Energy Codes

Connected Lighting simplified by Eaton



design and application guide





We make connections work*



Simplified connected lighting solutions for **Buildings**, **Communities & Homes**

* Eaton's portfolio of connected lighting solutions leverages the real-estate of the physical light fixture to increase building, business and community operating efficiency through controls and data. With connected lighting solutions, we go beyond controlling light to solve higher complexity problems enabled by sensing and communication capabilities within the light fixture itself.

With innovation you can rely on, and connections you can build on; that's how Eaton makes connections work.

www.Eaton.com/ConnectedLighting

Table of Contents

Energy Codes

ANSI / ASHRAE / IES Standard 90.1-2016	4
International Energy Conservation Code (IECC) 2015	4
California Title 24	4
Application code compliant sequence best practices	6-7
Terminology	8-9

WaveLinx applications & typical wiring diagrams

WaveLinx overview

IECC 2015

Classroom examples	11-12
Conference room examples	13-14
Office corridor example	15
Private office example	16
Lobby example	17
Open office example	18
Restaurant example	19
Retail example	20

10

40

ASHRAE 90.1 2016

Classroom examples	21-22
Conference room examples	23-24
Office corridor example	25
Private office example	26
Lobby example	27
Open office example	28
Restaurant example	29
Retail example	30
TITLE 24 2016	
Classroom examples	31-32
Conference room examples	33-34
Office corridor example	35
Private office example	36
Lobby example	37
Open office example	38
Restaurant example	39

DLVP applications & typical wiring diagrams

DLVP overview	41
Classroom, 2x2 fixtures with integrated sensors	42
Classroom, 2x2 fixtures	43
Classroom, 2x4 fixtures with integrated sensors	44
Classroom, 2x4 fixtures	45
Conference room, 2x2 fixtures with integrated sensors	46
Conference room, 2x2 fixtures	47
Conference room, 2x2 fixtures and downlights	48
Corridor/Hall, 2x4 fixtures with integrated sensors	49
Corridor/Hall, 2x4 fixtures	50
Executive office, 2x2 fixtures	51
Open office, 2x4 fixtures with integrated sensors and emergency	52
Open office, 2x4 fixtures with integrated sensors	53
Open office, 2x4 fixtures	54
Open office, 2x4 fixtures with integrated sensors and emergency	55
Private office, 2x4 fixtures with integrated sensors	56
Private office, 2x4 fixtures	57
Private offices, 2x4 fixtures with integrated sensors	58



Retail example

Energy Codes application notes

ANSI / ASHRAE / IES Standard 90.1-2016

Energy Standard for Buildings Except Low-Rise Residential Buildings (Standard 90.1-2016) adopted as of September 2016. 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 90.1-2013 to 90.1-2016:

- Reduced occupancy-sensor time delay from 30 to 20 minutes
- Requires partial-off to 50% in spaces where lights should remain ON, such as corridors and stairwells
- Requires daylight controls in primary, secondary and top light zones
- Requires functional testing requirements

International Energy Conservation Code (IECC) 2015

IECC 2015 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 2015 and the authority having jurisdiction for project-specific requirements and interpretation.

Below summarizes changes from 2012 to 2015:

- Daylighting Controls Revamped and Redefined
- Continuous Dimming Now Required in Certain
 Daylit Spaces
- Reduce Exterior Lights at Night
- Use a Digital Lighting Control System to Satisfy Additional Energy Efficiency Options
- New Commissioning Documents Deadline

California Title 24

California's Building Energy Efficiency Standards are updated on an approximately three-year cycle. The 2016 Standards will continue to improve upon the 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The effective date of the 2016 Standards is January 1, 2017. Below summarizes changes from 2013 to 2016:

- Mandatory controls eliminates power adjustment factors
- Simplify multilevel lighting controls
- Clarify partial-ON and partial-OFF requirements
- Clarified alterations controls requirements

Energy saving lighting control strategies

STRATEGY	DESCRIPTION	ESTIMATED SAVINGS
Manual Dimmer	Manual dimming control is one of five methods that satisfy the multi-level lighting control requirements.	10-20%
کی کی Occupancy کی Sensor کی	Occupancy/vacancy control turns lights Off (or partially Off) when a room is unoccupied. Lights can be turned On automatically or manually, when a person enters a room.	20-60%
	Daylighting control automatically adjusts lighting levels in response to the amount of daylight available in the space.	20-45%
Manual ON/ Auto OFF	Manual ON/Automatic OFF or Vacancy Mode is designed to ensure that lighting does not turn ON automatically.	40%-60%
Tuning Control	High-end tuning lowers the maximum light level, creating energy savings.	10-30%
Demand Response	Demand Response reduces light levels in response to a signal from an OpenADR device or BMS closure.	10-40%
Manually Switched ON/OFF	Manually switched ON/OFF method allows users to manually control the lighting within the space and complies with local control requirements.	10-20%
Receptacle Control	Plug load control turns controlled receptacles On, when the space is occupied, and Off, when the space is vacant.	15-50% Controlled loads
UL924 UL924 (Energy Back-up Circuit)	The ability to control emergency lighting along with normal lighting while ensuring they go to full bright during normal power loss.	15-30%

Application code compliant sequence best practices

	ASHRAE 90.1 2016	IECC 2015	T24 2016	Atrium	Banking	Classroom / Training / Lecture	Conference / Meeting room
Local Control	9.4.1(a)	C405.2.2.3	130.1(a), (b)				
Manual ON	9.4.1(b)	C405.2.2.3	130.1(a), (b)	\bigcirc	\bigcirc		
Partial Automatic ON	9.4.1(c)	C405.2.1.1	130.1(b)	\bigcirc	\bigcirc		
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)	C405.2.3.1	130.1(d)				
Automatic Partial OFF	9.4.1(g)	C405.2.1.2	130.1(c).6				
Automatic Full OFF	9.4.1(h)	C405.2.1.1	130.1(c).5	\bigcirc	\bigcirc		\bigcirc
Scheduled Shutoff	9.4.1(i)	C405.2.2.1	130.1(c)	\bigcirc	\bigcirc		\bigcirc
Receptacle Control	8.4.2	C405.2.4	130.5(d)				
Energy Monitoring	8.4.3.2		130.5(b)	\bigcirc	\bigcirc		\bigcirc
Parking Garage Lighting Control	9.4.2	C405.2.5	130.1(a), (b)				
Functional Testing	9.4.3	C408.2.3	130.1(a), (b)				
Demand Response			130.1(a), (b)	\bigcirc	\bigcirc		\bigcirc
Enhanced Digital Lighting Controls		C406.4		\bigcirc	\bigcirc	\bigcirc	\bigcirc

Required

Choose one



Required

EATON Connected Lighting Energy Codes

Terminology

HIGH-LEVEL TERMINOLOGY	RECOMMENDED PRODUCTS*
 Local control If the controlled space is ≤10,000 ft2 , a control device shall not control more than 2500 ft2 If the controlled space is larger than 10,000 ft2, no device shall control more than 10,000 ft2 The installed device shall be readily accessible and the load being controlled shall be visible when operating the control 	 WaveLinx DLVP Room Controller System Fifth Light Wallbox dimmers/sensors GDS when connected to LiteKeeper, ControlKeeper
 Restricted to Manual ON Vacancy modes must be used such that lights will not turn on automatically 	 WaveLinx DLVP Room Controller System Fifth Light VSW, VNW, VNLW VAC
 Restricted to Partial Automatic ON When in occupancy mode, automatic ON shall not exceed 50% of the lighting power 	 WaveLinx DLVP Room Controller System Fifth Light LiteKeeper/, ControlKeeper
 Bi-level Lighting Control The general lighting in a space must have the following functionality: Full ON, Full OFF, and Dimming Dimming may be continuous or through step dimming If step dimming, at least one intermediate step shall be between 30% and 50% of full lighting power 	 WaveLinx DLVP Room Controller System Fifth Light LiteKeeper, ControlKeeper OAC, OAWC with Low Voltage Switches
 Automatic Daylight Responsive Controls for Sidelighting Primary sidelighted areas with combined input power at 150W or greater shall be controlled by photocontrols Secondary sidelighted areas with combined input power at 300W or greater, the area shall be controlled by photocontrols Controls must also: be readily accessible for calibration, control primary and secondary sidelighted areas independently, and shall incorporate daylight dimming 	 WaveLinx DLVP Room Controller System Fifth Light Analog Photosensors with ControlKeeper
 Automatic daylight responsive controls for toplighting Space within any daylight area that has combined input power for all general lighting at 150W or greater shall be controlled by photocontrols. Control must: Be readily accessible for calibration adjustments Have daylight response through continuous dimming or Step dimming with a point between 50% and 70%, a point between 20% and 40% (or lowest dimming level that the technology permits), and a third point at full off General lighting with overlapping toplighted and sidelighted areas shall be controlled together 	 WaveLinx DLVP Room Controller System Fifth Light Analog Photosensors with ControlKeeper
 Automatic partial OFF (full OFF complies) Within 20 minutes of occupants leaving a space, lighting power shall automatically decrease at least 50% 	 WaveLinx DLVP Room Controller System Fifth Light ControlKeeper

* Additional product combinations may be code compliant. Please contact your Eaton's Lighting Systems representative for more information.

