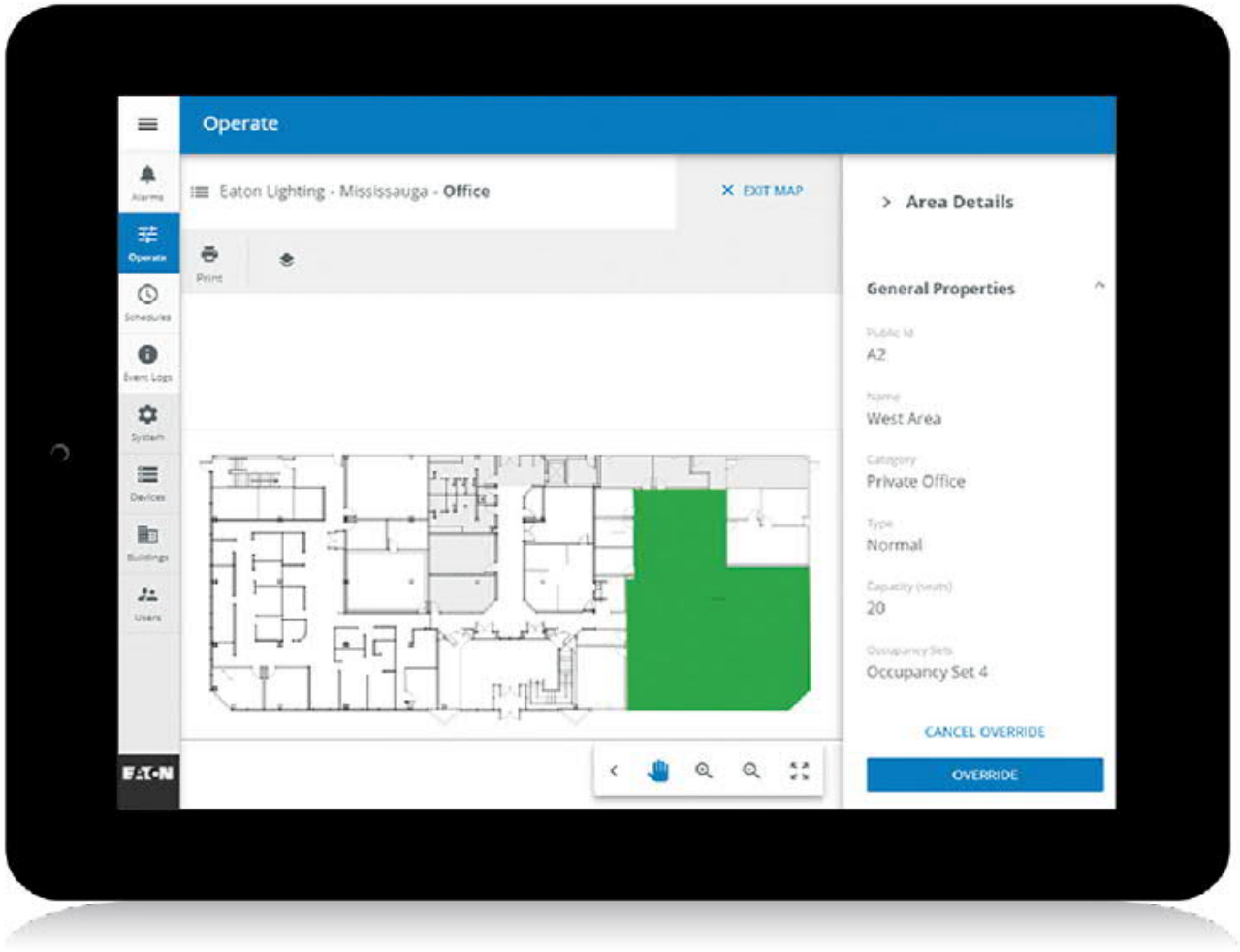
WaveLinx Software Applications

Trellix

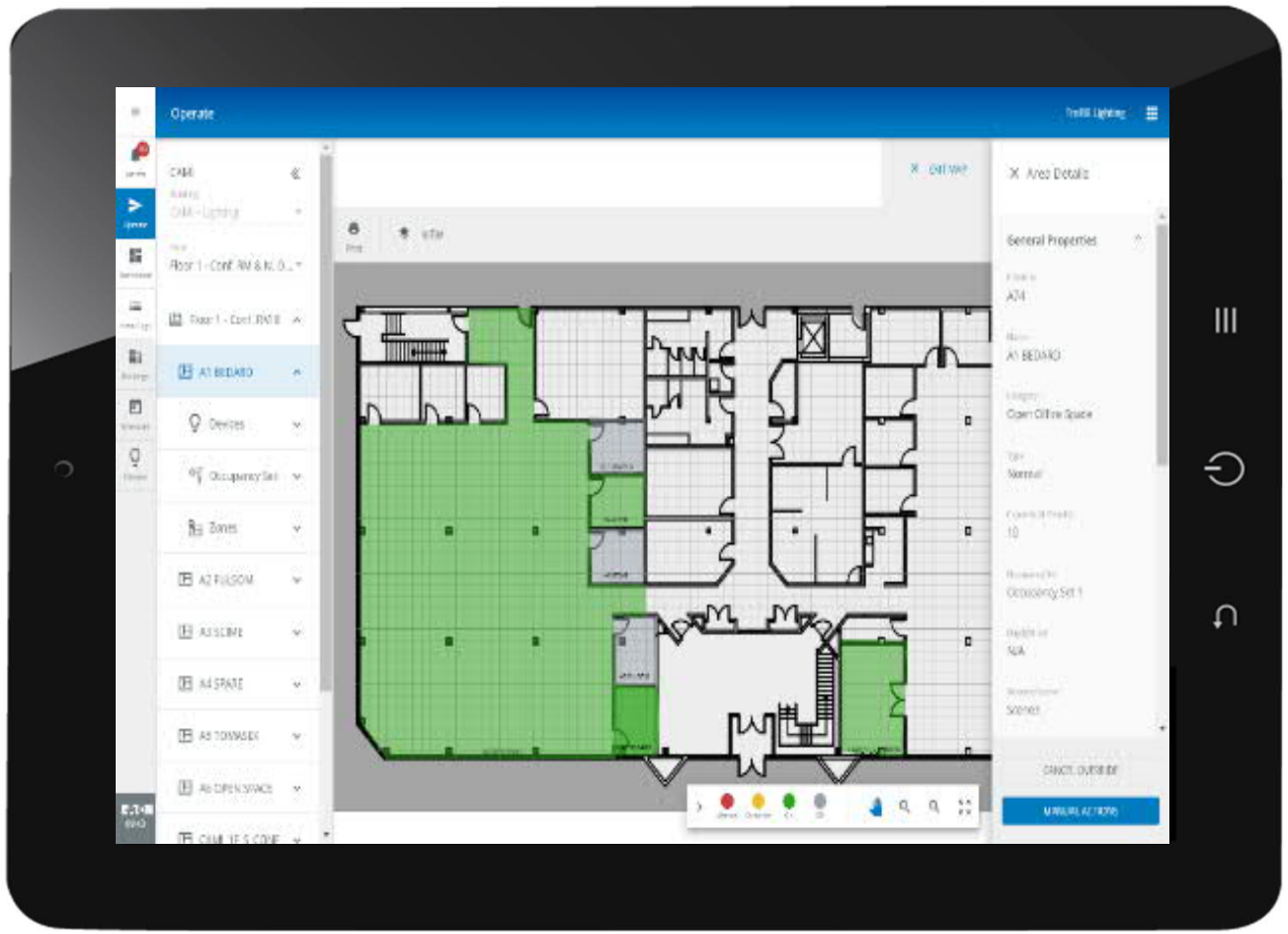
Enterprise | IoT | BACnet | API Integration

Connects WaveLinx with other building systems using BACnet and Public API.

Trellix also includes alarms with smart tips, system events, demand response, platform flexibility.

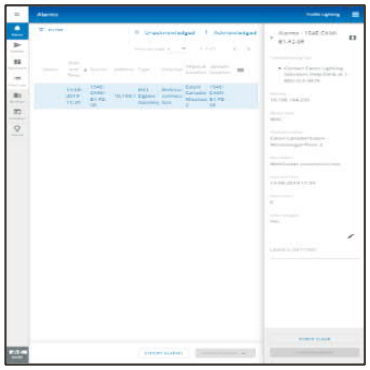


Trellix – Interface

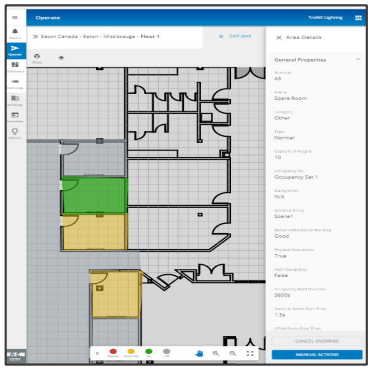


- Web-based application
- WaveLinx UX design – Same user experience across all software applications
