UNISON ECHO®

ASHRAE 90.1-2016
Application Guide

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ETC®

About ETC

ETC is a global leader in the manufacture of award-winning lighting-control systems, backed by our renowned 24/7/365 support. ETC offers complete solutions for any indoor or outdoor application, including office buildings, houses of worship, retail spaces, hospitality, and more. Our products lines include all the equipment necessary to meet stringent environmental codes, including occupancy and vacancy sensors, dual tech sensors, astronomical time clocks, centralized and distributed systems, wired and wireless controls, LED fixtures, power-control systems, and emergency lighting.

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About ASHRAE

ASHRAE 90.1 is a benchmark of energy-efficient design for buildings. Part of that includes specific requirements for lighting controls. To comply with the code designers need to incorporate the use of advanced lighting controls like daylight and occupancy/vacancy sensors as well as multi-level control capability. ASHRAE 90.1 is updated every three years.

About this guide

ETC developed this guide as a way to help designers quickly and easily create systems that fulfill all the requirements of ASHRAE. Its illustrations are meant to be a useful reference guide to standard ETC installations that designers can use as templates to help their project reach compliance. Designers, engineers and contractors can also take advantage of ETC's world-renowned customer service to receive help and guidance no matter what stage the product is in: design, submittal, or installation. To find out more, please contact your local ETC representative.

About Echo

The Unison Echo® control system offers flexible, scalable, and environmentally-friendly control – simply. Echo's intelligent daylight and occupancy/vacancy sensors easily control lighting output while its topology free, two-wire infrastructure means it's easy to install anywhere and adhere to your budget. Simple and powerful, Unison Echo ensures you get the most from a system with the least amount of hassle.

CODE REQUIREMENTS for common building spaces

	Control Requirement	Code Provision	Code Summary	Space Type							
				Private Office	Open Office	Conference, Meeting, Multiuse Room	Classroom, Lecture Hall, Training Room	Lobby	Corridor	Restroom	Stairwell
On-Off Control	Full Automatic On	9.4.1.1	Automatically controlled spaces are allowed to turn on to full.					✓	✓	✓	✓
	Local (Switch) Control	9.4.1.1a	Each space should have one or more readily accessible manual lighting controls that controls all lighting in the space. **Note:** Remote locations permitted for reasons of safety or security.	✓	✓	✓	✓	✓	✓	✓	✓
	Manual On	9.4.1.1b	None of the lighting in the space shall be automatically turned on.	✓ or ✓	✓ or ✓	✓ or ✓	✓ or ✓				
	Partial Automatic On	9.4.1.1c	The general lighting shall be allowed to be turned on automatically to 50% of the lighting power.								
	Automatic Partial Off via Occupancy Sensor	9.4.1.1g	Lighting power shall be automatically reduced by at least 50% within 20 minutes of all occupants leaving the space. Full Off also complies.					✓	✓		✓
	Automatic Full Off via Occupancy Sensor	9.4.1.1h	All lighting shall be automatically shut off within 20 minutes of all occupants leaving the space.	✓	✓ or ✓	✓	✓	✓ or ✓	✓ or ✓	✓	✓ or ✓
	Scheduled Shutoff (Timeclock)	9.4.1.1i	All lighting shall be automatically shut off during periods when the space is scheduled to be unoccupied using a time-of-day operated control. **Note:** A signal from another automatic control device or alarm/security system complies.								
Light Level Control	Bi-Level Lighting Control	9.4.1.1d	Controlled lighting shall have at least one control step between 30% and 70%, or continuous dimming, in additional to full on and full off.	✓	✓	✓	✓				✓
	Automatic Daylight Responsive Controls for Sidelighting/ Toplighting	9.4.1.1e, 9.4.1.1f	If the general lighting load is 150W or greater in the primary sidelighted or toplighted areas, or 300W or greater in the primary & secondary sidelighted areas, the general lighting in these areas shall be controlled by multi-step or continuous dimming photocontrols.	✓	✓	✓	✓	✓	✓	✓	✓
Additional Controls	Automatic Receptacle (i.e., Plug Load Control)	8.4.2	50% of all receptacles, and 25% of branch circuit feeders installed for modular furniture, shall be automatically turned off by an occupant sensor within 20 minutes of all occupants leaving the space. **Note:** A time-of-day schedule or a signal from an automatic control device or alarm/security system complies.	✓	✓		✓				