Exceptions: more detailed information may apply, please reference your local code for more detailed information.

Terminology

HIGH-LEVEL TERMINOLOGY	RECOMMENDED PRODUCTS*
 Automatic full OFF Within 20 minutes of occupants leaving a space, lighting shall be automatically shut OFF Each control shall not control more than 5000 ft2 	 WaveLinx DLVP Room Controller System Fifth Light LiteKeeper, ControlKeeper Wallbox and Ceiling Sensors
 Scheduled Shut-off When a space is scheduled to be vacant, lighting shall be automatically shut OFF. Any override control shall revert back to the schedule within 2 hours of the last action 	 WaveLinx DLVP Room Controller System Fifth Light LiteKeeper, ControlKeeper
 Receptacle Control Automatically turn off plug loads when the space is unoccupied by sensor or time schedule 	 WaveLinx DLVP Room Controller System Fifth Light LiteKeeper, ControlKeeper
 Energy Monitoring Provide energy measurement data on the system collected at a minimum of every 15 minute and reported at least hourly 	 WaveLinx (included with system) Fifth Light (included with system) PowerXpert (external measurement for all other systems)



WaveLinx Wireless Connected Lighting System

Wireless, code-compliant, and cost-effective, WaveLinx Wireless Connected Lighting System offers the most out-of-the-box functionality on the market. It's also one of the easiest connected lighting systems to install and manage.

Automatic code compliance? Yes, it's true

- Automatic code commissioning meets or exceeds code requirements
- Wireless integrated sensors ensure maximum efficiency and flexibility
- A simple mobile app allows building managers to easily adjust settings, even after the project has finished, with no need to go back into the wall
- Connected fixtures provide a platform for future scalability





Classroom example 1





Bill of Materials

Qty Catalog

WAC-POE 1

1

1

WSP-MV-010 2

Description

Wireless Area Controller WaveLinx Relay Switchpack with 0-10V dimming

- CWPD-1500 WaveLinx ceiling sensor
- W4S-RL-W WaveLinx Wallstation
- 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 12
- Encounter 2x4

Typical wiring detail

C405.

2.2.3

IECC 2015

C405 2.2.3

C405. 2.2.1

PoE Ne	etwork S	witch			((m))) WA Wire (m)) Con Install of WC	C-POE eless Are troller ed within 150 L devices	a ^{oft}
Design Consid	eration			Best F	Practice	Maximum	
Gateway/W	/ireless A	rea Cont	roller range	150 250	feet to feet LOS	300 feet LOS	
Number of	interior v	valls		2 wa	alls	3 walls	
Distance fr to 1st Wave	om Wirel eLinx dev	ess Area rice	Controller	150	feet	200 feet	
Distance be	etween V	VaveLinx	devices	75 fe	eet	150 feet	
Number of Wireless A	hops fro rea Contr	m oller		4 ho	ps	5 hops	
Number of Wireless A	areas pe rea Contr	r oller		16		16	
Number of	zones pe	er area		3		16	
Number of	scenes p	er area		6		10	
	Local	Manual	Partial Bi	evel	Daylight	Daylight	Partia

C405. 2.3.2

C405

2.3.1

2.2.1

2.4

Sequence of operations

Lighting

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

IECC 2015

ually Switched ON/OFF

Main

 \odot Manual ON/

Auto OFF

涁

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

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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



2.3

Ā

Classroom example 2





Bill of Materials

1

1

Qty Catalog

Description

- WAC-POE Wireless Area Controller
 - W4S-RI-W WaveLinx Wallstation

24EN-LD2-34-UNV-L835-CD1-SWPD1-U 12 Encounter 2x4 with WaveLinx Sensor

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 Optional plug load turns on/off with occupancy Automatic off of lighting and plug load on vacancy

IECC 2015

潂

ually Swite ON/OFF

Occupan

• 🔿 Manual ON/

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 that are less than 150W

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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 Complies with Enhanced Digital Lighting Control section C406

Typical wiring detail

Gateway/Wireless Area Controller range

Distance from Wireless Area Controller

Distance between WaveLinx devices

PoE Network Switch provided by others

Design Consideration

Number of interior walls

to 1st WaveLinx device

Number of hops from

Number of areas per Wireless Area Controller Number of zones per area

Wireless Area Controller



Maximum

300 feet

3 walls

200 feet

150 feet

5 hops

16

16

LOS

Best Practice

150 feet to

2 walls

150 feet

75 feet

4 hops

16

3

6

250 feet LOS







24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 recessed light fixture with 0-10V dimming

Number	r of scene	es per area	1	6		10									
	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 2015	C405. 2.2.3	C405. 2.2.3	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	C405. 2.3		C406. 4

IECC	2015	:									*		间次	<u>نې</u> "	E
Co	ont	fer	en	CE) T	00	m	exam	nnle 1		Manually S ON/O	witched M FF Di	anual Occupa mmer Sense	ancy Dayligh or Conti	nting rol
			••••					Слан			Lume	n Maintenance	Tuning	Manual ON/	,
Π.			1						Sequ	ence of c	operatio	Control	Control	Auto OFF	
	LH N	Wallsta	lition						Lighting 0-10V lig Up to 3 Out of t	j ghting load dimmable he box 75%	ds zones % high end	l trim			
	5 N			50	L Z				Occupa Automa Optiona Optiona Plug loa Automa	ncy tic auto or I vacancy I auto on t id turns on tic off of li	n to 50% mode to scene h with occu ghting and	ipancy I plug loa	ad on vaca	ncy	
Ļ			Occupancy	ی /Daylight S	Gensor				Dayligh Continu Individu Dayligh Not req than 150	ting ous dimm ial luminai ting not re uired in sp DW	ing to off re dayligh quired for aces witho	t dimmin indoor o out windo	g to appro ffices with ows or that	ximately out wind t are less	500 lux ows
Wirele: Instal of	WAC-POE ss Area Contr led within 15 WCL devices	roller Oft							Manual Top or c Remain Scene r Scene lo All off	Controls lominant b ing button aise ower	outton half s trigger so	lights (so cenes	ets lights to	o 50% or	less)
Bill of	Material	S #	Dee	mintio					Additio	nal Feature	es				
1 1 1 3 4	WAC-PC W4S-RL TM-SW LD4 OR 22EN-LI Encoun	97 -W PD1 LD6 D2-34-UN ter 2x2 w	Wav Wav Wav Port VV-L835-C vith Wave	relinx veLinx veLinx folio C D1-SV Linx S	n rea Cont Wallstatio Filemoun ommerci VPD1-U ensor	roller on t Daylig al Reces	ht Sens sed LEI	or D	Power r Automa area con Schedul wireless UL924 e battery Complie	neasureme tic deman- ntroller ing of part area cont mergency backup es with Enl	ent reporti d response tial off ligh roller control ca nanced Dig	ng throug e availab t levels a pabilitie gital Ligh	gh mobile le from wir nd times fi s available ting Contro	applicatio reless rom via lumin ol section	on naire 1 C406
Туріс	al wiriı	ng deta	nil												
Pol	E Networ	k Switch			((((1)))) WA Wir •))) Cor Instal of We	C-POE eless Are troller lled within 15 CL devices	9a Oft	W4S Wire scene v	-RL-W less 4 smal vallstation	l button		н N	*****		
Design C Gatewa	onsideration ay/Wireles	ss Area Co	ntroller ran	Best	: Practice) feet to	Maximum 300 fee	t	\langle			22	EN-LD2-3	84-UNV-L83	35-CD1-S	WPD1-U
Numar	or of inter-	orwalla		250) feet LOS	LOS		<i>h</i> .							
Distan	ce from W	/ireless Are	ea Controlle	er 150) feet	200 fee	t	((0		,					
Distan	ce betwee	en WaveLir	nx devices	75	feet	150 fee	t					()Lé	€ ()		
Numbe	er of hops ss Area Co	from ontroller		4 h	ops	5 hops									
Numbe	er of areas	s per ontroller		16		16		V D	VaveLinx T Vaylight Sei	ilemount nsor		Portf Com	olio mercial Rec	essed LEI	C
Numbe	er of zones	s per area		3		16		00 3/	ccupancy / daylig A Relay with 0-10	inting)V					
Numbe	er of scene	es per area	3	6		10									
1500	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
2015	C405. 2.2.3	2.2.3	2.1.1		2.3.2	2.3.1	2.1.2	2.1.1	2.2.1	2.4		2.5	2.3		406. 4

IECC 2015

Conference room example 2





Bill of Materials

Qty Catalog

Description

aly	Outdidg #	Description
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
1	TM-SWPD1	WaveLinx Tilemount Daylight Sensor
3	LD4 OR LD6	Portfolio Commercial Recessed LED
-		

2 DSI-WS-3L35-1D-UNV-AC48-T1-8-STD-SW-W Divide Suspended with WaveLinx Sensor

Sequence of operations

Lighting

0-10V lighting loads Up to 3 dimmable zones Individually addressable luminaires 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/off with occupancy Automatic off of lighting and plug load on vacancy

IECC 2015

漼

ually Switc ON/OFF

<u>. . . .</u>

Occupan

Manual ON

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

Manual Controls

Programmable Scenes Dominant button is 50% light level Scene raise Scene lower All off