- Designed for touch – Using your tablet or laptop

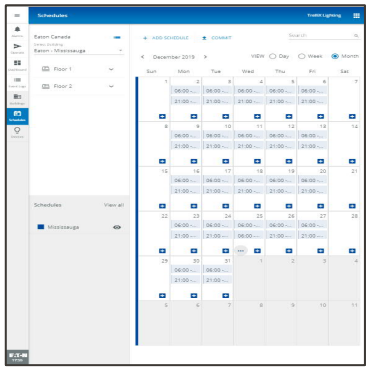
Trellix Lighting



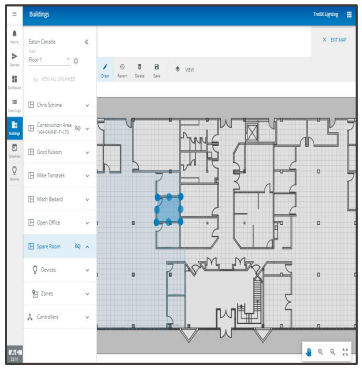
Alarms with Smart Tips
Get real-time notification on the Alarms console.



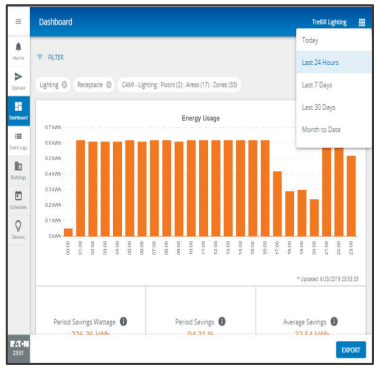
Manual Actions



Schedule
Manage the lights and controlled receptacles

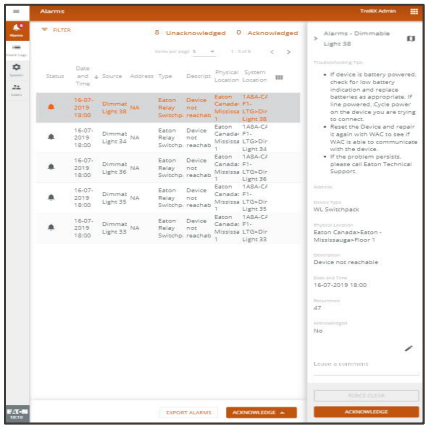


Floorplan Editor
Manage your floorplan



Dashboards
Improve your lighting system efficiency with better visibility and analytics.

