



Hospitality ASHRAE 90.1-2016 Solutions

Design Guide

Crestron Electronics, Inc.

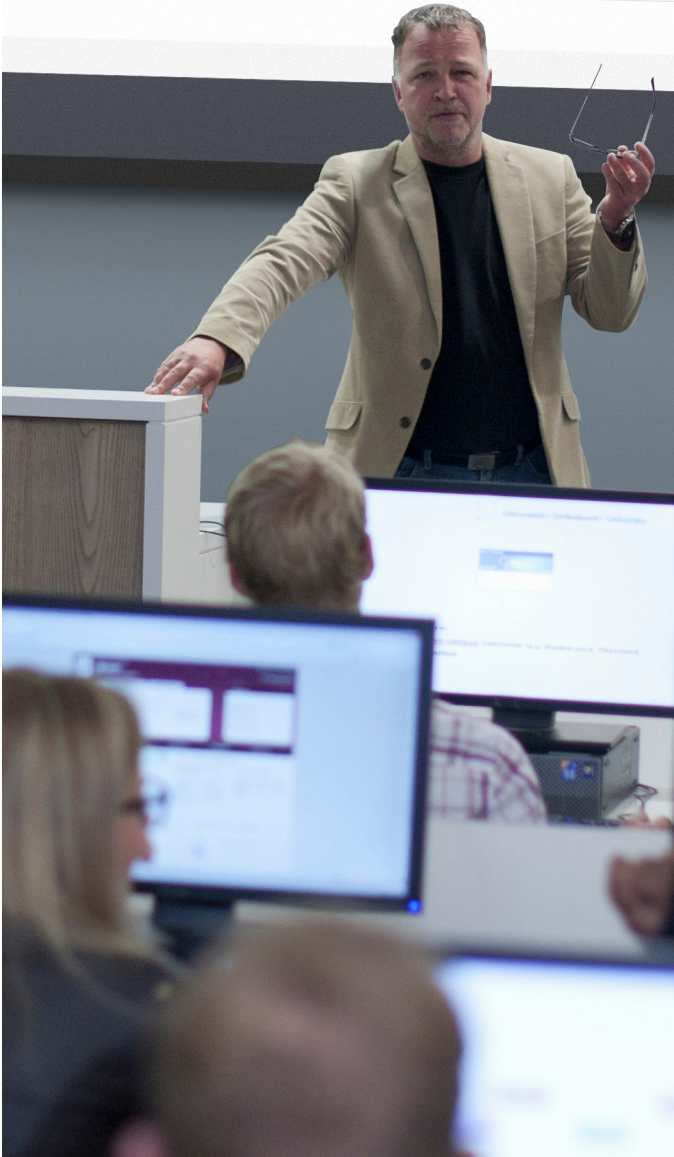
Contents

About ASHRAE 90.1-2016	1
Design Guide Information	1
ASHRAE 90.1-2016 Code Standards	2
Guest Room	4
Zūm.....	4
Guest Room Suite	5
Zūm.....	5
Lobby	6
Zūm.....	6
GLPP.....	7
GLPAC + DMX	8
Ballroom	9
GLPAC + DMX	9
Corridor	10
Zūm.....	10
GLPP.....	11
Public Restroom	12
Zūm.....	12
GLPP.....	13

TOTAL ENERGY CONSUMPTION

Per capita usage; 10⁹ BTU per person

	OIL	COAL	SOLAR
Hot climates	2.50b	3.1b	0.25
Moderate climates	1.23b	0.55b	1.18
Cool climates	0.09b	0.19b	3.73
Very cool climates	1.15b	1.30b	2.21
Arctic climates	0.20b	0.82b	1.32
	Total: 5.17	Total: 5.96	Total: 8.73



About ASHRAE 90.1-2016

ASHRAE 90.1-2016 is a residential and commercial building energy code that is designed to reduce energy consumption. The goal of this code is to reduce energy consumption by providing design and construction requirements for lighting controls.

Lighting controls such as occupancy status sensors, multi-level controls, and demand response provisions allow you to synchronize indoor light levels with daylight levels in accordance with ASHRAE 90.1-2016.

Design Guide Information

Crestron® offers this Design Guide for Hospitality - ASHRAE 90.1-2016 solutions to use as a reference for typical layouts. Use it as guidance to make code compliance quick and easy. The Crestron team is also available to support with detailed design, submittal, and installation requirements. For additional information, please contact your Crestron representative at CLCDesign@crestron.com or (888) 330-1502.