PRIVATE OFFICE: No Windows, 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Manual/Partial Automatic On (Section 9.4.1.1b/c)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)
- Plug-Load Control (Section 8.4.2)

OPERATION DETAILS:

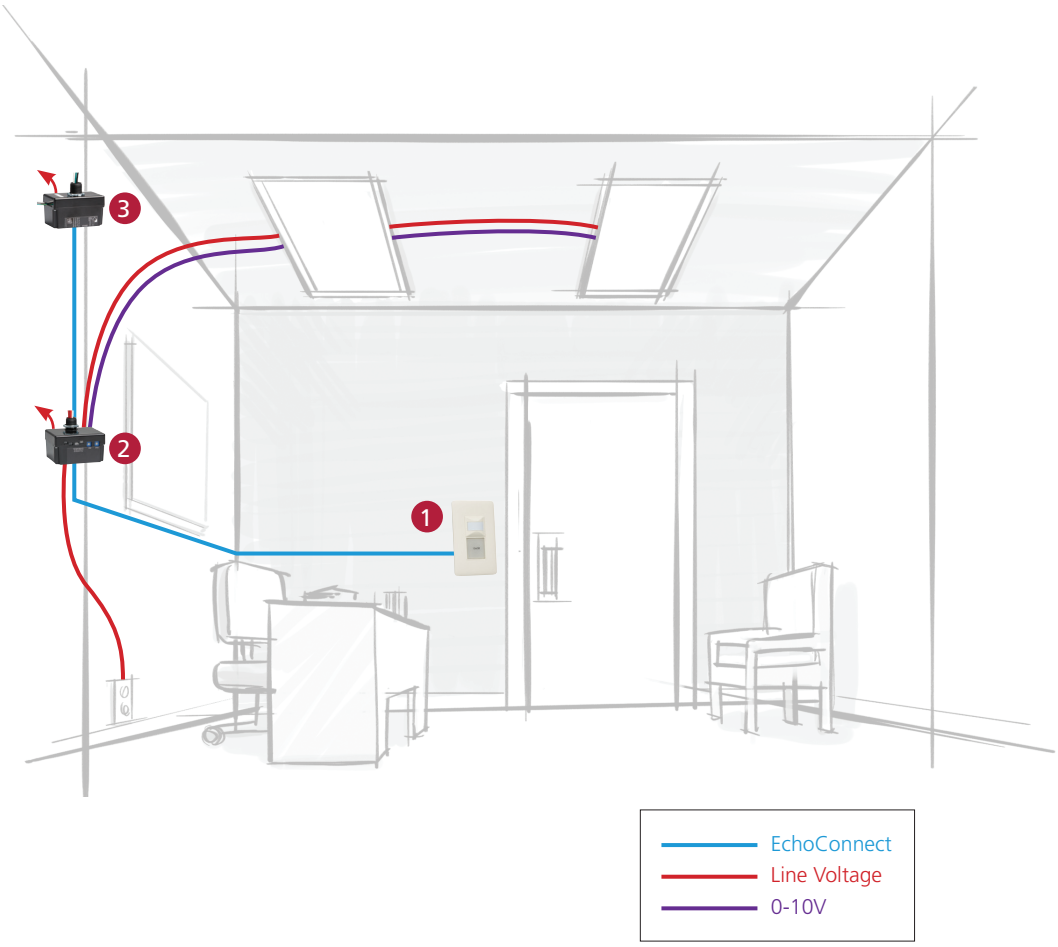
Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights and plug-load turn off when room becomes vacant