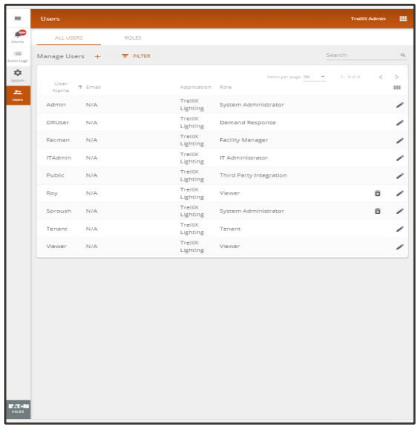
Trellix Admin



Alarms

View the health of the platform, the devices connected to the platform and any notifications generated by the Trellix applications.

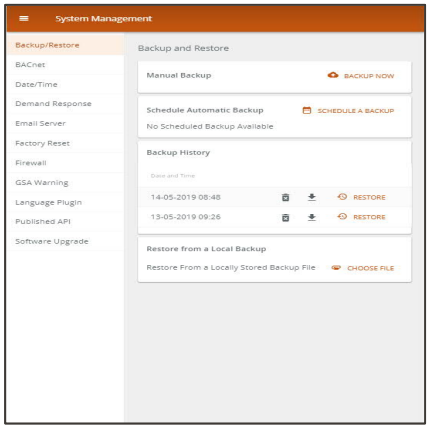
Alarms come with troubleshooting tips that allow users to troubleshoot the fault.



User Management

Manage users including their access to the applications, their roles for each application as well as their area of responsibility.

Create custom roles and assign permissions to the roles.

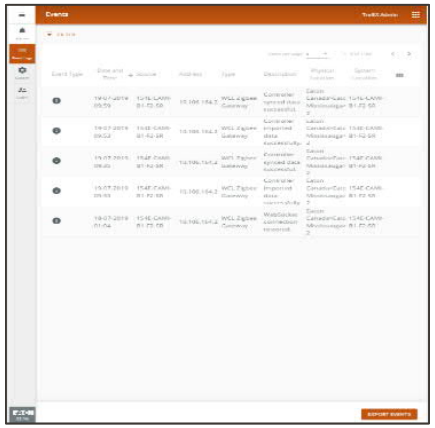


System Management

Configure the systems general settings such as time, network address and email server. Manage the various interfaces.

Enable/disable and test Demand Response.

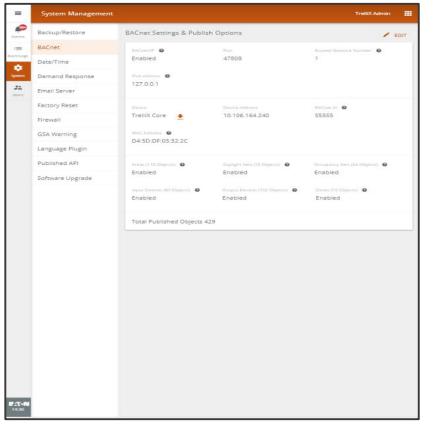
Upgrade, backup and restore the Trellix Core database and area controllers.



Events

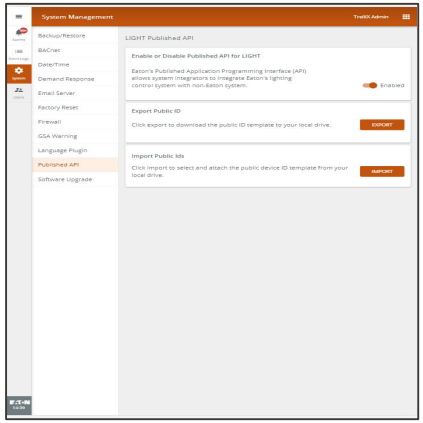
View notifications (past alarms and notifications) generated by all systems/apps. The notifications can be exported for analysis as csv output.

Trellix Exchange



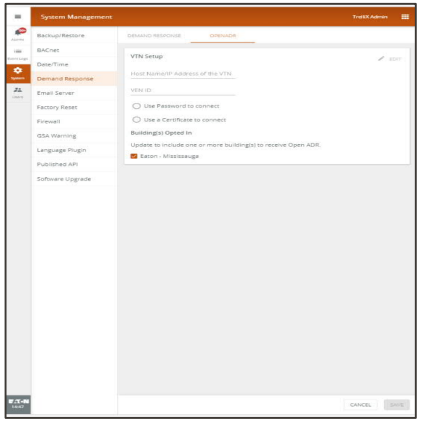
BACnet/IP Interface

Unlock the value of your connected lighting system by sending data (light level, occupancy, power consumption, device status, etc...) from your Wavelinx system to your Building Automation System.



Public REST API

Unlock the value of your connected lighting system by sending data (light level, occupancy, power consumption, device status, etc...) from your Wavelinx system to your Building Internet of Things (BIoT) platform.



OpenADR

Use OpenADR to receive demand response signals from utility company to all connected area controllers.