ASHRAE 90.1-2016 Code Standards

Summary

ASHRAE 90.1-2016 Code Standards

	Code Provision	Minimum Control Requirement	Code Description
ON/OFF CONTROLS	9.4.1.1	Automatic Full On (Occupancy Sensing Mode)	Lighting is permitted to automatically turn to full on.
	9.4.1.1.a	Local Control	There should be one or more readily accessible manual lighting controls in each space.
	9.4.1.1.b/c	Manual On / Partial Auto On (Vacancy Sensing Mode)	The general lighting can be manually turned on or automatically turned on up to 50%.
	9.4.1.1.g	Automatic Partial Off	Lighting power should be automatically reduced by at least 50% within 20 minutes of vacancy.
	9.4.1.1.h	Automatic Full Off	All lighting must be shut off within 20 minutes of vacancy.
	9.4.1.1.i	Scheduled Shutoff (Programmable Timeclock)	All lighting should be automatically shut off during periods when the space is scheduled to be unoccupied using a programmable timeclock or signal from another control device (i.e. security system).
	9.4.1.3.b	Master Off	The lights and switched receptacles must turn off 20 minutes after vacancy.
	9.4.1.3.b.1	Bathroom Off	Guest room bathrooms must have separate control devices that turn the lights off 30 minutes after vacancy.
LIGHT LEVEL CONTROL	9.4.1.1.d	Bi-level Control (0-10v Dimming)	The general lighting should use continuous dimming or have at least one intermediate step between 30-70% power in addition to full on and full off.
	9.4.1.1.e/f	Automatic Daylight Control (Photocontrol)	In primary side daylit general lighting zones using more than 150W (or using more than 300W within the primary and secondary daylit zones), daylight must be harvested using photocontrols. In top daylit general lighting zones using more than 150W, daylight must be harvested using photocontrols.
PLUG LOAD CONTROL	8.4.2	Automatic Receptacle Control	50% of all receptacles and 25% of modular furniture feeders must be turned off 20 minutes after vacancy.

Primary Solutions

Zūm™ Wireless Light Control

GLPP

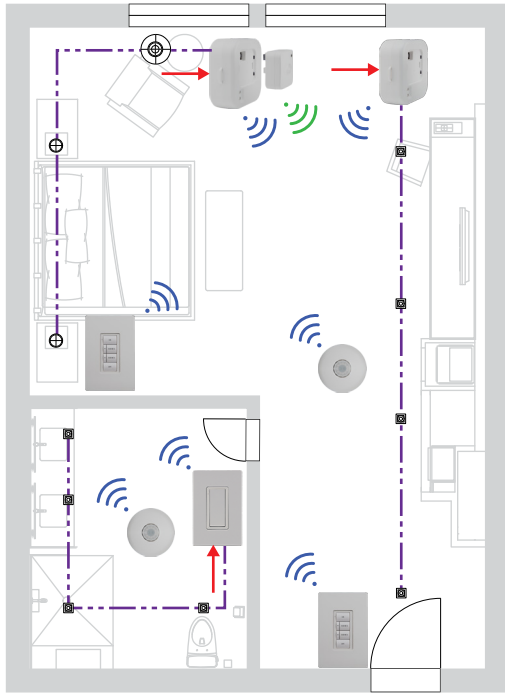
GLPAC

* Optional

Space Type					
Guest Room	Guest Room Bathroom	Corridor	Lobby	Ballroom	Restroom
		✓	✓		✓
		✓	✓	✓	✓*
				✓	
		✓	✓		
See 9.4.1.3.b		✓	✓	✓	✓
		or	or	or	
		✓	✓	✓	
✓					
	✓				
				✓	
✓		✓	✓	✓	✓
See 9.4.1.3.b					
✓	✓	✓	✓		✓
		✓	✓		✓
			✓		

Guest Room

Zūm








ASHRAE 90.1-2016 Code Compliance:

- ▶ Master Off (9.4.1.3.b)
- ▶ Bathroom Off (9.4.1.3.b.1)

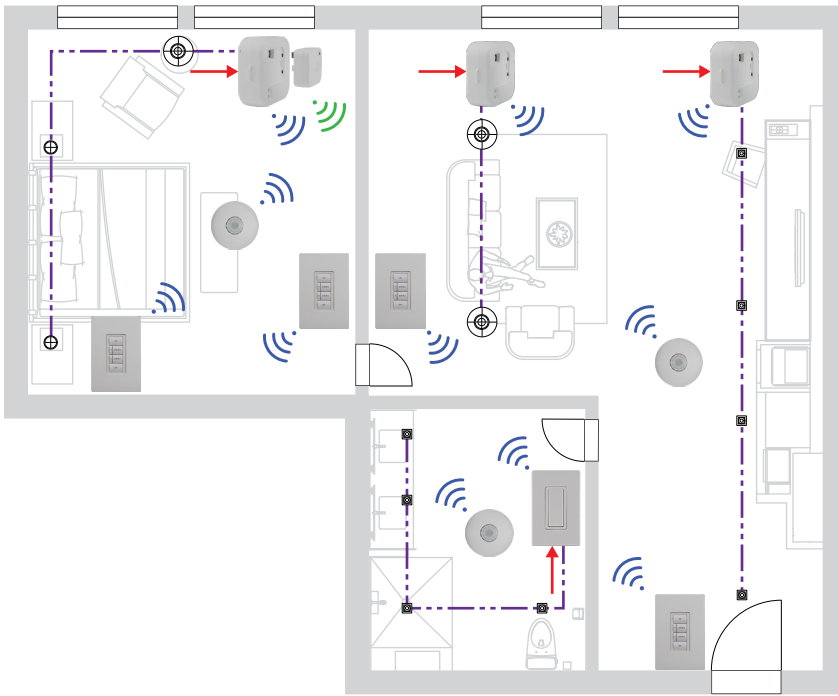
Local Control:



Symbol	Qty.	Product	Description
	2	ZUMMESH-JBOX-5A-LV	Junction Box Zone Controller, 0-10V Dimming, 5A
	1	ZUMMESH-5A-LV	Zūm™ Wall-Box Dimmer, 5A
	1	ZUMMESH-NETBRIDGE	Zūm™ Network Bridge
	2	ZUMMESH-KP10CBATT	6-Button Battery-Powered Keypad
	2	ZUMMESH-PIR-VACANCY-BATT	PIR Vacancy Sensor (AUTO-OFF)