Additional Features

Power measurement reporting through mobile application 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

Complies with Enhanced Digital Lighting Control section C406

Typical wiring detail

PoE Ne	etwork	Switch			(((mp))) WA Wire ()) Con Install of WC	C-POE eless Are troller ed within 150 L devices	a ^{oft}		(((' 1')))	DSI-W Divide	S-3L35-1D Suspended	-UNV-AC	:48-T1-8-S WaveLinx :	TD-SW-V Sensor
Design Cons	sideration			Best	t Practice	Maximum	I.							
Gateway/	/Wireles	s Area Co	ntroller ran	ge 150 250) feet to) feet LOS	300 fee LOS	t							
Number of interior walls 2 walls 3 walls								4		((((a))))				
Distance from Wireless Area Controller 150 feet to 1st WaveLinx device) feet	200 fee								
Distance	betwee	n WaveLir	nx devices	75	feet	150 fee	t						(4	
Number o Wireless	of hops Area Co	from ontroller		4 h	ops	5 hops		ء س						
Number o Wireless	of areas Area Co	per ontroller		16		16		W	/ireless 4 mall button	ess 4 WaveLinx Tilemount p button Daylight Sensor (Portf	
Number o	of zones	per area		3		16		SC	ene wallstation		occupan 3A Relay	cy / daylighting with 0-10V	g	Rece
Number o	of scene	es per area	a	6		10								
l	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
IECC 2015	C405. 2.2.3	C405. 2.2.3	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	C405. 2.3	

Office corridor example



Bill of Materials

1

2

Qty Catalog

- og # Description
- WAC-POE Wireless Area Controller
- W1L-RL-W WaveLinx Wallstation
- 6 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 with WaveLinx Sensor

Sequence of operations

Lighting

0-10V lighting loads Up to 3 dimmable zones Individually addressable luminaires 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

IECC 2015

ually Switched ON/OFF

<u>```</u>

Main

Manual ON/

Auto OFF

澎

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

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

Typical wiring detail (((•••))) WAC-POE (((**n**))) W1L-RL-W Wireless Area Wireless 1 large button TATEL I ·))) Controller scene wallstation PoE Network Switch Installed within 150ft of WCL devices ((())) provided by others **Design Consideration** Best Practice Maximum 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Gateway/Wireless Area Controller range 150 feet to 300 feet Encounter 2x4 recessed light fixture 250 feet LOS LOS with 0-10V dimming Number of interior walls 2 walls 3 walls Distance from Wireless Area Controller 150 feet 200 feet to 1st WaveLinx device Distance between WaveLinx devices 75 feet 150 feet Number of hops from 4 hops 5 hops Wireless Area Controller 16 16 Number of areas per Wireless Area Controller Number of zones per area 3 16 6 Number of scenes per area 10 Daylight Top Local Control Partial ON Bilevel Lighting Daylight Side Partial OFF Parking Garage Functional Testing Enhanced Digital Manual ON Automatic OFF Scheduled OFF Receptacle Control Energy Monitoring Demand C405 C405 C405. C405. C405 C405 C405. C405. C405 C405. C405 C406. IECC 2015 2.2.3 2.2.3 2.1.1 2.3.2 2.3.1 2.1.2 2.1.1 2.2.1 2.4 2.5 2.3 Ā

EATON WaveLinx design and application guide

Private office example





Bill of Materials

Qty Catalog

- Description
- 1 WAC-POE Wireless Area Controller 1
 - W4S-RL-W WaveLinx Wallstation
- 22EN-LD2-34-UNV-L835-CD1-SWPD1-U 2 Encounter 2x2 with WaveLinx Sensor

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

IECC 2015

潂

ually Swite ON/OFF

<u>. . . .</u>

60 Manual ON/

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

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

Power measurement reporting through mobile application 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

Complies with Enhanced Digital Lighting Control section C406



EATON WaveLinx design and application guide

Lobby example





Bill of Materials

Qty Catalog

Description

WaveLinx Wallstation

WaveLinxTilemount Daylight Sensor

Portfolio Commercial Recessed LED

- WAC-POE Wireless Area Controller 1
- W4S-RL-W 2
- 1 TM-SWPD1
- 6 LD4 OR LD6
- 2 22EN-LD2-34-UNV-L835-CD1-SWPD1-U
 - Encounter 2x2 with WaveLinx Sensor

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

IECC 2015

ually Switched ON/OFF

Main

 Θ Manual ON/

Auto OFF

漼

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

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

Complies with Enhanced Digital Lighting Control section C406



pen office example





Bill of Materials

Qty Catalog

- Description
- WAC-POE Wireless Area Controller 1 2
 - W4SL-RL-W WaveLinx Wallstation
- 24 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 with WaveLinx Sensor

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 Optional plug load turns on/off with occupancy Automatic off of lighting and plug load on vacancy

IECC 2015

澎

ually Swite ON/OFF

Manual ON/

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

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise Lower

All off

Additional Features

Power measurement reporting through mobile application 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

Complies with Enhanced Digital Lighting Control section C406

Typical wiring detail

PoE Network Switch provided by others

Number of interior walls

to 1st WaveLinx device

Number of hops from

Number of areas per Wireless Area Controller Number of zones per area

Wireless Area Controller

Number of scenes per area

Gateway/Wireless Area Controller range

Distance from Wireless Area Controller

Distance between WaveLinx devices

Design Consideration



Best Practice

150 feet to

2 walls

150 feet

75 feet

4 hops

16

3

6

250 feet LOS



Maximum

300 feet

3 walls

200 feet

150 feet

5 hops

16

16

10

LOS





24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 recessed light fixture with 0-10V dimming

	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 2015	C405. 2.2.3	C405. 2.2.3	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	C405. 2.3		C406. 4

Restaurant example





Bill of Materials

Qty Catalog

5

- 1 WAC-POE

Description

- Wireless Area Controller
- W4SL-RL-W WaveLinx Wallstation
- 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 24 Encounter 2x4 with WaveLinx Sensor

Sequence of operations

Lighting

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

Occupancy

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

IECC 2015

Main

 Θ Manual ON/

Auto OFF

漼 ually Switched ON/OFF

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

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise

Lower

All off

Additional Features

Power measurement reporting through mobile application 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

Complies with Enhanced Digital Lighting Control section C406

Typical wiring detail ((())) WAC-POE (((**†**))) W4S-RL-W Wireless Area Wireless 4 small button Tagen •))) Controller scene wallstation н PoE Network Switch Installed within 150ft of WCL devices (((•))) provided by others **Design Consideration** Best Practice Maximum 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Gateway/Wireless Area Controller range 150 feet to 300 feet Encounter 2x4 recessed light fixture 250 feet LOS LOS with 0-10V dimming Number of interior walls 2 walls 3 walls Distance from Wireless Area Controller 150 feet 200 feet to 1st WaveLinx device Distance between WaveLinx devices 75 feet 150 feet Number of hops from 4 hops 5 hops Wireless Area Controller Number of areas per 16 16 Wireless Area Controller Number of zones per area 16 3 6 Number of scenes per area 10 Local Control Partial ON Bilevel Lighting Daylight Side Daylight Top Partial OFF Parking Garage Functional Testing Enhanced Digital Manual ON Automatic OFF Scheduled OFF Receptacle Control Energy Monitoring Demand Respons C405 C405 C405. C405 C405 C405. C405. C405 C405. C405 C406. IECC 2015 C405. 2.2.3 2.2.3 2.1.1 2.3.2 2.3.1 2.1.2 2.1.1 2.2.1 2.4 2.5 2.3 Ā

Retail example





Bill of Materials Catalog

arintiar

uty	Catalog #	Description
1	WAC-POE	Wireless Area Controller
6	W4SL-RL-W	WaveLinx Wallstation
4	WSP-MV-010	WaveLinx Relay Switchpack with 0-10V dimming

- 4 LDCM-PL-120-277-010V-GR Linear Dimming Control Modules 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 23
- Encounter 2x4 with WaveLinx Sensor

Typical wiring detail

)
PoE Network Switch provided by others	



			q					
Design Co	nsideration				Best F	ractice	Maximum	
Gateway	/Wireless	s Area Con	troller ran	ige	150 ⁻ 250 ⁻	feet to feet LOS	300 feet LOS	
Number	of interio	r walls			2 wa	3 walls		
Distance to 1st W	e from Wi /aveLinx c	reless Area levice	er	150	feet	200 feet		
Distance	e betweer	n WaveLin>		75 fe	eet	150 feet		
Number Wireless	of hops f s Area Co	rom ntroller			4 ho	ps	5 hops	
Number Wireless	of areas Area Co	per ntroller			16		16	
Number	of zones	per area			3		16	
Number	of scene	s per area			6		10	
	Local Control	Manual ON	Partial ON	Bile Ligh	vel iting	Daylight Side	Daylight Top	Part OFF

C405.