Manual Control:
- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Echo dimming controllers support manual-on, auto-on, and 50%-on from a single model
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E-DOC-SM_	Echo Dual Tech Switch-Mount Sensor
2	1	EDLD	Echo Dual-Channel 0-10V Controller
3	1	E-SPS	Echo Station Power Supply

PRIVATE OFFICE: Windows, 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Manual/Partial Automatic On (Section 9.4.1.1b/c)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Daylight Responsive Controls (Section 9.4.1.1e/f)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)
- Plug-Load Control (Section 8.4.2)

OPERATION DETAILS:

Lights:

- All lights are dimmable
- All fixtures can be controlled together
- Maximum level can be limited to 80%

Occupancy Control:

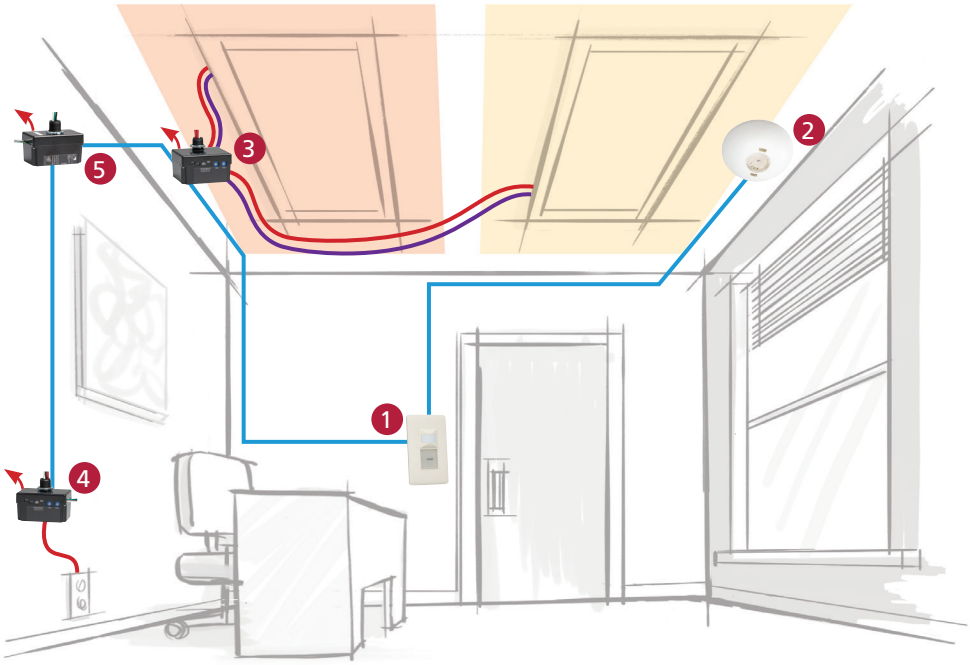
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Manual Control:

- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Echo dimming controllers support manual-on, auto-on, and 50%-on from a single model
- Unison Echo supports seamless connection to Paradigm control systems for facility wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



Primary Daylight Zone
Secondary Daylight Zone

EchoConnect
Line Voltage
0-10V

BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E-DOC-SM_	Echo Dual Tech Switch-Mount Sensor
2	1	ELS	Echo Ceiling-Mount Light Sensor
3	1	EDLD	Echo Dual-Channel 0-10V Controller
4	1	ERC	Echo Single-Zone Relay Controller
5	1	E-SPS	Echo Station Power Supply

OPEN OFFICE: 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Manual/Partial Automatic On (Section 9.4.1.1b/c)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Daylight Responsive Controls (Section 9.4.1.1e/f)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)

OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row controlled independently
- Maximum level can be limited to 80%