Guest Room Suite

Züm








ASHRAE 90.1-2016 Code Compliance:

- ▶ Master Off (9.4.1.3.b)
- ▶ Bathroom Off (9.4.1.3.b.1)

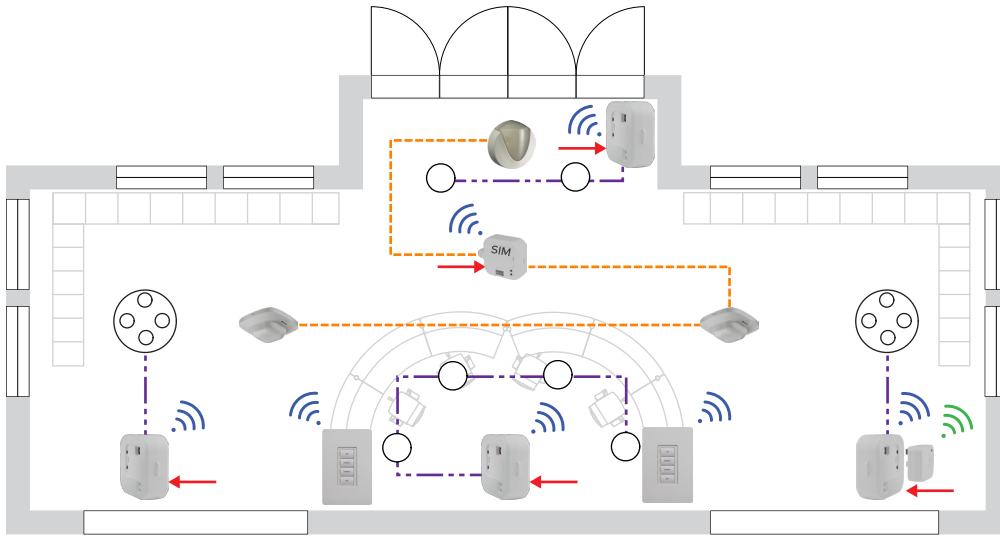
Local Control:



Symbol	Qty.	Product	Description
	3	ZUMMESH-JBOX-5A-LV	Junction Box Zone Controller, 0-10V Dimming, 5A
	1	ZUMMESH-5A-LV	Züm™ Wall-Box Dimmer, 5A
	1	ZUMMESH-NETBRIDGE	Züm™ Network Bridge
	4	ZUMMESH-KP10CBATT	6-Button Battery-Powered Keypad
	3	ZUMMESH-PIR-VACANCY-BATT	PIR Vacancy Sensor (AUTO-OFF)

Lobby

Zūm



- ▶ Add a ZUM-FLOOR-HUB and ZUMNET-GATEWAY for scheduled shutoff (9.4.1.1.i).

ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Partial Off (9.4.1.1.g)
- ▶ Automatic Full Off (9.4.1.1.h)
- ▶ Automatic Daylight Control (Photocontrol) (9.4.1.1.e/f)

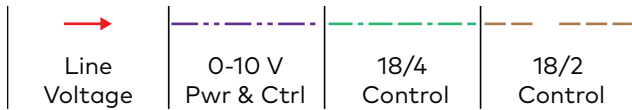
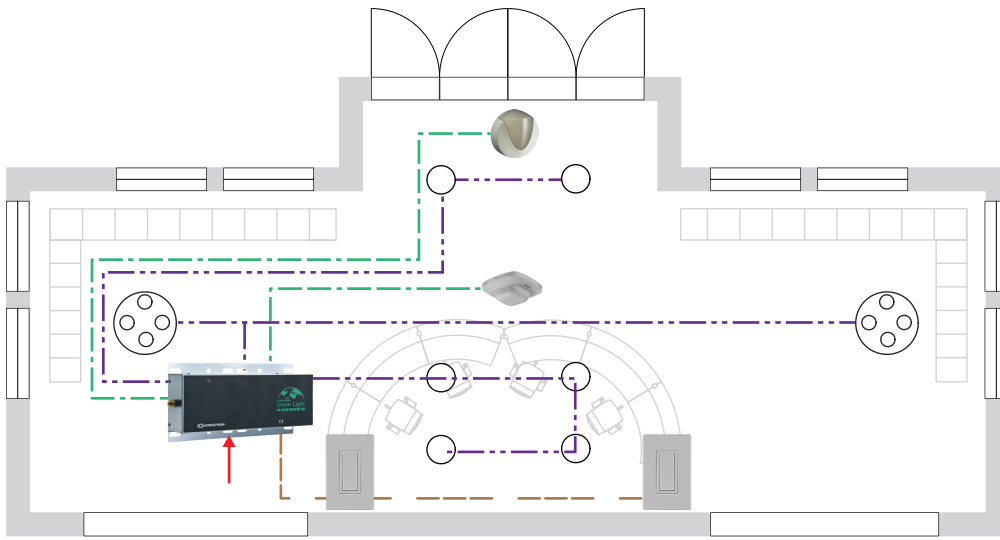
Local Control:



Symbol	Qty.	Product	Description
	4	ZUMMESH-JBOX-5A-LV	Junction Box Zone Controller, 0-10V Dimming, 5A
	1	ZUMMESH-JBOX-SIM	Zūm™ Junction Box Sensor Integration Module
	1	ZUMMESH-NETBRIDGE	Zūm™ Network Bridge
	2	ZUMMESH-KP10CBATT	6-Button Battery-Powered Keypad
	2	GLA-IR-QUATTRO-COM1-24	High Definition PIR Presence Detector, Ceiling Mount, Square & Scalable 360° Coverage, 18-24 VAC/VDC
	1	GLS-LOL	Crestron Green Light® Photosensor, Open-Loop

Lobby

GLPP







ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Partial Off (9.4.1.1.g)
- ▶ Automatic Full Off (9.4.1.1.h)
- ▶ Automatic Daylight Control (Photocontrol) (9.4.1.1.e/f)

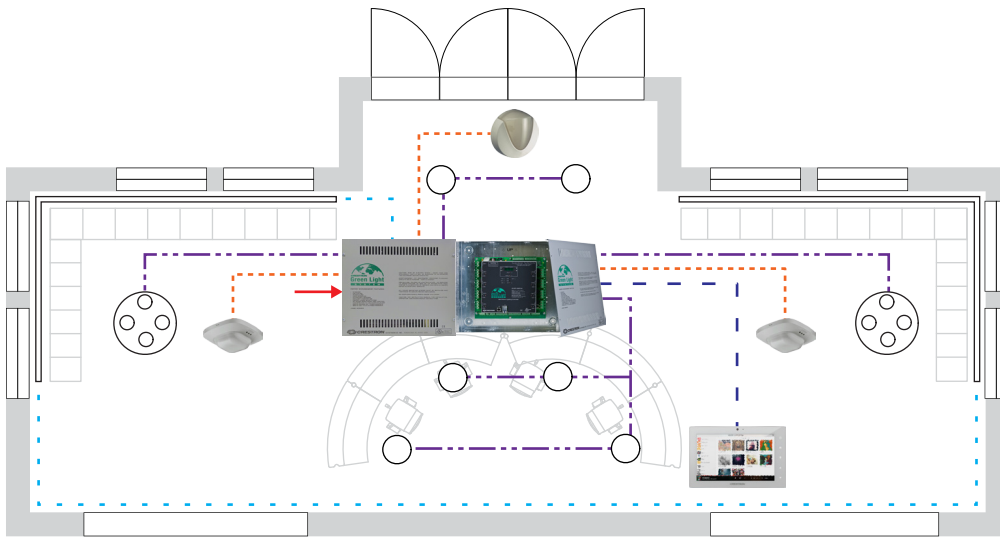
Local Control:



Product	Qty.	Product	Description
	1	GLPP-1DIMFLV3-CN-PM	3-Ch 0-10V Dimmer with Cresnet®
	2	GLPPA-KP	In-Wall Keypad for GLPP
	1	GLA-IR-QUATTRO-COM1-24	High Definition PIR Presence Detector, Ceiling Mount, Square & Scalable 360° Coverage, 18-24 VAC/VDC
	1	GLS-LOL	Creston Green Light® Photosensor, Open-Loop

Lobby

GLPAC + DMX








ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Partial Off (9.4.1.1.g)
- ▶ Scheduled Shutoff (Programmable Timeclock) (9.4.1.1.i)
- ▶ Automatic Daylight Control (Photocontrol) (9.4.1.1.e/f)

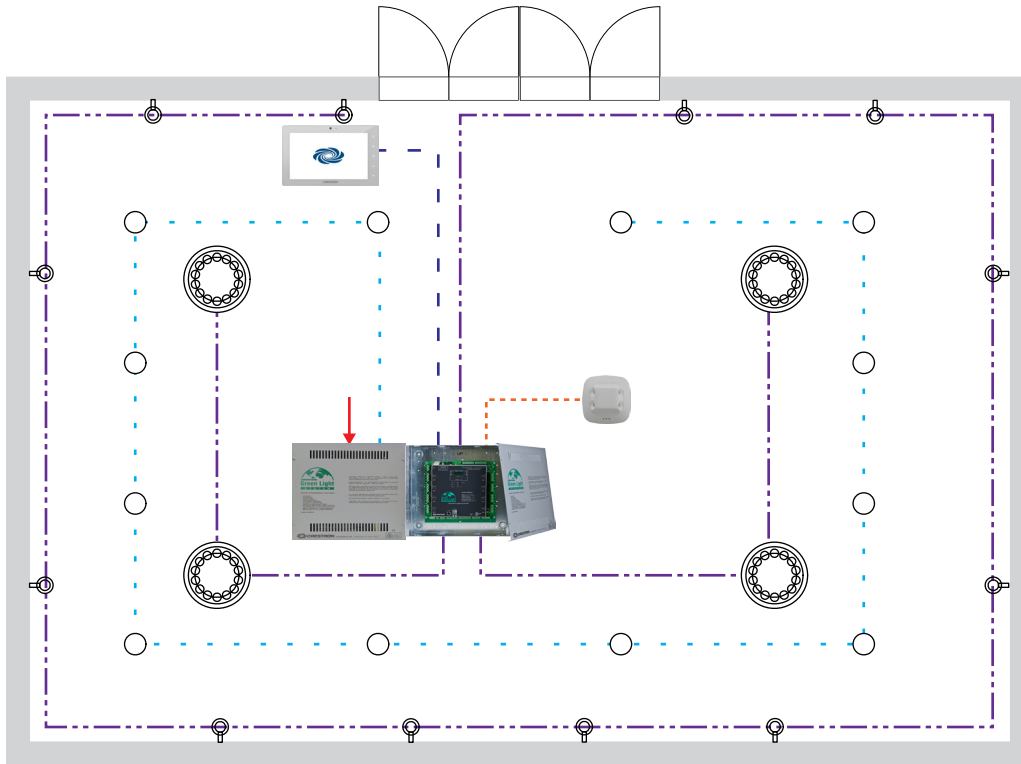
Local Control:



Product	Qty.	Product	Description
	1	GLPAC-DIMFLV4	Green Light Integrated Lighting System, 4-Channel
	1	DIN-EN2x18	RMC3, DIN-SCAN-DMX, CEN-POE-SW5
	1	TSW-760	7" Touch Screen
	2	GLA-IR-QUATTRO-COM1-24	High Definition PIR Presence Detector, Ceiling Mount, Square & Scalable 360° Coverage, 18-24 VAC/VDC
	1	GLS-LOL	Crestron Green Light® Photosensor, Open-Loop

Ballroom

GLPAC + DMX







ASHRAE 90.1-2016 Code Compliance:

- ▶ Local Control (9.4.1.1.a)
- ▶ Manual On / Partial Auto On (Vacancy Sensing Mode) (9.4.1.1.b/c)
- ▶ Automatic Full Off (9.4.1.1.h)
- ▶ Scheduled Shutoff (Programmable Timeclock) (9.4.1.1.i)
- ▶ Bi-level Control (0-10v Dimming) (9.4.1.1.d)
- ▶ Automatic Daylight Control (Photocontrol) (9.4.1.1.e/f)

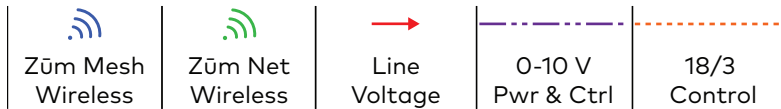
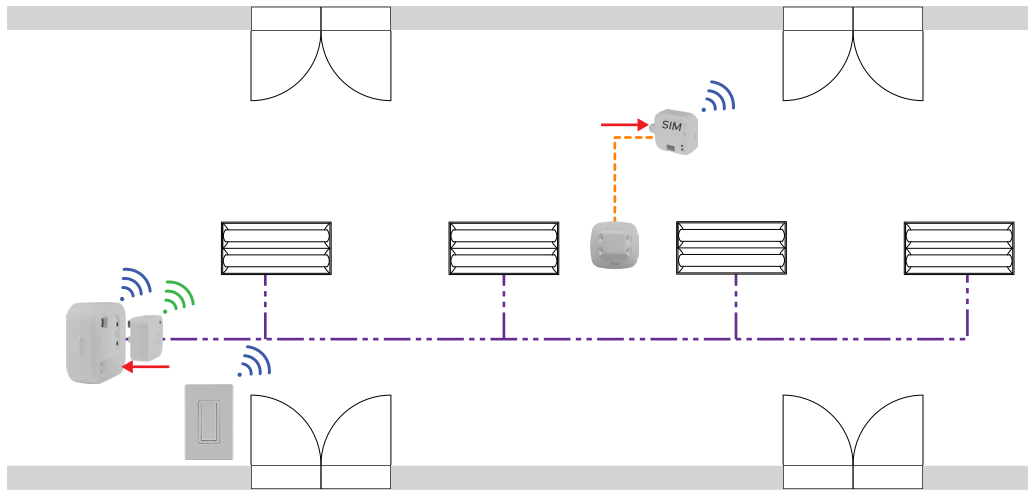
Local Control:



Product	Qty.	Product	Description
	1	GLPAC-DIMFLV4	Green Light Integrated Lighting System, 4-Channel
	1	DIN-EN2x18	RMC3, DIN-SCAN-DMX, CEN-POE-SW5
	1	TSW-760	7" Touch Screen
	1	GLA-IR-QUATTRO-COM1-24	High Definition PIR Presence Detector, Ceiling Mount, Square & Scalable 360° Coverage, 18-24 VAC/VDC

Corridor

Zūm

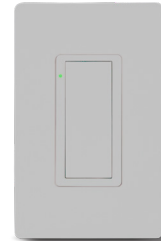







- ▶ UL924 emergency lighting devices are available for life safety.
- ▶ Add a ZUM-FLOOR-HUB and ZUMNET-GATEWAY for scheduled shutoff (9.4.1.1.i).

ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Partial Off (9.4.1.1.g)
- ▶ Automatic Full Off (9.4.1.1.h)