2.1.1



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 Optional plug load turns on/off 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

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise

Lower All off

Additional Features

Power measurement reporting through mobile application 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

Complies with Enhanced Digital Lighting Control section C406



IECC 2015

C405

2.2.3

C405

2.2.3

Classroom example 1





Bill of Materials

Qty Catalog

W4S-RL-W 1

2 WR-15

2

- WSP-MV-010
- CWPD-1500 1

Typical wiring detail

Description

	Wireless Area Controller
V	WaveLinx Wallstation

- WaveLinx Receptacle
 - WaveLinx Relay Switchpack with 0-10V dimming
 - WaveLinx ceiling occupancy sensor
- 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 12 Encounter 2x4

PoE Network Switch

Gateway/Wireless Area Controller range

Distance from Wireless Area Controller

Distance between WaveLinx devices

provided by others

Number of interior walls

to 1st WaveLinx device

Number of hops from

Number of areas per

Wireless Area Controller

Wireless Area Controller

Number of zones per area

Design Consideration

E A Car

2 walls

150 feet

75 feet

4 hops

16

3

WAC-POE (((**n**))) Wireless Area •)))

Controller

Installed within 150ft of WCL devices

Best Practice Maximum

150 feet to 300 feet 250 feet LOS LOS

3 walls

200 feet

150 feet

5 hops

16

16



(((())))

WR-15

W4S-RL-W

scene wallstation

Wireless 4 small button

Wireless Receptacle

CWPD-1500 Wireless Ceiling Sensor

occupancy sensor

((((•))))



2x4 recessed light fixture

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

Number of	Number of scenes per area			6		10								
	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
ASHRAE 90.1-2016	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	

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 Daylighting not required for indoor spaces without windows Not required in spaces without windows or that are less than 120W

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

ш

Ν

0-10



Manual ON/ Auto OFF

Classroom example 2



Description

Wireless Area Controller

WaveLinx Wallstation

WaveLinx Receptacle



Bill of Materials

Qty Catalog

1 WAC-POE

1 W4S-RL-W

- 2 WR-15
- 12 24EN-LD2-34-UNV-L835-CD1-SWPD1-U
- Encounter 2x4 with INstinct Sensor

Manually Switched ON/OFF Manual Dimmer Sensor

ASHRAE 90.1 2016





 \odot

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 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 120W

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

Typical wiring detail (((**n**))) ((())) WAC-POE W4S-RL-W Wireless 4 small button Wireless Area -ALQU •**)**) Controller scene wallstation PoE Network Switch Installed within 150ft of WCL devices N (((**(**))) provided by others **Design Consideration Best Practice** Maximum D 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Gateway/Wireless Area Controller range 150 feet to 300 feet Encounter 2x4 recessed light fixture 250 feet LOS LOS with 0-10V dimming Number of interior walls 2 walls 3 walls (((**(**¶))) Distance from Wireless Area Controller 150 feet 200 feet **WR-15** • to 1st WaveLinx device Wireless (1,1) Receptacle Distance between WaveLinx devices 75 feet 150 feet Number of hops from 4 hops 5 hops Wireless Area Controller 16 16 Number of areas per Wireless Area Controller Number of zones per area 3 16 Number of scenes per area 6 10 Daylight Side Scheduled OFF Partial ON Bilevel Lighting Daylight Partia OFF Automatic Receptacle Control Energy Monitori Parking Garage Functional Testing Demand Response Local Contro Manual ON ASHRAE 90.1-2016 9.4.1 9.4.1.1 9.4.1.1 9.4.1.1 9.4.1.1 9.4.1.1 9.4.1.1 9.4.1.1 9.4.1.1 (i) 8.4.2 8.4.3.2 9.4.1.2 9.4.3 (a) (b) (c) (d) (e) (f) (g) (h)

EATON WaveLinx design and application guide

Conference room example 1



WAC-POE Wireless Area Controller Installed within 150ft of WCL devices

Bill of Materials

Qty Catalog

- 1 WAC-POE
- 1 W4S-RL-W
- 1 WR-15
- 1 TM-SWPD1

3

- TM-SWPD1 WaveLinx Tilemount Daylight Sensor
- LD4 OR LD6 Portfolio Commercial Recessed LED

Description

Wireless Area Controller

WaveLinx Wallstation

WaveLinx Receptacle

- 4 22EN-LD2-34-UNV-L835-CD1-SWPD1-U
- Encounter 2x2 with WaveLinx Sensor

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 120W

ASHRAE 90.1 2016

H

Manua

Occupancy

X

Tunin

60

Manual ON/

Auto OFF

潂

Manually Switched ON/OFF

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

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Conference room example 2





Bill of Materials

Qty Catalog

-		•
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation
1	WR-15	WaveLinx Receptacle
1	TM-SWPD1	WaveLinx Tilemount Daylight Sensor
6	LD4 OR LD6	Portfolio Commercial Recessed LED

Description

DSI-WS-3L35-1D-UNV-AC48-T1-8-STD-SW-W 2 Divide Suspended with WaveLinx Sensor

Typical wiring detail

Sequence of operations

Lighting

0-10V lighting loads Up to 3 dimming 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 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

ASHRAE 90.1 2016

 Θ Manual ON/ Auto OFF

漼

Manually Switched ON/OFF

Main

than 120W Manual Controls

Programmable Scenes Dominant button is 50% light level Scene raise Scene lower All off

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Office corridor example



Bill of Materials

Qty Catalog

2

- Description
- WAC-POE 1
 - Wireless Area Controller
 - W4SL-RL-W WaveLinx Wallstation
- 6 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 with WaveLinx Sensor

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 offices without windows Not required in spaces without windows or that are less than 120W

ASHRAE 90.1 2016

H

Manua

Occupanc

X

0

Manual ON/ Auto OFF

澎

Manually Switched ON/OFF

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

Typical wiring detail

Design ConsiderationBest PracticeMaximumGateway/Wireless Area Controller range150 feet to 250 feet LOS300 feet LOSNumber of interior walls2 walls3 wallsDistance from Wireless Area Controller to 1st WaveLinx device150 feet200 feetDistance between WaveLinx devices75 feet150 feetNumber of hops from Wireless Area Controller4 hops5 hopsNumber of areas per Wireless Area Controller1616Number of zones per area316	PoE Network Switch	((()))) WA(Wire •)) Cont Installe of WCl	C-POE less Area croller ed within 150ft devices
Gateway/Wireless Area Controller range150 feet to 250 feet LOS300 feet LOSNumber of interior walls2 walls3 wallsDistance from Wireless Area Controller to 1st WaveLinx device150 feet200 feetDistance between WaveLinx devices75 feet150 feetNumber of hops from Wireless Area Controller4 hops5 hopsNumber of areas per Wireless Area Controller1616Number of zones per area316Number of scenes per area610	Design Consideration	Best Practice	Maximum
Number of interior walls2 walls3 wallsDistance from Wireless Area Controller150 feet200 feetto 1st WaveLinx device75 feet150 feetDistance between WaveLinx devices75 feet150 feetNumber of hops from Wireless Area Controller4 hops5 hopsNumber of areas per Wireless Area Controller1616Number of zones per area316Number of scenes per area610	Gateway/Wireless Area Controller range	150 feet to 250 feet LOS	300 feet LOS
Distance from Wireless Area Controller to 1st WaveLinx device150 feet200 feetDistance between WaveLinx devices75 feet150 feetNumber of hops from Wireless Area Controller4 hops5 hopsNumber of areas per Wireless Area Controller1616Number of zones per area316Number of scenes per area610	Number of interior walls	2 walls	3 walls
Distance between WaveLinx devices75 feet150 feetNumber of hops from Wireless Area Controller4 hops5 hopsNumber of areas per Wireless Area Controller1616Number of zones per area316Number of scenes per area610	Distance from Wireless Area Controller to 1st WaveLinx device	150 feet	200 feet
Number of hops from Wireless Area Controller4 hops5 hopsNumber of areas per Wireless Area Controller1616Number of zones per area316Number of scenes per area610	Distance between WaveLinx devices	75 feet	150 feet
Number of areas per Wireless Area Controller1616Number of zones per area316Number of scenes per area610	Number of hops from Wireless Area Controller	4 hops	5 hops
Number of zones per area316Number of scenes per area610	Number of areas per Wireless Area Controller	16	16
Number of scenes per area 6 10	Number of zones per area	3	16
	Number of scenes per area	6	10



24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 recessed light fixture with 0-10V dimming

	Local	Manual	Partial	Bilevel	Daylight	Daylight	Partial	Automatic	Scheduled	Receptacle	Energy	Parking	Functional	Demand
	Control	ON	ON	Lighting	Side	Top	OFF	OFF	OFF	Control	Monitoring	Garage	Testing	Response
ASHRAE 90.1-2016	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	

Private office example





Bill of Materials

Qty Catalog # 1

- Description
- WAC-POE Wireless Area Controller WaveLinx Wallstation
- 1 W4S-RL-W
- 1 WR-15
- WaveLinx Receptacle
- 22EN-LD2-34-UNV-L835-CD1-SWPD1-U 2 Encounter 2x2 with WaveLinx Sensor

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 120W

ASHRAE 90.1 2016

De

 Θ Manual ON/ Auto OFF

鲨

Manually Switched ON/OFF

Main

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

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Lobby example



Description

Wireless Area Controller

WaveLinx Wallstation

WaveLinx Receptacle



Bill of Materials

Qty Catalog

- 1 WAC-POE
- 2 W4S-RL-W
- WR-15 1

1

6

- TM-SWPD1
- WaveLinxTilemount Daylight Sensor
 - LD4 OR LD6 Portfolio Commercial Recessed LED
- 22EN-LD2-34-UNV-L835-CD1-SWPD1-U 2
- Encounter 2x2 with WaveLinx Sensor