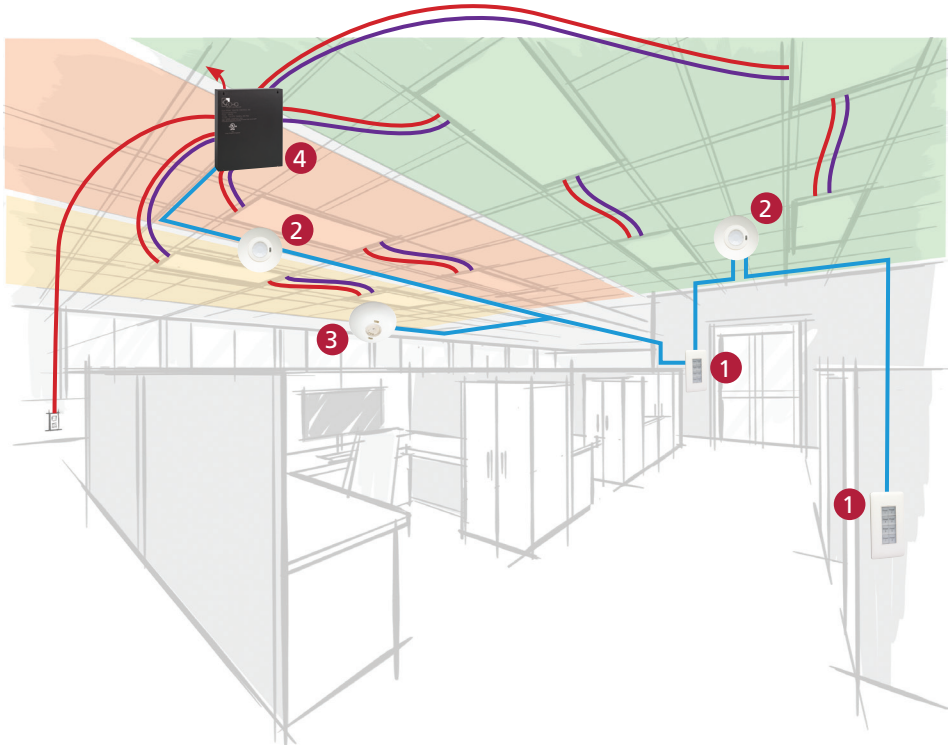
Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Lights turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Daylight zones defined by rows
- Not required in spaces with primary sidelighted or toplighted areas with a load <150W

Manual Control:
- On/off & raise/lower control of lights
- Additional Echo Controllers offer individual row control

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- All Echo Controllers are rated for 20A and support plug load control
- A complete range of UL924 and UL1008 emergency solutions are available



Primary Daylight Zone
Secondary Daylight Zone
General Lighting

EchoConnect
Line Voltage
0-10V

BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	2	E100_	Echo Inspire Button Control Station
2	2	E-DVAC-C	Echo Dual Tech Ceiling-Mount Vacancy Sensor
3	1	ELS	Echo Ceiling-Mount Light Sensor
4	1	ERMC8	Echo Room Controller

CONFERENCE ROOM: 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Manual/Partial Automatic On (Section 9.4.1.1b/c)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Daylight Responsive Controls (Section 9.4.1.1e/f)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)
- Plug-Load Control (Section 8.4.2)

OPERATION DETAILS:

Lights:

- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:

- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:

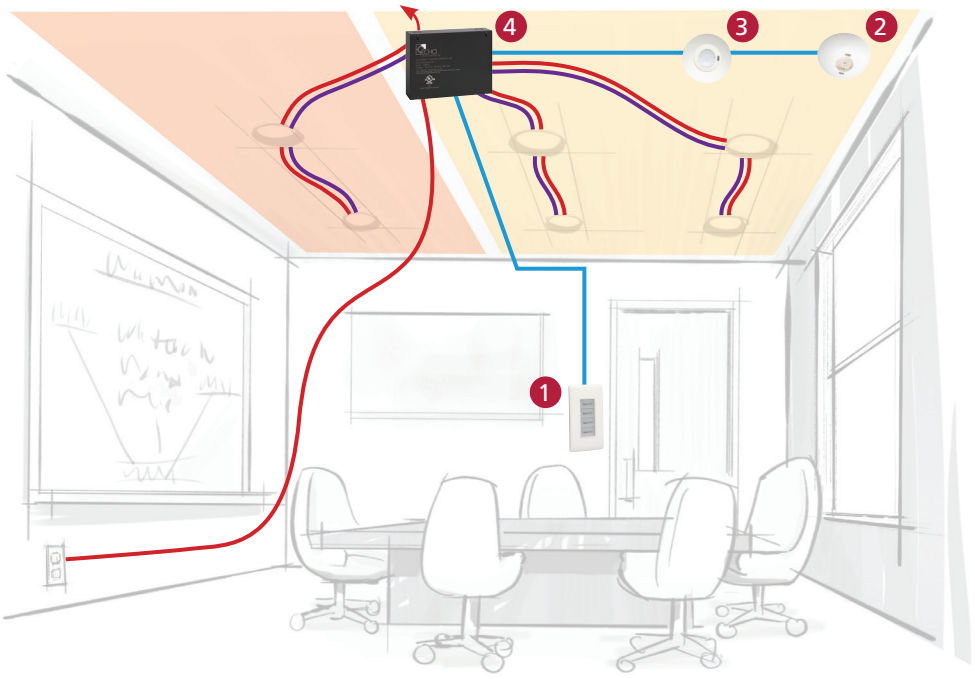
- Smooth continuous dimming
- Daylight zones defined by rows
- Not required in spaces with primary sidelighted or toplighted areas with a load <150W

Manual Control:

- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Echo dimming controllers support manual-on, auto-on, and 50%-on from a single model
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



Primary Daylight Zone
Secondary Daylight Zone

EchoConnect
Line Voltage
0-10V

BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E1004	Echo Inspire 4-Button Control Station
2	1	ELS	Echo Ceiling-Mount Light Sensor
3	1	E-DVAC-C	Echo Dual Tech Ceiling-Mount Vacancy Sensor
4	1	ERMC4	Echo Room Controller

CLASSROOM: 0-10V Dimming Fixtures (Distributed Relays)

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Manual/Partial Automatic On (Section 9.4.1.1b/c)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Daylight Responsive Controls (Section 9.4.1.1e/f)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)
- Plug-Load Control (Section 8.4.2)

OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row controlled independently
- Maximum level can be limited to 80%

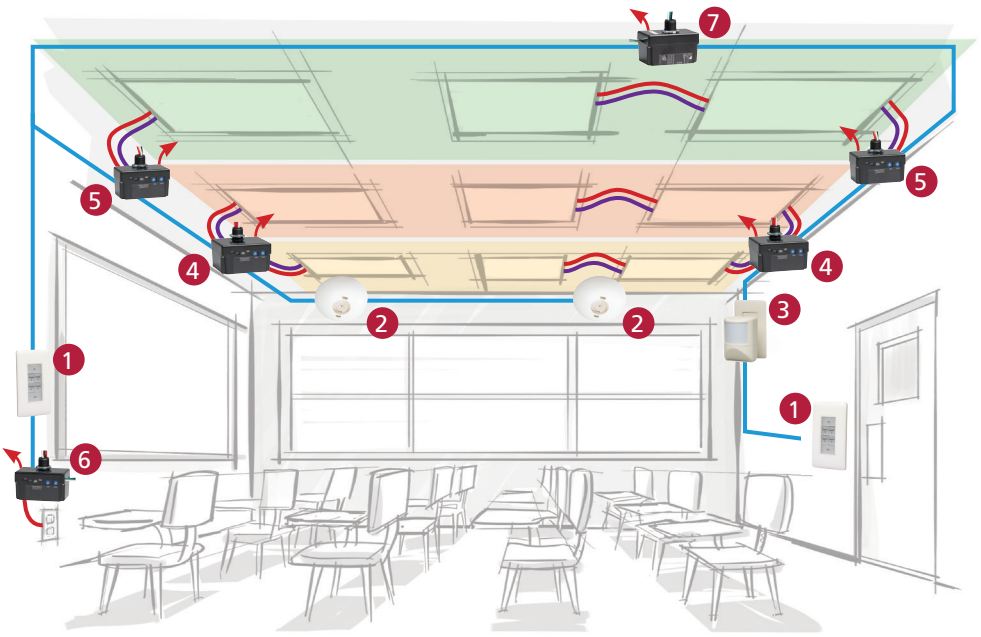
Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Provides up to three daylight zones, each controlled independently
- Not required in spaces with primary sidelighted or toplighted areas with a load <150W