Trellix 6.3 – Dashboard

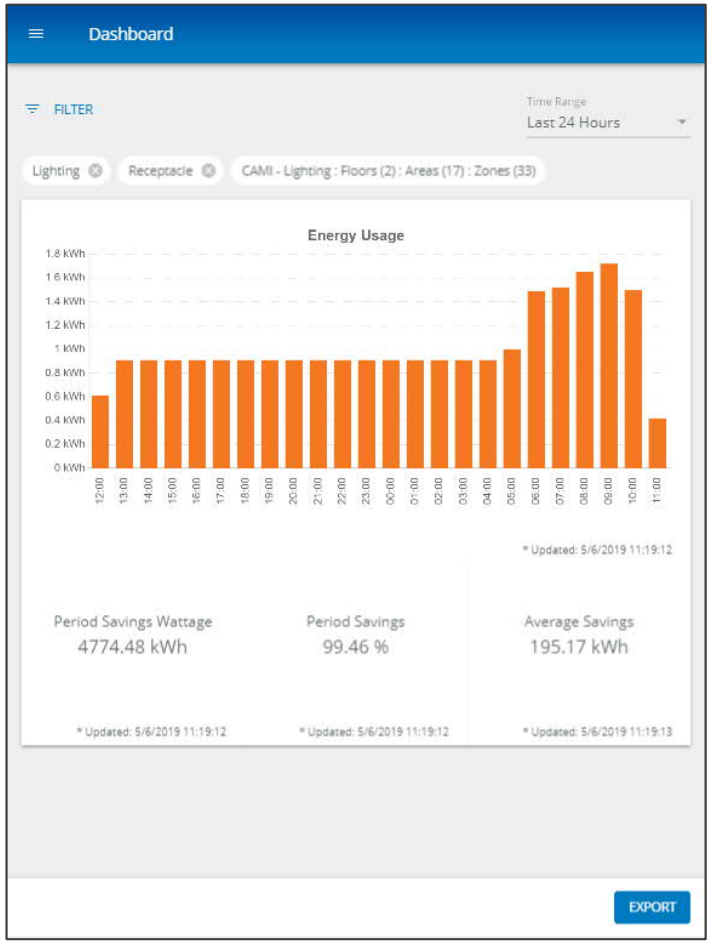
An all-new Dashboard

Energy Dashboard – Pre-configured energy dashboard providing users with insight with their building(s) energy usage and energy savings.

Smart filter option – Allows users to view the energy usage based on specific time period and building hierarchy.

Technical Details

- Devices sending energy/power data to WAC every 5 minutes
- Energy data calculated at WAC level
- Energy data sent to the Trellix Core every 15 minutes
- Time series data stored within Trellix Core for 13 months

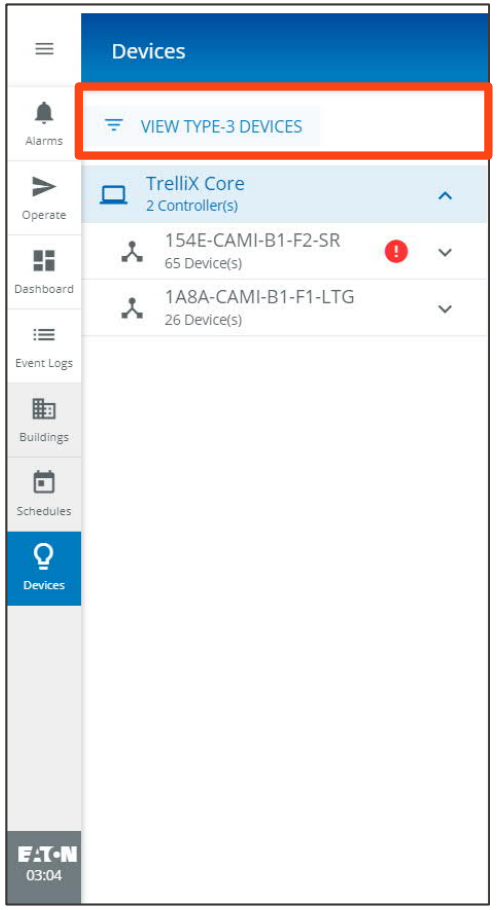


WaveLinx – Energy Usage

Supporting both measured and calculated methods

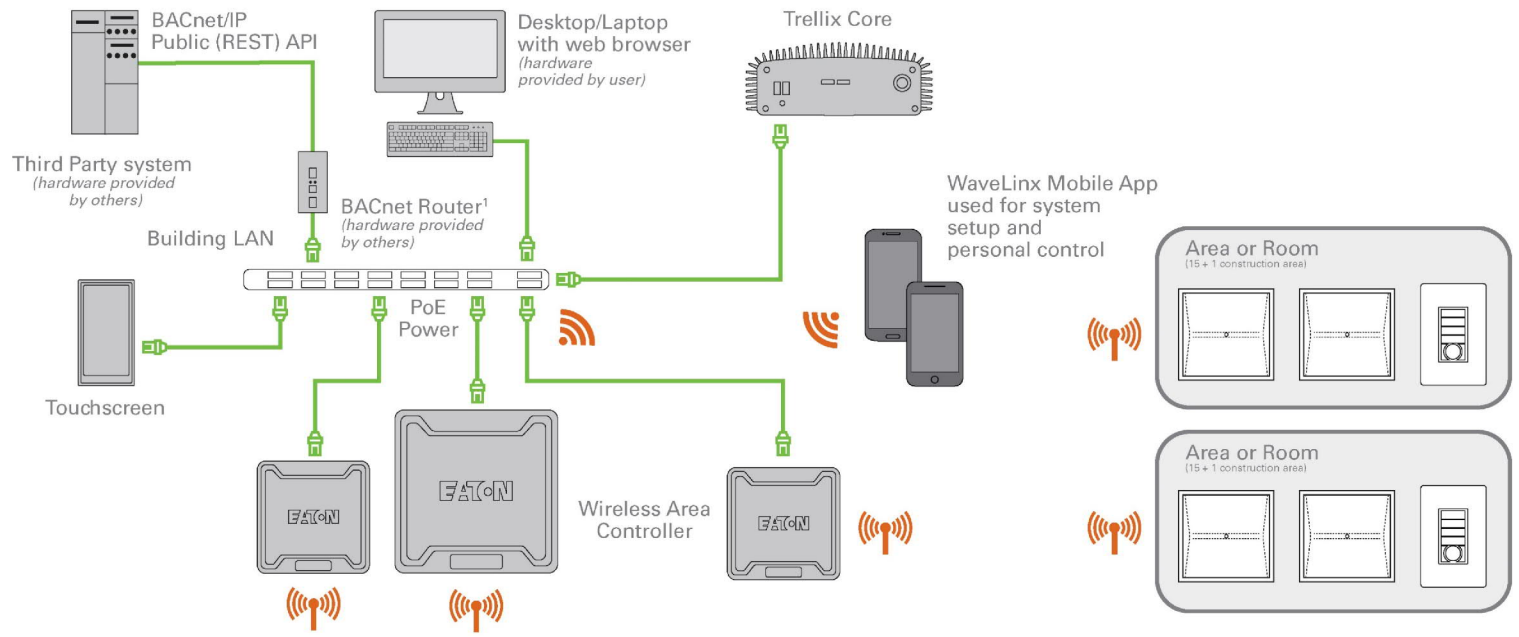
The Wireless Areas Controller calculates the energy usage for an area based on the data received from the devices connected to it:

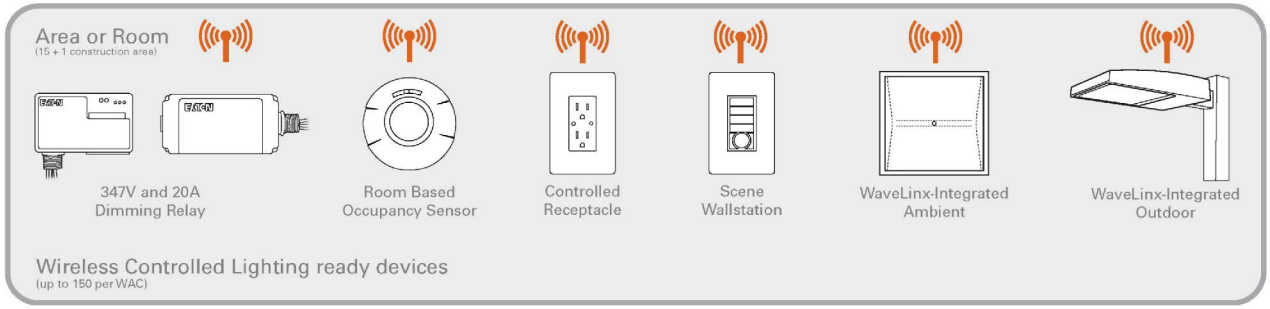
- Type 1 – Devices with integrated energy metering: Metalux ≤50W integrated sensor
- Type 2 – Devices with integrated power metering: Integrated sensor fixtures other than Type I, Wireless switchpacks (WSP-MV-010), Wireless receptacles
- Type 3 – Devices with user input calculated energy - WaveLinx wireless fixtures, WOLC, Wireless switchpacks (WSP-CA-010), outdoor & industrial fixtures



WaveLinx network installation

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





KEY

Wi-Fi Signal

IEEE 802.15.4

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.

WaveLinx Security

Physical Security

- Isolated architecture
- Physical access

Customer Security

- Customer security partnership
- NIST-recommended best practices

Device Security

- AES 128-bit encryption, recommended by NIST as part of FIPS publication 197.

Network Security

- Secure HTTPS (TLS1.2) protocols
- Secure WPA2 technology
- Mobile application uses HTTPS (TLS1.2)