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 120W

ASHRAE 90.1 2016

H

Manual

Occupancy

X

Tunin

60

Manual ON/

Auto OFF

潂

Manually Switched ON/OFF

Manual Controls

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

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



pen office example



Description



Bill of Materials

Qty Catalog

- 1 WAC-POE Wireless Area Controller WaveLinx wallstation
- W4SL-RL-W 2
- 2 WR-15
- WaveLinx Receptacle 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 24
- Encounter 2x4 with WaveLinx Sensor

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 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 that are less than 120W

ASHRAE 90.1 2016

 Θ Manual ON/ Auto OFF

鲨

Manually Switched ON/OFF

<u>. . . .</u>

Main

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise Lower

All off

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Restaurant example





Bill of Materials

Qty Catalog

1 5 W4SL-RL-W

WR-15

Typical wiring detail

Number of interior walls

to 1st WaveLinx device

Number of hops from

Wireless Area Controller Number of areas per

Wireless Area Controller Number of zones per area

2

Description

- WAC-POE
 - Wireless Area Controller WaveLinx Wallstation
 - WaveLinx Receptacle
- 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 24 Encounter 2x4 with WaveLinx Sensor

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

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 that are less than 120W

ASHRAE 90.1 2016

H

Manua

Occupancy

X

60

Manual ON/ Auto OFF

澎

Manually Switched ON/OFF

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise

Lower

All off

Additional Features

Power measurement reporting through mobile application 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

(((**•**p))) WAC-POE Wireless Area Tagen •))) Controller Installed within 150ft of WCL devices PoE Network Switch provided by others **Design Consideration** Best Practice Maximum

Gateway/Wireless Area Controller range

Distance from Wireless Area Controller

Distance between WaveLinx devices

150 feet to

2 walls

150 feet

75 feet

4 hops

16

3

250 feet LOS

300 feet

LOS

3 walls

200 feet

150 feet

5 hops

16

16



(((••)))

W4S-RL-W

scene wallstation

Wireless 4 small button

•

(,)

WR-15

Wireless

Receptacle



24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 recessed light fixture with 0-10V dimming

Number of	scenes p	per area		6		10								
	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
ASHRAE 90.1-2016	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	

Retail example





Bill of Materials Qty

Catalog # Description

-	-	-
1	WAC-POE	Wireless Area Controller
6	W4SL-RL-W	WaveLinx Wallstation
4	WSP-MV-010	WaveLinx Relay Switchpack with 0-10V dimming
2	WR-15	WaveLinx Receptacle

- LDCM-PL-120-277-010V-GR 4 Linear Dimming Control Modules

23 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 with WaveLinx Sensor

Typical wiring detail

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 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 that are less than 120W

ASHRAE 90.1 2016

De

 \odot Manual ON/ Auto OFF

鲨

Manually Switched ON/OFF

<u>. . . .</u>

Main

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise

Lower All off

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Classroom example 1





Bill of Materials

Qty Catalog # WAC-POF 1

•	W/ KO I OL
1	W4S-RL-W

2 WR-15

1

- 2 WSP-MV-010
- Wireless Area Controller WaveLinx Wallstation WaveLinx Receptacle WaveLinx Relay Switchpack with 0-10V dimming WaveLinx ceiling occupancy sensor

130.1

(d)

130.1

(c).6

(d)

Description

- CWPD-1500 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 12
- Encounter 2x4

Typical wiring detail

130.1

(a)(b)

130.1

(a)(b)

130.1

(b)

T24 2016

PoE	Networ	k Switch				((1))) N N N O Insof	VA /ire on stall	C-POE eless Are troller ed within 150 L devices	a ^{oft}
Design Cor	nsideration				Best F	Practice		Maximum	
Gateway/Wireless Area Controller range						150 feet to 250 feet LOS		300 feet LOS	
Number	of interio	or walls			2 walls			3 walls	
Distance from Wireless Area Controller to 1st WaveLinx device						150 feet		200 feet	
Distance	e betwee	n WaveLin:	k devices		75 feet			150 feet	
Number Wireless	of hops Area Co	from ntroller			4 hops			5 hops	
Number of areas per Wireless Area Controller								16	
Number of zones per area								16	
Number	of scene	s per area			6			10	
	Local Control	Manual ON	Partial ON	Bilev Light	el ing	Daylight Side		Daylight Top	Partial OFF

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 Daylighting not required for indoor spaces without windows Not required in spaces without windows or that are less than 120W

TITLE 24 2016

澎

ually Switch ON/OFF

<u>.</u>

Maint

 Θ

Manual Controls

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

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Classroom example 2



Description



Bill of Materials

Qty Catalog

- WAC-POE Wireless Area Controller 1 WaveLinx Wallstation
- W4S-RL-W 1
 - WR-15
- 2 WaveLinx Receptacle
- 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 12 Encounter 2x4 with WaveLinx Sensor

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 Automatic off of lighting and plug load on vacancy

TITLE 24 2016

<u>. . . .</u>

Maint

De

 \odot

Manual ON/

Auto OFF

漼

Manually Switched ON/OFF

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 that are less than 120W

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

Typical wiring detail (((**•**•))) ((())) WAC-POE W4S-RL-W Wireless 4 small button Wireless Area -ALQU •))) Controller scene wallstation PoE Network Switch Installed within 150ft of WCL devices (((**(**))) provided by others **Design Consideration Best Practice** Maximum D 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Gateway/Wireless Area Controller range 150 feet to 300 feet Encounter 2x4 recessed light fixture 250 feet LOS LOS with 0-10V dimming Number of interior walls 2 walls 3 walls (((**(**¶))) Distance from Wireless Area Controller 150 feet 200 feet **WR-15** • to 1st WaveLinx device Wireless (1,1) Receptacle Distance between WaveLinx devices 75 feet 150 feet Number of hops from 4 hops 5 hops Wireless Area Controller 16 16 Number of areas per Wireless Area Controller Number of zones per area 3 16 Number of scenes per area 6 10 Scheduled OFF Daylight Top Local Control Manual ON Partial ON Bilevel Lighting Daylight Side Partial OFF Automatic OFF Receptacle Control Energy Monitoring Parking Garage Functional Testing Demand Response Enhanced Digital 130.1 130.1 130.1 130.1 130.1 130.1 130.1 130.1 130.5 130.5 130.1 130.4 130.1 (e) T24 2016 130.1 (e) (a)(b) (a)(b) (b) (d) (d) (c).6 (c).5 (c) (d) (b) (d)

EATON WaveLinx design and application guide

TITLE 24 2016: Conference room example 1





Bill of Materials

Qtv Catalog

- WAC-POE 1
- W4S-RI-W 1
- 1 WR-15

1

- WaveLinx Receptacle
- TM-SWPD1 WaveLinxTilemount Daylight Sensor Portfolio Commercial Recessed LED

Description

Wireless Area Controller

WaveLinx Wallstation

- 3 LD4 OR LD6
- 22EN-LD2-34-UNV-L835-CD1-SWPD1-U 4 Encounter 2x2 with WaveLinx Sensor

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

TITLE 24 2016

Manua

Occupancy

X

Tunin

0

Manual ON/ Auto OFF

漼

Manually Switched ON/OFF

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 120W

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

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



TITLE 24 2016: Conference room example 2





Bill of Materials

Otv Catalog

Description

,		
1	WAC-POE	Wireless Area Controller
1	W4S-RL-W	WaveLinx Wallstation

- 1 WR-15 WaveLinx Receptacle
- 1 TM-SWPD1
- WaveLinxTilemount Daylight Sensor
- 6 LD4 OR LD6 Portfolio Commercial Recessed LED
- DSI-WS-3L35-1D-UNV-AC48-T1-8-STD-SW-W 2 Divide Suspended with WaveLinx Sensor

Typical wiring detail

Sequence of operations

Lighting

0-10V lighting loads Up to 3 dimming 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 Automatic off of lighting and plug load on vacancy

TITLE 24 2016

<u>. . . .</u>

Maint

 \odot

Manual ON/

澎

Manually Switched ON/OFF

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 120W

Manual Controls

Programmable Scenes Dominant button is 50% light level Scene raise Scene lower All off

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



TITLE 24 2016: Office corridor example



Bill of Materials

Qty

1

2

Catalog

- WAC-POE Wi
 - OE Wireless Area Controller

Description

- W1L-RL-W WaveLinx Wallstation
- 6 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x2 with WaveLinx Sensor

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

TITLE 24 2016

Manua

Occupant

X

0

Manual ON/ Auto OFF

澎

Manually Switched ON/OFF

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 120W

Manual Controls

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

Additional Features

Power measurement reporting through mobile application 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

Typical wiring detail

Wireless Area Controller Number of zones per area

Number of scenes per area

PoE Network Switch provided by others	(((p))) WAC Wire ()) Cont Installe of WCL	C-POE less Area roller d within 150ft devices
Design Consideration	Best Practice	Maximum
Gateway/Wireless Area Controller range	150 feet to 250 feet LOS	300 feet LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 feet	200 feet
Distance between WaveLinx devices	75 feet	150 feet
Number of hops from Wireless Area Controller	4 hops	5 hops
Number of areas per	16	16