Manual Control:
- On/off & raise/lower control of lights
- Optional scene control

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	2	E1006	Echo Inspire 6-Button Control Station
2	2	ELS	Echo Ceiling-Mount Light Sensor
3	1	E-DVAC-W	Echo Dual Tech Wall-Mount Vacancy Sensor
4	2	EDLD	Echo Dual-Channel 0-10V Controller
5	2	ELD	Echo Single-Channel 0-10V Controller
6	1	ERC	Echo Single-Zone Relay Controller
7	1	E-SPS	Echo Station Power Supply

CLASSROOM: 0-10V Dimming Fixtures (Panel Alternative)

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Manual/Partial Automatic On (Section 9.4.1.1b/c)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Daylight Responsive Controls (Section 9.4.1.1e/f)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)
- Plug-Load Control (Section 8.4.2)

OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row controlled independently
- Maximum level can be limited to 80%

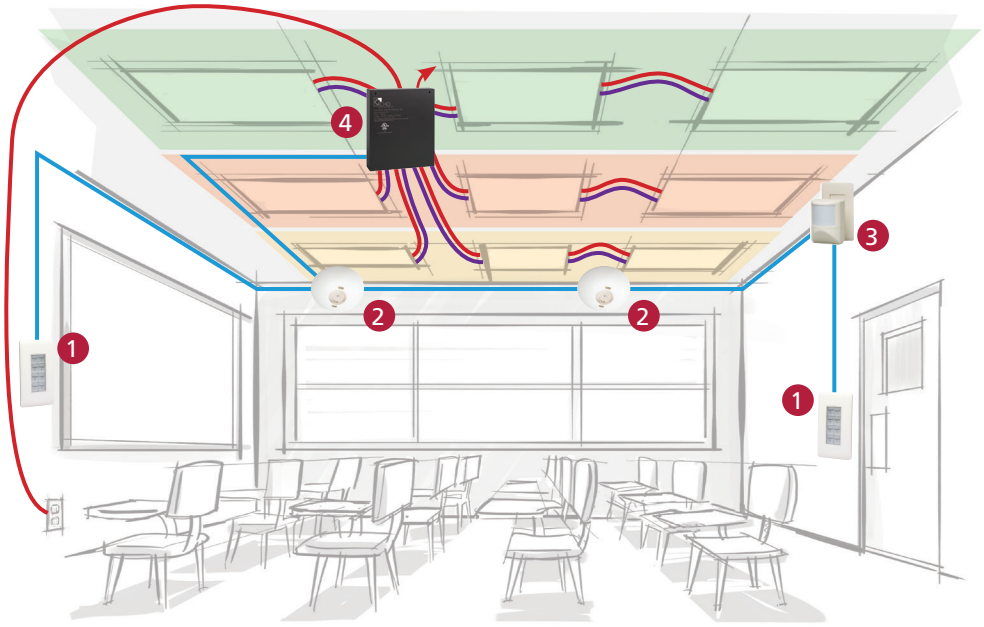
Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Provides up to three daylight zones, each controlled independently
- Not required in spaces with primary sidelighted or toplighted areas with a load <150W

Manual Control:
- On/off & raise/lower control of lights
- Optional scene control

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



Primary Daylight Zone
Secondary Daylight Zone
General Lighting

EchoConnect
Line Voltage
0-10V

BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	2	E1008	Echo Inspire 8-Button Control Station
2	2	ELS	Echo Ceiling-Mount Light Sensor
3	1	E-DVAC-W	Echo Dual Tech Wall-Mount Vacancy Sensor
4	1	ERMC8	Echo Room Controller