Network Segmentation

- Small target potential
- Segmentation of networks

OTA Update Security

- Digitally signed OTA

Eaton COE Assurance

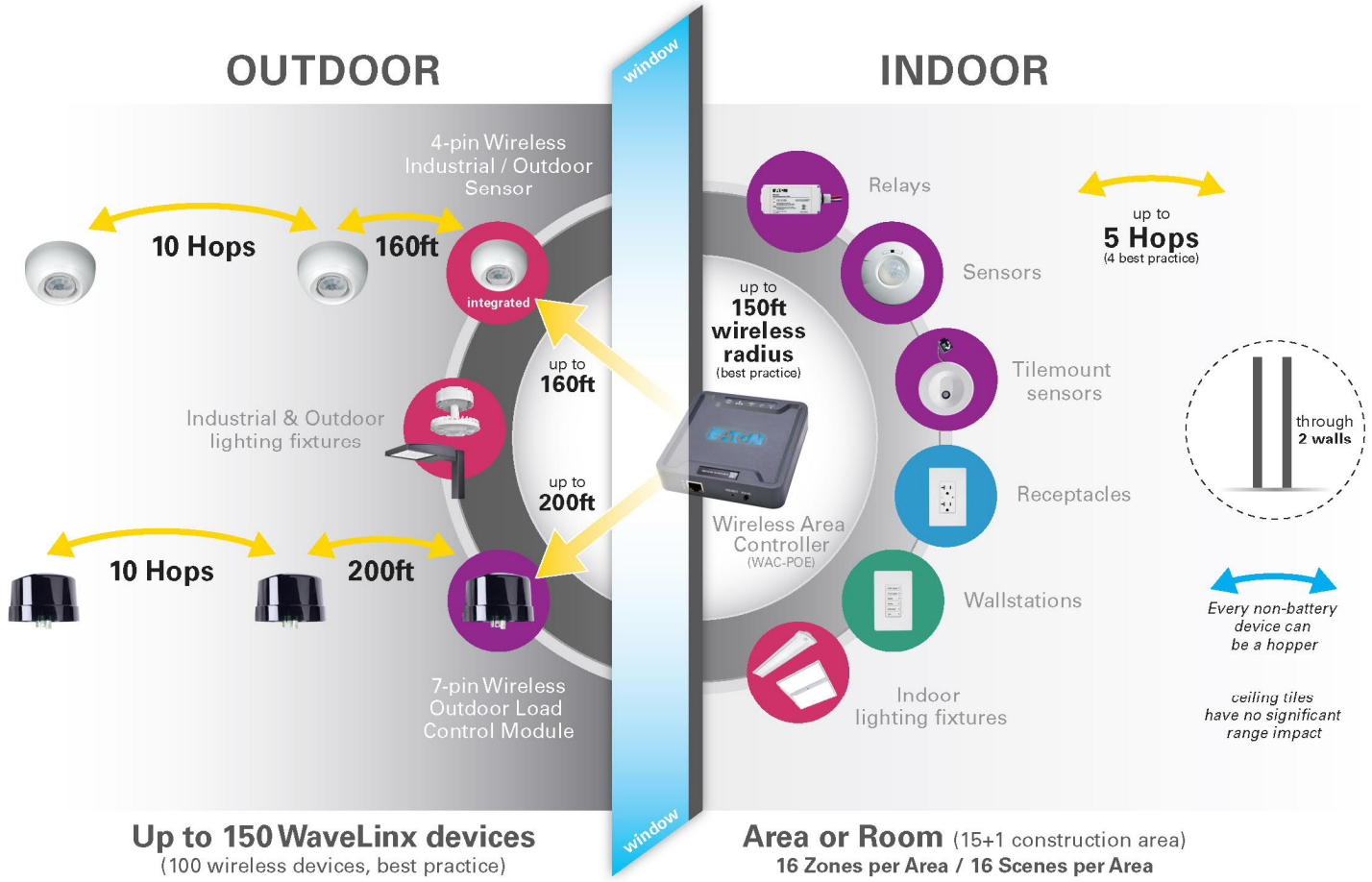
- Guidance and assurance
- Public resource

Security must be a part of the conversation

WaveLinx Security

First lighting control product certified to UL 2900 cybersecurity standard

WaveLinx Installation Rules

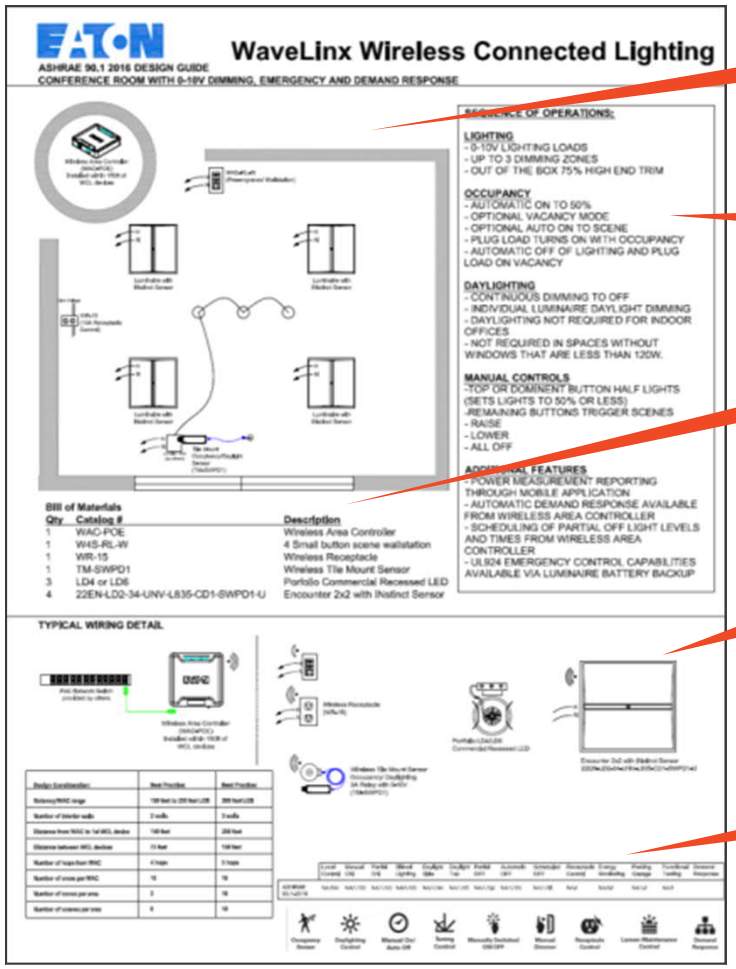


WaveLinx – Design Guide Examples

IECC-2015, ASHRAE 90.1-2016, T24-2016

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



Plan

Operation

Bill of materials

Fixture selection

Code details

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What about controls for GUV lighting?

UL1598, it’s new! But it’s not.

Examples of current germicidal UVC devices

Products that UL will certify for safety.

Products that UL is unwilling to certify for safety due to high risk.