3

6

16

10

W1L-RL-W Wireless 1 large button





24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 recessed light fixture with 0-10V dimming

	Local	Manual	Partial	Bilevel	Daylight	Daylight	Partial	Automatic	Scheduled	Receptacle	Energy	Parking	Functional	Demand	Enhanced
	Control	ON	ON	Lighting	Side	Top	OFF	OFF	OFF	Control	Monitoring	Garage	Testing	Response	Digital
T24 2016	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)	

TITLE 24 2016: Private office example



Wallstation 5H Receptacle Control 00 (5



Bill of Materials

- Qty Catalog #
- 1 WAC-POE
- W4S-RL-W 1
- 1 WR-15
- Description Wireless Area Controller
- WaveLinx Wallstation
- WaveLinx Receptacle
- 22EN-LD2-34-UNV-L835-CD1-SWPD1-U 2 Encounter 2x2 with WaveLinx Sensor

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 120W

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

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Lobby example



Description

Wireless Area Controller

WaveLinx Wallstation



Bill of Materials

- Qty Catalog #
- WAC-POF 1
- W4S-RL-W 2
- 1 WR-15

1

6

- WaveLinx Receptacle
- TM-SWPD1 WaveLinxTilemount Daylight Sensor
 - LD4 OR LD6 Portfolio Commercial Recessed LED
- 22EN-LD2-34-UNV-L835-CD1-SWPD1-U 2
- Encounter 2x2 with WaveLinx Sensor

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 120W

TITLE 24 2016

Manua

Occupancy

Δ

Tunin

60

Manual ON/

Auto OFF

漼

Manually Switched ON/OFF

Manual Controls

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

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



pen office example





Bill of Materials

Qty Catalog # 1

- Description
- Wireless Area Controller WAC-POE WaveLinx Wallstation
- 2 W4SL-RL-W
- 2 WR-15
- WaveLinx Receptacle 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 24
- Encounter 2x4 with WaveLinx Sensor

<u>. . . .</u> Main

TITLE 24 2016

澎

Manually Switched ON/OFF



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 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 that are less than 120W

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise Lower

All off

Additional Features

Power measurement reporting through mobile application 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

Typical wiring detail (((**†**))) ((())) WAC-POE W4S-RL-W Wireless 4 small button Wireless Area -ALQU •))) Controller scene wallstation Installed within 150ft of WCL devices PoE Network Switch (((**(**))) provided by others **Design Consideration Best Practice** Maximum D 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Gateway/Wireless Area Controller range 150 feet to 300 feet Encounter 2x4 recessed light fixture 250 feet LOS LOS with 0-10V dimming Number of interior walls 2 walls 3 walls (((¶))) 200 feet Distance from Wireless Area Controller 150 feet **WR-15** (Ļ to 1st WaveLinx device Wireless (1,1) Receptacle Distance between WaveLinx devices 75 feet 150 feet Number of hops from 4 hops 5 hops Wireless Area Controller 16 16 Number of areas per Wireless Area Controller Number of zones per area 3 16 Number of scenes per area 6 10 Scheduled OFF Partial ON Bilevel Lighting Local Control Manual ON Daylight Side Daylight Top Partial OFF Automatic OFF Receptacle Control Energy Monitoring Parking Garage Functional Testing Demand Response Enhanced Digital 130.1 130.1 130.1 130.1 130.1 130.1 130.1 130.5 130.5 130.1 130.4 130.1 (e) T24 2016 130.1 130.1 (e) (a)(b) (a)(b) (b) (d) (d) (c).6 (c).5 (c) (d) (b) (d)

Restaurant example





Bill of Materials

Qty Catalog

1 5 W4SL-RL-W

2

Description

WAC-POE

WR-15

- Wireless Area Controller
- WaveLinx Wallstation
- WaveLinx Receptacle
- 24EN-LD2-34-UNV-L835-CD1-SWPD1-U 24 Encounter 2x4 with WaveLinx Sensor



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

Automatic off of lighting and plug load on vacancy

TITLE 24 2016

Manua

Occupanc

X

Tunin

• 🖸

Manual ON/ Auto OFF

澎

Manually Switched ON/OFF

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 that are less than 120W

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise

Lower

All off

Additional Features

WR-15

Wireless

Receptacle

Power measurement reporting through mobile application 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

Typical wiring detail

Wireless Area Controller Number of areas per

Wireless Area Controller Number of zones per area

PoE Network Switch	(((p))) WA Wire •)) Con Install of WC	C-POE eless Area troller ed within 150ft L devices
Design Consideration	Best Practice	Maximum
Gateway/Wireless Area Controller range	150 feet to 250 feet LOS	300 feet LOS
Number of interior walls	2 walls	3 walls
Distance from Wireless Area Controller to 1st WaveLinx device	150 feet	200 feet
Distance between WaveLinx devices	75 feet	150 feet
Number of hops from	4 hops	5 hops



150 feet 5 hops

16

16

16

3



(((••)))

•

(,)



24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 recessed light fixture with 0-10V dimming

Number	r of scene	s per area		6		10									
	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
T24 2016	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)	

Retail example





Bill of Materials Oty Catalog

Catalog # Description

-	•	•
1	WAC-POE	Wireless Area Controller
6	W4SL-RL-W	WaveLinx Wallstation
4	WSP-MV-010	WaveLinx Relay Switchpack with 0-10V dimming

WaveLinx Receptacle

- 2 WR-15
- 4 LDCM-PL-120-277-010V-GR

Linear Dimming Control Modules

23 24EN-LD2-34-UNV-L835-CD1-SWPD1-U Encounter 2x4 with WaveLinx Sensor

Typical wiring detail

Image: Second control <thImage: Second control</th> Image: Second cont

TITLE 24 2016

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 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 that are less than 120W

Manual Controls

Top or dominant button half lights (sets lights to 50% or less) Remaining buttons trigger scenes Raise Lower

All off

Additional Features

Power measurement reporting through mobile application Automatic demand response available from wireless area controller

Scheduling of partial off light levels and times from wireless area controller



Distributed Low-Voltage Power System

The low-voltage system that's practically plug and play.

No more struggling to find qualified electrical labor for your job site. No more waiting weeks for commissioning teams. No more compliance woes. Eliminate costly project delays with our groundbreaking Distributed Low-Voltage Power System, and save up to 20% on the total installed cost of your LED lighting and controls system.

Designed to meet the code requirements of your project

The DLVP system was designed entirely with compliance in mind, to rid you of unnecessary project snarls. Combined with Eaton's highly efficient low-voltage LED fixtures, integrated or external sensors drive energy efficiency throughout the building.

Features like scene control, receptacle control, and automatic turn-off help you customize your system to meet your area's requirements, and can achieve energy savings of up to 65%.

Code compliance, out-of-the-box

Meets or exceeds the requirements of ASHRAE/ANSI/IES, IECC and Title 24 energy codes.



Classroom, 2x2 fixtures with integrated sensors



Bill of Materials Qty Catalog

- 1 LVPM-06-100-03 1 RC-6TSB-P2-W
- 1 RC-61SB-P2-1 LVHH-02
- 1 LVHH-02
- 1 SPRC-20-120
- 1 GGRJ45-25P-G
- 1 GGRJ45-50P-G

18 LVC-15P

Description

600W low-voltage power module 6 button scene station (white) DLVP personal remote

- 20AMP receptacle control
- pre-terminated control cable, 25 feet pre-terminated control cable, 50 feet
- low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

ually Switched ON/OFF Manual

Dimme

ccupa

d.

Demand Response UL924

UL924 (Energy Back-up Circuit)

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1-SV (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



Classroom, 2x2 fixtures



Bill of Materials Qty Catalog #

- LVPM-06-100-03 1 RC-6TSB-P2-W 1 OACT-DT-2000 1 OCC-RJ45 1 DSRC-FMOIR 1 LVHH-02 1 SPRC-20-120
- 1
- GGRJ45-106-G 1
- 2 GGRJ45-25P-G
- GGRJ45-50P-G 1
- LVC-15P 18

Description

600W low-voltage power module 6 button scene station (white) 2000 saft. dual tech sensor input/output device 3 zone daylight sensor/ir receiver **DLVP** personal remote 20AMP receptacle control

- pre-terminated control cable, 10 feet
- pre-terminated control cable, 25 feet
- pre-terminated control cable, 50 feet
- low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load vacancy

Manual

Dimme

ally Switched ON/OFF

)ccupa

.