STAIRWELL: 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Bi-Level Lighting Control (Section 9.4.1.1d)
- Automatic Partial-Off (or Full-Off) via Occupancy Sensor (Section 9.4.1.1g)
- Scheduled Shutoff (i.e., Timeclock, see pg. 17) (section 9.4.1.1i)

OPERATION DETAILS:

Lights:
- All lights are dimmable
- Maximum level can be limited to 80%

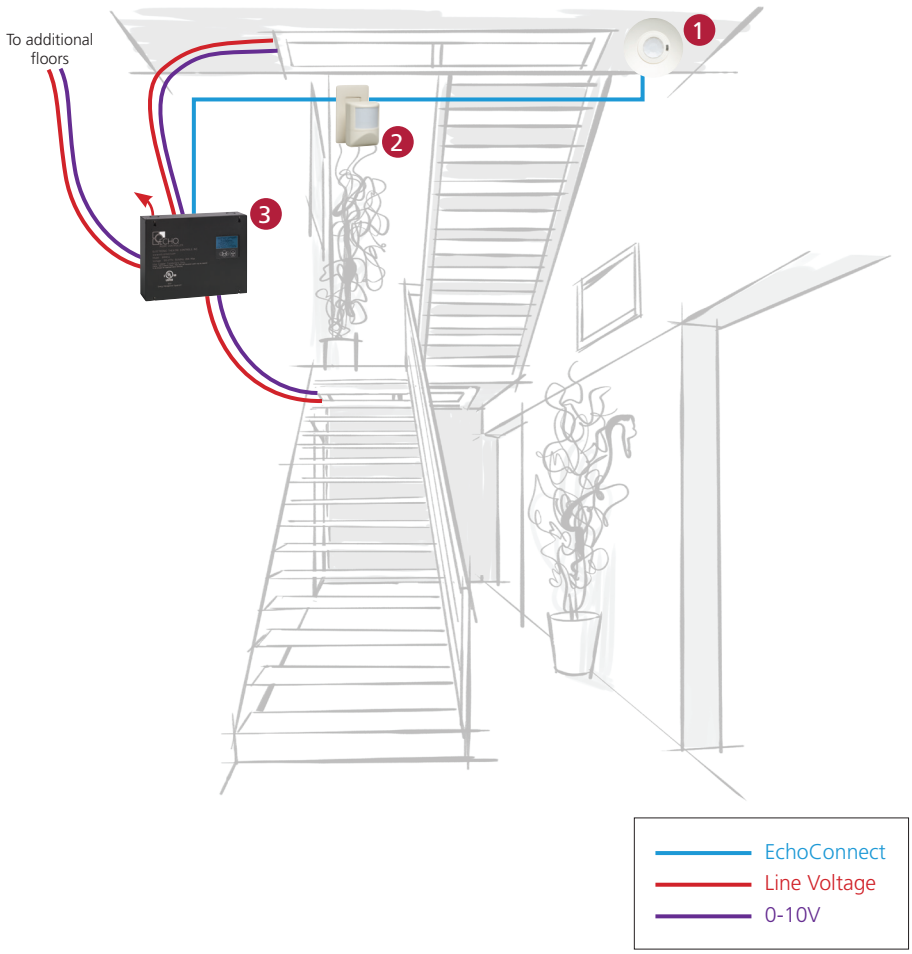
Occupancy Control:
- Lights automatically drop to 50% (or lower) when space becomes vacant

Auto-Off Control:
- Lights automatically turn off when the space becomes vacant or can be shut-off via timeclock (see pg. 17 for programmable timeclock)

Manual Control:
- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available
- For primary sidelight/toplight daylight zones with a load >150W, add Echo Light Sensors for daylight control (section 9.4.1.1[e/f])



BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E-DVAC-C	Echo Dual Tech Ceiling-Mount Vacancy Sensor
2	1	E-DVAC-W	Echo Dual Tech Wall-Mount Vacancy Sensor
3	1	ERMC4-TC	Echo Room Controller with TimeClock