Type of UVC Device	Sample Image	Environment	Assessing the risks	Safety Certification(s)
Home use portable sterilizer Marketed to clean a room in the home		Consumer	UVC is NOT contained - not safe for a home setting There is too great a risk that people and pets could accidentally be exposed to UVC and be injured, and ozone may be emitted. The exposure dose to people can be far above accepted levels and can cause injury. Integral timers or proximity and orientation sensors pose concerns with accuracy and reliability of these safeguards, as well as opportunities for misuse or bypass	NOT eligible for certification for consumer use
Personal portable sterilizer/wand Marketed to be hand held and moved over surfaces to sterilize		Consumer		NOT eligible for certification for consumer use; for commercial and healthcare applications contact UL to discuss
Home use air cleaners with internal (contained) UVC Marketed to homes and offices		Consumer	UVC is contained The UVC source is inside the product enclosure and a safeguard disables the UVC when an access door is opened	UL 507 for electrical investigation; standard includes personal injury requirements for UVC based on ANSI RP-27 for photobiological assessment
Portable and stationary UVC sterilization boxes		Consumer and Commercial	UVC is contained The UVC source is inside the enclosure; opening the door will disable the UV source. Testing would ensure that any 'UV leakage' will be within safe exposure dose limits	UL 73 for electrical investigation; includes personal injury requirements for UVC based on ANSI RP-27 for photobiological assessment. UL 62368-1 (or 60950-1) may also apply.
Upper room (UVGI) Mounted out of easy typically 2.1m (7 feet) from floor		Commercial	UVC containment is achieved based on product design features plus site safeguards Unlike typical luminaires, these have construction features that direct UV energy away from the occupied space	UL 1598 for electrical investigation IEC 62471 for photobiological assessment
Commercial/industrial heating & ventilation May also be found in home settings		Commercial	UVC is contained inside the air duct and not visible Access is restricted to qualified personnel during installation and service. The design also includes other product safeguards such as ON/ OFF switch and interlock switch	UL 1598 (or UL 153) and UL 1995 for electrical investigation; UL 1995 includes personal injury requirements for UVC based on ANSI RP-27 for photobiological assessment
Water treatment UVC disinfects the water as an alternative to chlorination		Commercial	UVC is contained inside a water vessel and not visible Access is restricted to qualified personnel during installation and service	UL 979 for water treatment equipment ANSI RP-27 for photobiological assessment
Mobile UVC sterilizer/ equipment sterilization		Healthcare and Commercial	UVC containment is achieved by limiting access to the space so people are not present during operation In addition, the equipment includes reliable safeguards and is operated by staff with training for its proper use	In healthcare settings - UL 61010 for electrical investigation; the standard references IEC 62471 for photobiological assessment to address personal injury concerns for UVC In commercial settings - UL 73 for electrical investigation; standard includes personal injury requirements for UVC based on ANSI RP-27 for photobiological assessment
Permanently installed/hybrid lighting systems Have UVC or UVC and regular lights		Healthcare and Commercial	UVC containment is achieved based on product safeguards, trained staff and site safeguards	UL 1598 for electrical investigation IEC 62471 for photobiological assessment
UVC mobile units Used to decontaminate surgical equipment between procedures		Healthcare	UVC containment is achieved based on product safeguards, trained staff and site safeguards	UL 61010 for electrical investigation; the standard references IEC 62471 for photobiological assessment to address personal injury concerns for UVC
UVC lamps and components Ballasts, LED drivers, UVC sources, controls, sensors, etc.		Components	Components for use in UV devices and lamps (bulbs) can be certified; contact UL to discuss the specific use and design, and intended operation (within luminaires or only within equipment designed specifically for germicidal applications)	Multiple, as applicable

Always follow device labeling and manufacturer recommendations for appropriate settings, use restrictions, recommended PPE (if applicable), and required training. Don't see your product type here? We can help. Contact us today.

Empowering Trust®

Consumer

Commercial

Health Care

"Containment"

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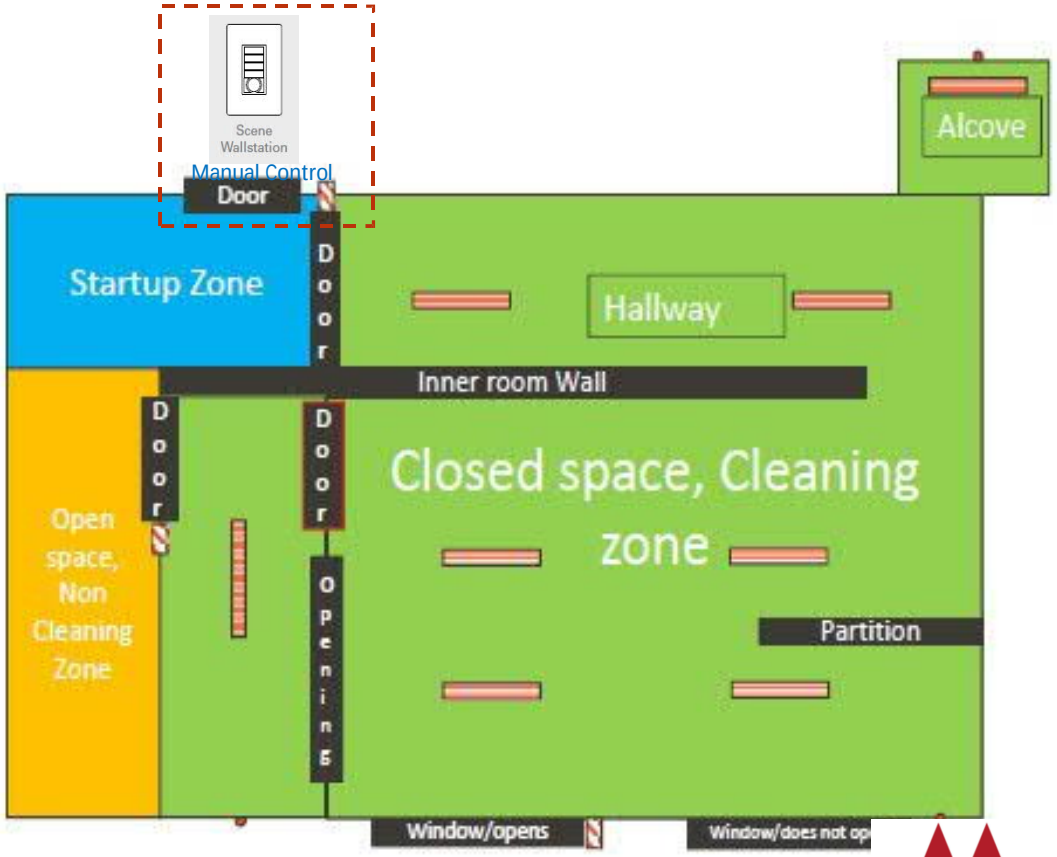
Essential Safeguards - Generic Example