Demand Response

UL924

UL924 (Energy Back-up Circuit)

Daylighting

Continuous dimming to off Out of the box 3 daylight zone support Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device

UL924 emergency control capabilities with remote relay unit Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature 35 - 3500K

40 - 4000K



Classroom, 2x4 fixtures with integrated sensors





Bill of Materials Qty Catalog

- 1 LVPM-06-100-03
- 1 RC-6TSB-P2-W
- 1 LVHH-02
- 1 SPRC-20-120
- 1 GGRJ45-25P-G
- 1 GGRJ45-50P-G
- 10 LVC-15P
- 2 LVC-30P

Description

600W low-voltage power module 6 button scene station (white) DLVP personal remote

20AMP receptacle control

pre-terminated control cable, 25 feet pre-terminated control cable, 50 feet low-voltage lighting cable, 15 feet low-voltage lighting cable, 30 feet

Sequence of operations

Lighting Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-SLVPD1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



Classroom, 2x4 fixtures



Bill of Materials Qty Catalog

1	LVPM-06-100-03
1	RC-6TSB-P2-W
1	OACT-DT-2000
1	OCC-RJ45
1	DSRC-FMOIR
1	LVHH-02
1	SPRC-20-120
1	GGRJ45-10P-G
2	GGRJ45-25P-G
1	GGRJ45-50P-G
10	LVC-15P
2	LVC-30P

Description

600W low-voltage power module 6 button scene station (white) 2000 sqft. dual tech sensor input/output device 3 zone daylight sensor/ir receiver DLVP personal remote 20AMP receptacle control pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet pre-terminated control cable, 50 feet low-voltage lighting cable, 15 feet low-voltage lighting cable, 30 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load vacancy

Manual

Dimme

ally Switched ON/OFF)ccupa

.

Demand Response UL924

UL924 (Energy Back-up Circuit)

Daylighting

Continuous dimming to off Out of the box 3 daylight zone support Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device

UL924 emergency control capabilities with remote relay unit Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature 35 - 3500K 40 - 4000K

Typical wiring detail



EATON Connected Lighting Energy Codes

Conference room, 2x2 fixtures with integrated sensors



Bill of Materials Oty Catalog

,	••••••	
1	LVPM-03-100-03	30
1	RC-6TSB-P2-W	6
1	RC-6TSB-ZAD-W	6
1	OACT-DT-0501	50
1	OCC-RJ45	in
1	SPRC-20-120	20
1	DSRC-FMOIR	3 :
1	LVHH-02	DI
1	GGRJ45-006-G	pr
1	GGRJ45-10P-G	pr
1	GGRJ45-25P-G	pr
6	LVC-15P	lo

Description

00W low-voltage power module button scene station (white) button raise/lower (white) 00 sqft. dual tech sensor put/output device AMP receptacle control zone daylight sensor/ir receiver LVP personal remote re-terminated control cable, 6 inches re-terminated control cable, 10 feet e-terminated control cable, 25 feet low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

Manual

Dimme

ccupa

.... Demand Response UL924

UL924 (Energy Back-up Circuit)

ally Switched

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



Conference room, 2x2 fixtures



Bill of Materials Oty Catalog

,	
1	LVPM-03-100-03
1	RC-6TSB-P2-W
1	RC-6TSB-ZAD-W
1	OAWC-P-120W
1	OCC-RJ45
1	SPRC-20-120
1	DSRC-FMOIR
1	LVHH-02
1	GGRJ45-006-G
3	GGRJ45-10P-G
3	GGRJ45-25P-G
6	LVC-15P

Button 5: Zone 3 Raise

Button 6: Zone 3 Lower

Description

300W low-voltage power module 6 button scene station (white) 6 button raise/lower (white) 500 sqft. dual tech sensor input/output device 20AMP receptacle control 3 zone daylight sensor/ir receiver **DLVP** personal remote pre-terminated control cable, 6 inches pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load vacancy

Manual

Dimme

ally Switched ON/OFF

ccupa

....

Demand Response

UL924

UL924 (Energy Back-up Circuit)

Daylighting

Continuous dimming to off Out of the box 3 daylight zone support Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device

UL924 emergency control capabilities with remote relay unit Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature 35 - 3500K 40 - 4000K



*Immediately provides daylight dimming upon powerup

Conference room, 2x2 fixtures and downlights



Bill of Materials Qty Catalog

1	LVPM-06-100-03
1	RC-6TSB-P2-W
1	RC-6TSB-ZAD-W
1	OAWC-P-120W
1	OCC-RJ45
1	SPRC-20-120
1	DSRC-FMOIR
1	LVHH-02
1	GGRJ45-006-G
2	GGRJ45-10P-G
3	GGRJ45-25P-G
2	LVC-8P
4	IVC-15P

Description

600W low-voltage power module 6 button scene station (white) 6 button raise/lower (white) 500 sqft. dual tech sensor input/output device 20AMP receptacle control 3 zone daylight sensor/ir receiver DLVP personal remote pre-terminated control cable, 6 inches pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy

ally Switched

Daylighting

Continuous dimming to off Out of the box 3 daylight zone support Not required in spaces without windows or that are less than 120W

Dimme

)ccupar

....

Demand Response UL924

UL924 (Energy Back-up Circuit)

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device

UL924 emergency control capabilities with remote relay unit Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts) Portfolio: LD6B15DLV EU6B102080XX 6LBM1H (16 watts) Halo Commercial: PD615DLVB PDM6B8XX 61VH (14 watts

XX= color temperature

35 - 3500K 40 - 4000K



Corridor/Hall, 2x4 fixtures with integrated sensors



Bill of Materials Qty Catalog

1	LVPM-03-100-03
2	RC-3TSB-Z1D-W
1	LVHH-02
1	GGRJ45-25P-G
1	GGRJ45-50P-G

- 1 LVC-8P
- 5 LVC-15P

Description

300W low-voltage power module 3 button zone raise/lower (white) DLVP personal remote pre-terminated control cable, 25 feet pre-terminated control cable, 50 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional partial on/partial off Optional auto on to scene Automatic off of lighting on vacancy Automatic partial off of lighting on vacancy

Manual Controls

On/off/raise lower Single or multiple zones

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Manua

Dimme

ally Switc

cupane

h

Demand Respons UL924

UL924 (Energy Back-up Circuit)

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-SLVPD1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature 35 - 3500K 40 - 4000K



Corridor/Hall, 2x4 fixtures





Bill of Materials Qty Catalog

1	LVPM-03-100-03	
2	RC-3TSB-Z1D-W	
2	OACT-DT-2000	
2	OCC-RJ45	
1	LVHH-02	
1	GGRJ45-10P-G	

- 2 GGRJ45-25P-G
- 1 GGRJ45-50P-G
- 6 LVC-15P

Description

300W low-voltage power module 3 button zone raise/lower (white) 2000 sqft. dual tech sensor input/output device DLVP personal remote pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet pre-terminated control cable, 50 feet low-voltage lighting cable, 15 feet

Sequence of operations

bequeinee of operat

Lighting Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional partial on/partial off Automatic off of lighting on vacancy Automatic partial off of lighting on vacancy

Manual Controls

On/off/raise lower Single or multiple zones

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Substitute any Greengate low-voltage occupancy sensor Switchpack power supply may be needed to power more than two occupancy sensors

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



Executive office, 2x2 fixtures



Bill of Materials Oty Catalog

Qty 1 1	Catalog # LVPM-03-100-03 RC3DE-PL	Description 300W low-voltage power module room controller
1	KU-015B-P4-W ΩΔWC-P-120W	b Dutton scene station (White)
1	OCC-RJ45	input/output device
1	SPRC-20-120	20AMP receptacle control
1	DSRC-FMOIR	3 zone daylight sensor/ir receiver
1	LVHH-02	DLVP personal remote
1	HHPRG-RC	handheld daylight
1	GGRJ45-006-G	pre-terminated control cable, 6 inches
2	GGRJ45-10P-G	pre-terminated control cable, 10 feet
3	GGRJ45-25P-G	pre-terminated control cable, 25 feet
2	LVC-8P	low-voltage lighting cable, 8 feet
5	LVC-15P	low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Automatic off of lighting on vacancy Automatic partial off of lighting on vacancy

Daylighting

Continuous dimming to off Out of the box 3 daylight zone support Not required in spaces without windows or that are less than 120W

Manual

Dimme

ally Switched ON/OFF

ccupa

.

Demand Response

UL924

UL924 (Energy Back-up Circuit)

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts) Portfolio: LD6B15DLV EU6B102080XX 6LBM1H (16 watts) Halo Commercial: PD615DLVB PDM6B8XX 61VH (14 watts

XX= color temperature

35 - 3500K 40 - 4000K



Open office, 2x4 fixtures with Manual ally Switched ON/OFF Dimme integrated sensors and emergency



Bill of Materials Qty Catalog #

- 2 LVPM-06-100-03 RC-6TSB-P4-W
- 2
- 1 LVHH-02
- SPRC-20-120 1
- 1 **RRU-XXX** GGRJ45-10P-G 2
- GGRJ45-25P-G 1
- 1 GGRJ45-50P-G
- 4 LVC-8P
- 13 LVC-15P
- 7 LVC-30P

Description

600W low-voltage power module 6 button zone raise/lower (white) **DLVP** personal remote 20AMP receptacle control Remote Relay Unit 120v or 277v pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet pre-terminated control cable, 50 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet low-voltage lighting cable, 30 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

ccupa

.... Demand Respons

UL924 (Energy Back-up Circuit

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



EATON Connected Lighting Energy Codes

Open office, 2x4 fixtures with integrated sensors



Bill of Materials Qty Catalog #

2 LVPM-06-100-03 2 RC-6TSB-P2-W

- 1 LVHH-02
- SPRC-20-120 1
- 2 GGRJ45-10P-G GGRJ45-25P-G 1
- 1 GGRJ45-100P-G
- LVC-8P 4
- 16 LVC-15P
- LVC-30P Δ

Description

600W low-voltage power module 6 button scene station (white) **DLVP** personal remote