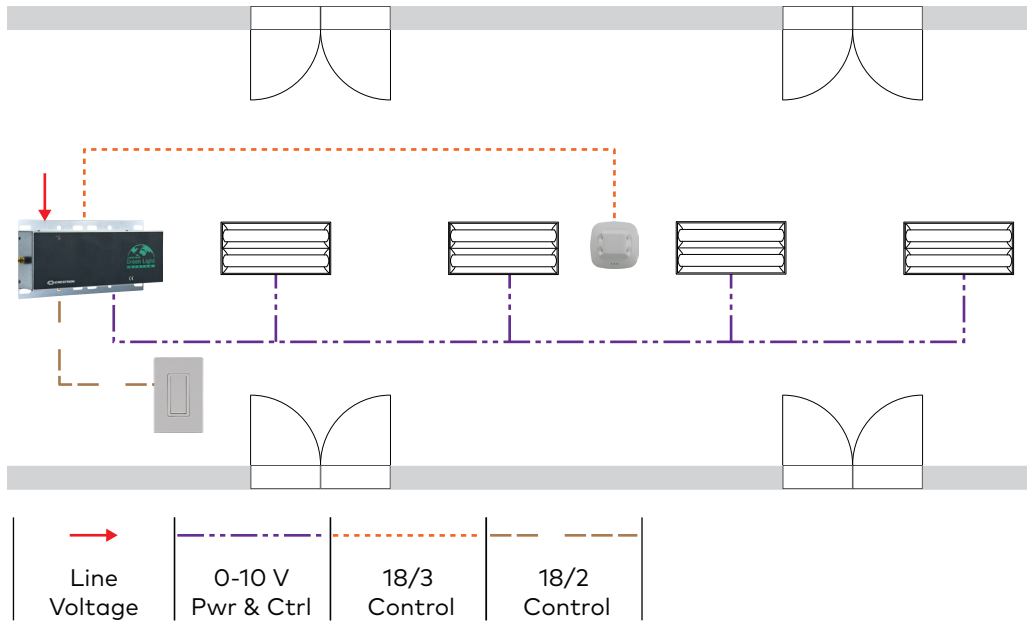
Local Control:



Symbol	Qty.	Product	Description
	1	ZUMMESH-JBOX-5A-LV	Junction Box Zone Controller, 0-10V Dimming, 5A
	1	ZUMMESH-JBOX-SIM	Zūm™ Junction Box Sensor Integration Module
	1	ZUMMESH-NETBRIDGE	Zūm™ Network Bridge
	1	ZUMMESH-KP10ABATT	Rocker-Button Battery Powered Keypad
	1	GLA-US-HALLWAY-COM1-24	40 kHz Ultrasonic Presence Detector, Ceiling Mount, Hallway Coverage, 18-24 VAC/VDC, 33 ft corridor coverage, up to 8 hallway sensors per SIM

Corridor

GLPP






ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Partial Off (9.4.1.1.g)
- ▶ Automatic Full Off (9.4.1.1.h)

- ▶ UL924 emergency lighting devices are available for life safety.

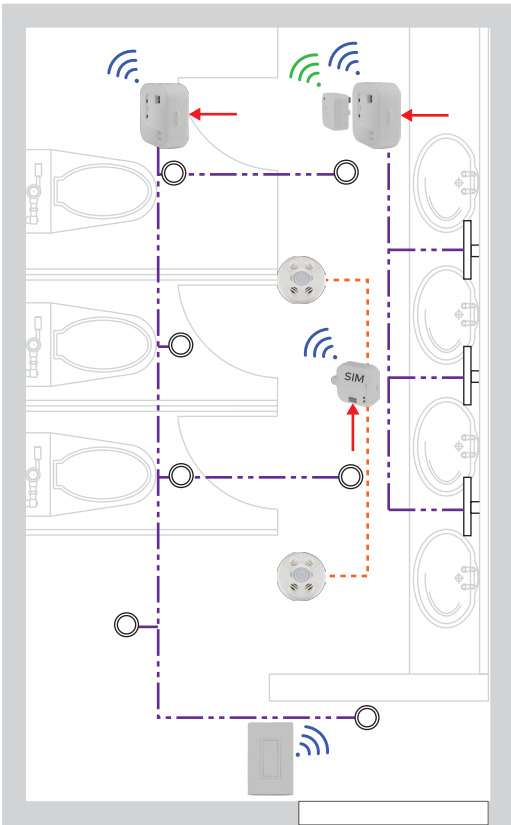
Local Control:



Product	Qty.	Product	Description
	1	GLPP-1DIMFLVCN-PM	1-Ch 0-10V Dimmer with Cresnet®
	1	GLPPA-KP	In-Wall Keypad for GLPP
	1	GLA-US-HALLWAY-COM1-24	40 kHz Ultrasonic Presence Detector, Ceiling Mount, Hallway Coverage, 18-24 VAC/VDC

Public Restroom

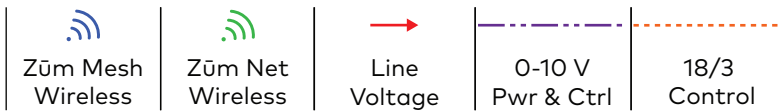
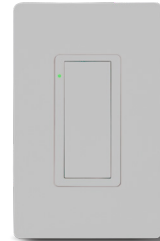
Zūm








ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Full Off (9.4.1.1.h)

Local Control:

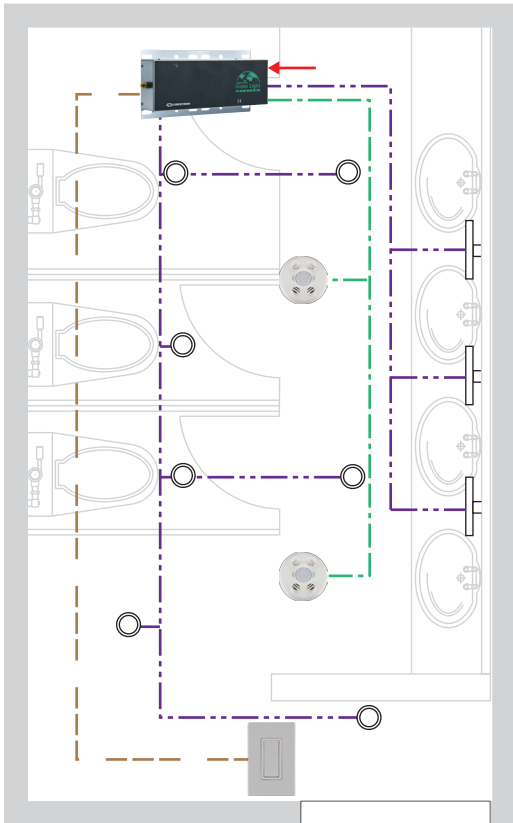


- ▶ Local control (9.4.1.1.a) is optional.
- ▶ Automatic daylight control (photocontrol) (9.4.1.1.e/f) may be required if windows are present.

Symbol	Qty.	Product	Description
	2	ZUMMESH-JBOX-5A-LV	Junction Box Zone Controller, 0-10V Dimming, 5A
	1	ZUMMESH-JBOX-SIM	Zūm™ Junction Box Sensor Integration Module
	1	ZUMMESH-NETBRIDGE	Zūm™ Network Bridge
	1	ZUMMESH-KP10ABATT	Rocker-Switch Battery Powered Keypad
	2	GLS-ODT-C-NS	Dual-Technology Ceiling Mount Occupancy Sensor

Public Restroom

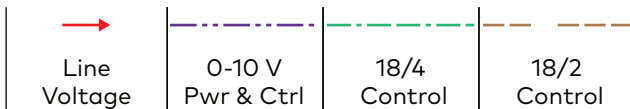
GLPP






ASHRAE 90.1-2016 Code Compliance:

- ▶ Automatic Full On (Occupancy Sensing Mode) (9.4.1.1)
- ▶ Local Control (9.4.1.1.a)
- ▶ Automatic Full Off (9.4.1.1.h)

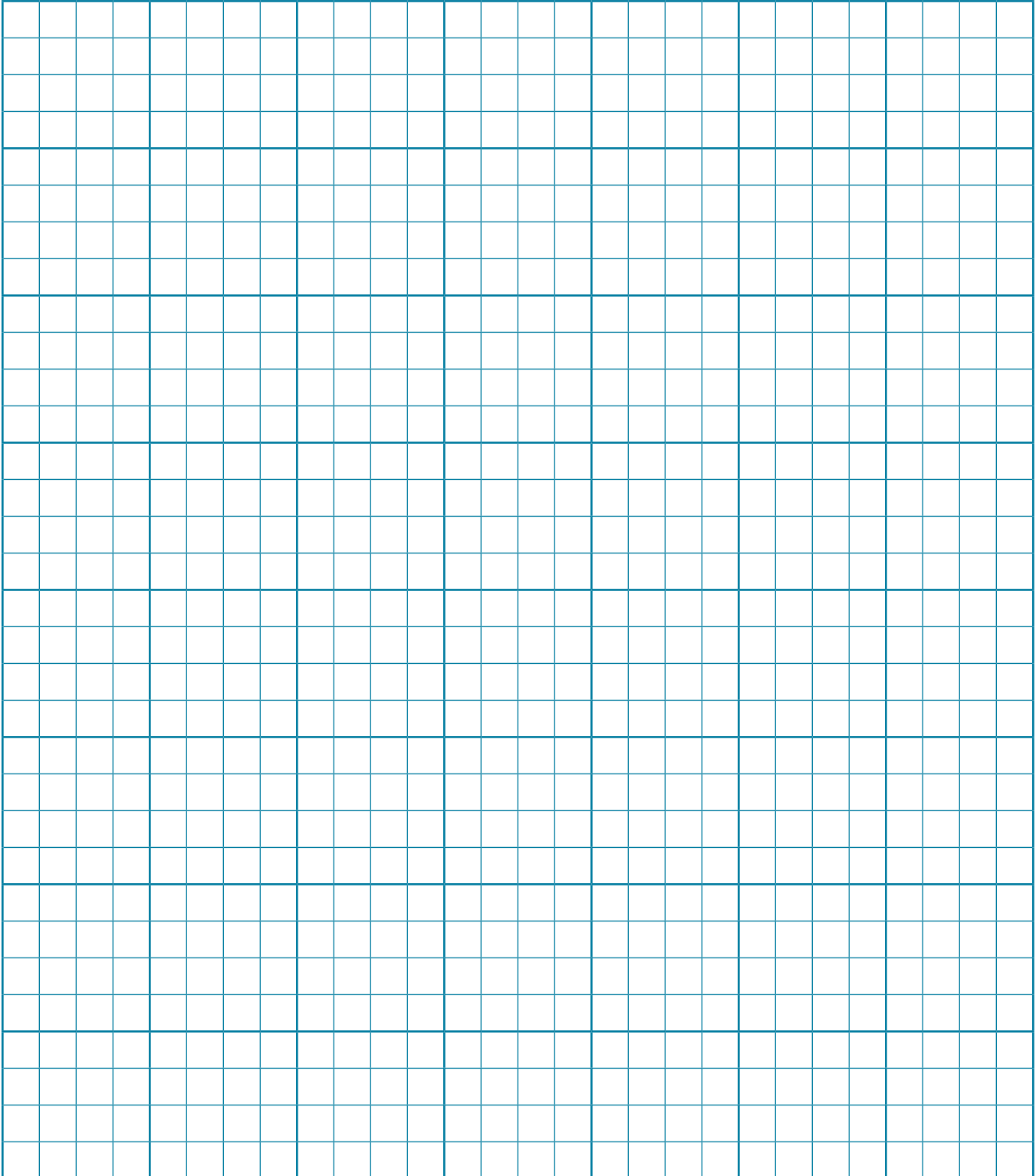
Local Control:



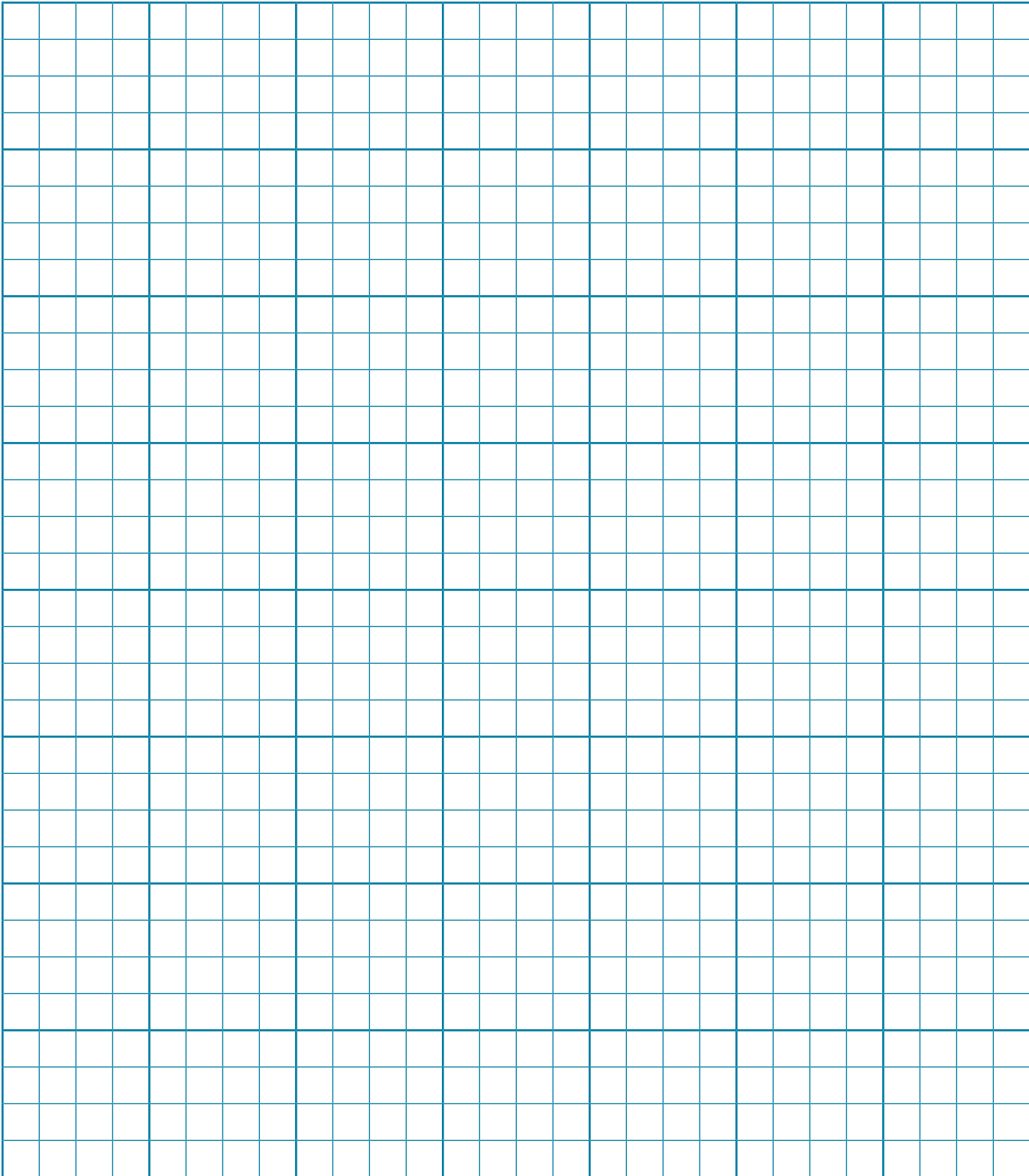
- ▶ Local control (9.4.1.1.a) is optional.
- ▶ Automatic daylight control (photocontrol) (9.4.1.1.e/f) may be required if windows are present.

Product	Qty.	Product	Description
	1	GLPP-1DIMFLV2CN-PM	2-Ch 0-10V Dimmer with Cresnet®
	1	GLPPA-KP	In-Wall Keypad for GLPP
	2	GLS-ODT-C-NS	Dual-Technology Ceiling Mount Occupancy Sensor

Notes



Notes



Crestron, the Crestron logo, 3-Series, Cresnet, Crestron Green Light, Cameo, Züm are either trademarks or registered trademarks of Crestron Electronics, Inc. in the United States and/or other countries. ASHRAE is either a trademark or registered trademark of American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. in the United States and/or other countries. Other trademarks, registered trademarks, and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Crestron disclaims any proprietary interest in the marks and names of others. Crestron is not responsible for errors in typography or photography.

This document was written by the Technical Publications department at Crestron Electronics, Inc.

©2018 Crestron Electronics, Inc.