Open space – areas not enclosed completely on all sides if all doors and windows are closed. Not suitable for GUV luminaires.
Closed space – areas that can be completely enclosed and a boundary defined.
Doors - reliable enclosures with common door materials such as wood, metal, opaque plastics.
Windows – standard window glass blocks UVC emissions
Openings – openings that are not for doors/windows with an example of a food service window opening.
Partitions - a wall feature potentially creating an alcove.
Gates – interlocked areas without a door (not commonly used – special cases only)
Alcoves – Areas not easily seen when verifying no one is present in the cleaning zone
Hallways – open areas connecting rooms
Startup zone – location outside of enclosed, radiated area
Cleaning zone– radiated area while GUV luminaires are powered and interlocks are closed
Trained user – Person trained the exposure risks, operating the system, verifying upon cleaning no one is in the cleaning zone and is responsible for deactivating the system when done cleaning.
Commissioner – person who verifies system is operational and validates all push-buttons and interlocks operate as intended upon installation
Maintenance – Lamp replacement (from FL instructions)
Interlocks – essential safety component for the system.
Push buttons – Push button switches when pushed latch the cleaning circuit relays
GUV Luminaire – Germicidal Luminaire

Design requirements –

- All doors and windows into closed space cleaning zone have interlocks
- Openings are considered in terms of creating open spaces and closed spaces
- Startup zone is outside of the closed space and behind an interlocked door
- Windows that can open are interlocked
- Any areas that create an alcove or nook shall have push button activator places
- Consider the cleaner's inspection of the space for adding additional push button switches (permanently placed furniture or equipment)
- For bathrooms place a push button in all stalls or partitioned areas, if it's an area where water could splash such as a shower we require a wet rated switch
- For rooms that experience high levels of humidity we require Damp rated Interlocks/Push buttons
- All interlocks must be closed, all switches must be activated for the system to activate. Consider labeling the interlocks and switches for local instructional purposes or developing a training guide for cleaners



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UL Certified System

Germicidal UV System

1. Control Panel

1. Control Panel

- Available in medium (16 inputs) and large (24 inputs).
  - An input is a pushbutton wired back to the control panel.
- One User Station can be wired into the control panel.
- Integrated timer mechanism
  - Maximum 6 hours.
- 120-277VAC
  - 120V- 1900W max
  - 277V- 4400W max

2. User Station

2. User Station

- Fits in double gang wallbox

1. **Selector switch-** provides power to pushbuttons and magnetic sensors
2. **START LED-** indicator to show if power is being supplied
3. **READY LED-** to show the user all pushbuttons and magnetic sensors are in the closed position.
4. **Keyed momentary switch-** to turn the GUV fixtures on. allows authorized personnel to operate the system
5. **GO LED-** letting the user know the GUV fixtures are on

3. Clearance Pushbutton

3. Clearance Pushbutton

- Placed inside and outside the room to be disinfected.
- Ensures the user walks the space and checks for occupants.
- Illuminates when the button is engaged.
- IP65 rating
- Fits into standard single gang wallbox

- Fits in single gang wallbox

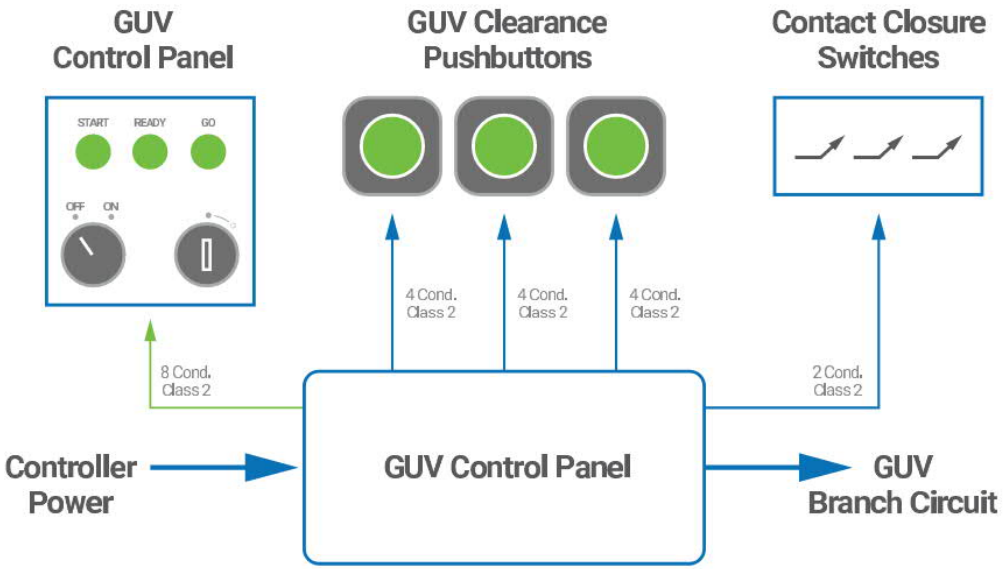
4. Magnetic Sensors

4. Magnetic Sensor

- Placed on any point of entry including doors and windows
- UL508 rated built in triple redundancy
- Coded magnetic actuator cannot be defeated
- IP67 rating

How it all connects...

Block Diagram:



Questions?

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