20AMP receptacle control

pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet pre-terminated control cable, 100 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet low-voltage lighting cable, 30 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic partial off of lighting on vacancy

Manual

cupa

666

UL924 UL924 (Energy Back-up Circuit)

ally Switched ON/OFF

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-SLVPD1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



EATON Connected Lighting Energy Codes

Open office, 2x4 fixtures



Bill of Materials Qty Catalog #

2

2	LVPM-06-100-03	600W low-voltage
2	RC-6TSB-P2-W	6 button scene sta
2	OACT-DT-2000	2000 sqft. dual te
2	OCC-RJ45	input/output devi
1	DSRC-FMOIR	3 zone daylight se
1	LVHH-02	DLVP personal rei
1	SPRC-20-120	20AMP receptacle
1	GGRC-SPLITTER	RJ45 cable splitte
2	GGRJ45-10P-G	pre-terminated co
2	GGRJ45-25P-G	pre-terminated co
2	GGRJ45-50P-G	pre-terminated co
1	GGRJ45-100P-G	pre-terminated co
4	LVC-8P	low-voltage lighti
16	LVC-15P	low-voltage lighti
4	LVC-30P	low-voltage lighti

Description

e power module ation (white) ch sensor ce ensor/ir receiver mote e control ontrol cable, 10 feet ontrol cable, 25 feet ontrol cable, 50 feet ontrol cable, 100 feet ng cable, 8 feet ng cable, 15 feet ng cable, 30 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

ally Switched ON/OFF

Manual

Dimme

ccupa

....

Demand Response

UL924

UL924 (Energy Back-up Circuit

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



Open office, 2x4 fixtures with integrated sensors and emergency



Bill of Materials Qty Catalog

1	LVPM-06-100-03
1	LVPM-03-100-03
1	RC-6TSB-P2-W
1	LVHH-02
1	SPRC-20-120
1	RRU-XXX
1	GGRJ45-10P-G
2	GGRJ45-25P-G
1	GGRJ45-50P-G
2	LVC-8P
8	LVC-15P
2	LVC-30P

Description

600W low-voltage power module 300W low-voltage power module 6 button scene station (white) DLVP personal remote 20AMP receptacle control Remote Relay Unit 120v or 277v pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet low-voltage lighting cable, 30 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-SLVPD1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature 35 - 3500K 40 - 4000K



Relay Interface



Connect up to 90W per low-voltage circuit

Private office, 2x4 fixtures with integrated sensors



Bill of Materials Qty Catalog

- 1 LVPM-03-100-03
- 1 RC-5TSB-P2-W
- 1 LVHH-02
- 1 SPRC-20-120
- 1 GGRJ45-10P-G
- 1 GGRJ45-25P-G
- 2 LVC-8P
- 3 LVC-15P

Description

300W low-voltage power module 5 button scene station (white) DLVP personal remote 20AMP receptacle control pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet

Sequence of operations

Lighting Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

ally Switched

Dimme

ccupa

....

Demand Response UL924

UL924 (Energy Back-up Circuit

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (39 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (40 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (42 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (38 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (38 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (39 watts) Portfolio: LD6B15DLV EU6B102080XX 6LBM1H (16 watts) Halo Commercial: PD615DLVB PDM6B8XX 61VH (14 watts)

XX= color temperature

35 - 3500K 40 - 4000K

Typical wiring detail



Connect up to 90W per low-voltage circuit

Private office, 2x4 fixtures



Bill of Materials Qty Catalog #

Descrip	t
---------	---

1	LVPM-03-100-03
1	RC-5TSB-OS2-W
1	OACT-DT-0501
1	OCC-RJ45
1	SPRC-20-120
1	DSRC-FMOIR
1	LVHH-02
1	GGRJ45-006-G
1	GGRJ45-10P-G
2	GGRJ45-25P-G
2	LVC-8P
3	LVC-15P

Typical wiring detail

tion

300W low-voltage power module 5 button scene station (white) 500 saft. dual tech sensor input/output device 20AMP receptacle control 3 zone daylight sensor/ir receiver **DLVP** personal remote pre-terminated control cable, 6 inches pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet low-voltage lighting cable, 8 feet low-voltage lighting cable, 15 feet

Sequence of operations

Lighting

Up to 3 dimmable zones

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Out of the box plug load turns on with occupancy Automatic off of lighting and plug load on vacancy

ally Switched ON/OFF

Manual

Dimme

ccupa

d.

Demand Response

UL924

UL924 (Energy Back-up Circuit)

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Programmable scenes Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device

UL924 emergency control capabilities with remote relay unit Substitute any Greengate low-voltage occupancy sensor

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-U (39 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-U (40 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-U (42 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-U (38 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-U (35 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-U (38 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (39 watts) Portfolio: LD6B15DLV EU6B102080XX 6LBM1H (16 watts) Halo Commercial: PD615DLVB PDM6B8XX 61VH (14 watts)

XX= color temperature 35 - 3500K 40 - 4000K

DSRC-FMOIR Blue (control) ł **Daylight Sensor** OAC-P-120W Red (10-30VDC OCC-RJ45 Adjustable daylight sensor dome * Immediately provides daylight dimming upon powerup Dual Technology Wall Black (common) **Occupancy Coupler** Occupancy/Vacancy Sensor *Allows connection to any Greengate Occupancy / Vacancy Sensor *Defaults to vacancy sensor mode. Manual ON/Automatic OFF (all loads) for maximum energy savings SPRC-R-20-120 20A Receptacle Control 0 E:T-I <u>...</u> 120V Receptacle circuit ₫ **Normal Power** âņ 🖻 RC-5TSB-OS2-* Neutral Line 아이아이아 Ô Button 1: All zones on 100% ┢ Button 2: All zones on 50% White/ORG or Button 3: Raise all White/BLK Neutral Button 4: Lower all Button 5: All off Connect up to 90W per low-voltage circuit *Immediately provides daylight dimming upon powerup Black - Hot (120/277VAC) -@() - (\bigcirc)

Private offices, 2x4 fixtures with integrated sensors



Bill of Materials Qty Catalog

- 1 LVPM-03-100-03 1 RC-3TLB-Z1D
- 1 RC-3TLB-Z2D
- 1 RC-3TLB-Z3D
- 1 GGRJ45-10P-G
- 2 GGRJ45-25P-G
- 5 LVC-15P
- 1 LVC-30P

Description

- 300W low-voltage power module
- 3 button raise/lower toggle
- 3 button raise/lower toggle
- 3 button raise/lower toggle
- pre-terminated control cable, 10 feet pre-terminated control cable, 25 feet
- low-voltage lighting cable, 15 feet
- low-voltage lighting cable, 30 feet

Sequence of operations

Lighting

Up to 3 dimmable zones/spaces

Occupancy

Out of the box vacancy mode Optional auto on to 50% Optional auto on to scene Automatic off of lighting and plug load on vacancy

ually Switched ON/OFF Manual

Demand

UL924 (Energy Back-up Circuit)

Daylighting

Continuous dimming to off Individual fixture daylight dimming Not required in spaces without windows or that are less than 120W

Manual Controls

Individual dimming zone raise/lower All off

Additional Features

Automatic demand response available with open ADR compliant device

UL924 emergency control capabilities with remote relay unit

Available Fixture Models

Metalux Encounter: 22EN-LD2-25-48V-L8XX-LV1-SLVPD1-U (22 watts) Metalux SkyRidge: 22SR-LD2-29-C-48V-L8XX-LV1-SLVPD1-U (23 watts) Metalux ArcLine: 22ALNG-LD4-25-48V-L8XX-LV1-SLVPD1-U (21 watts) Metalux Cruze: 22CZ-LD5-24-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux FRLED: 24FR-LD4-40-48V-L8XX-LV1-SLVPD1-U (20 watts) Metalux GRLED: 22GR-LD4-24-F1-48V-L8XX-LV1-SLVPD1-U (20 watts) Corelite Bridge: BRG-WS-2LXX-LD2-48V-22-LV1 (23 watts)

XX= color temperature

35 - 3500K 40 - 4000K



*Immediately provides daylight dimming upon powerup



Energy Codes application notes

Lighting Product Lines Halo Halo Commercial Portfolio Iris RSA Metalux Corelite Neo-Ray Fail-Safe MWS Ametrix Shaper io Lumark McGraw-Edison Invue Ephesus Lumière Streetworks AtLite Sure-Lites

Controls Product Lines

Greengate iLumin Zero 88 Fifth Light Technology iLight (International Only)

Connected Lighting Systems

LumaWatt Pro WaveLinx Distributed Low-Voltage Power ConnectWorks

Eaton 1121 Highway 74 South Peachtree City, GA 30269 P: 770-486-4800 www.eaton.com/lightingsystems For service or technical assistance: 1-800-553-3879

Canada Sales 5925 McLaughlin Road Mississauga, Ontario L5R 1B8 P: 905-501-3000 F: 905-501-3172 © 2017 Eaton All Rights Reserved Printed in USA Publication No. BR525080EN September, 2017

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

Product availability, specifications, and compliances are subject to change without notice.