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Automatic Daylight Responsive Controls (Section 9.4.1.1e/f)
- Automatic Partial and Full-Off via Occupancy Sensor (Section 9.4.1.1g/h)

OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

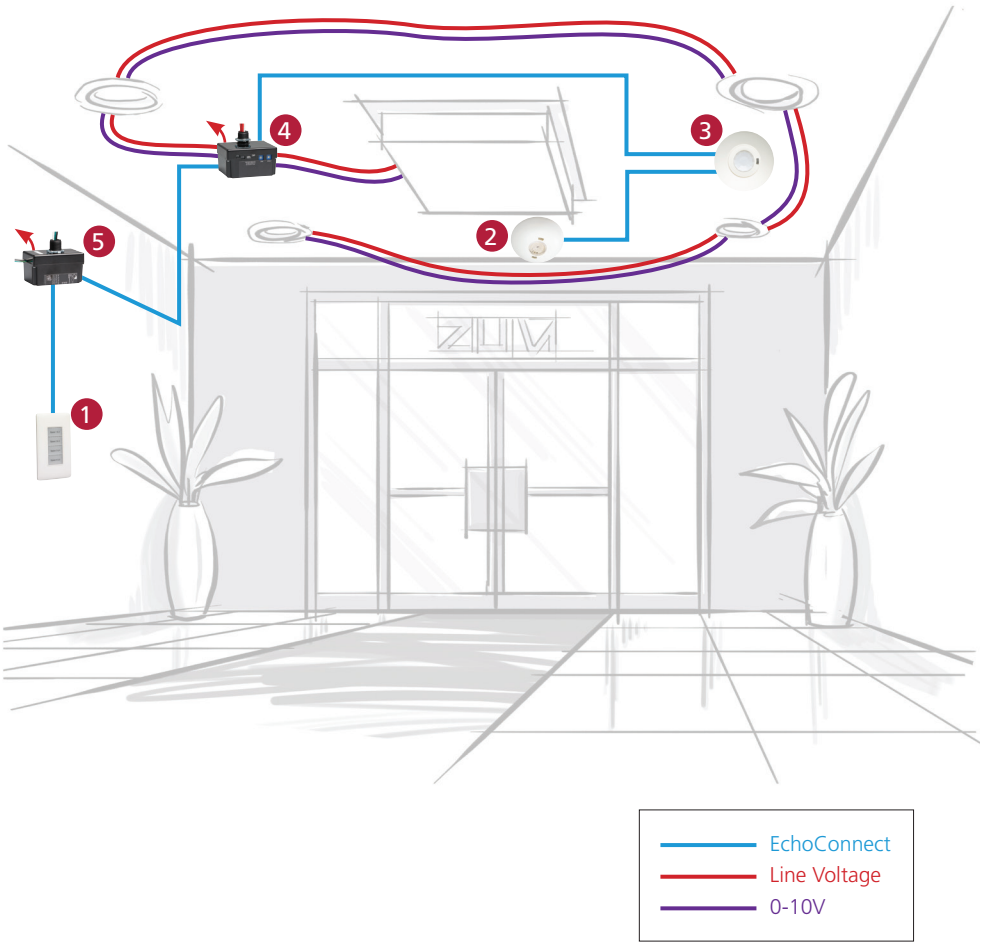
Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant (or optionally can be configured to dim to <50%)

Daylight Control:
- Smooth continuous dimming
- Not required in spaces with primary sidelighted or toplighted areas with a load <150W

Manual Control:
- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E1004	Echo Inspire 4-Button Control Station
2	1	ELS	Echo Ceiling-Mount Light Sensor
3	1	E-DOC-C	Echo Dual Tech Ceiling-Mount Occupancy Sensor
4	1	EDLD	Echo Dual-Channel 0-10V Controller
5	1	E-SPS	Echo Station Power Supply

PRIVATE/SINGLE ROOM: 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)

OPERATION DETAILS:

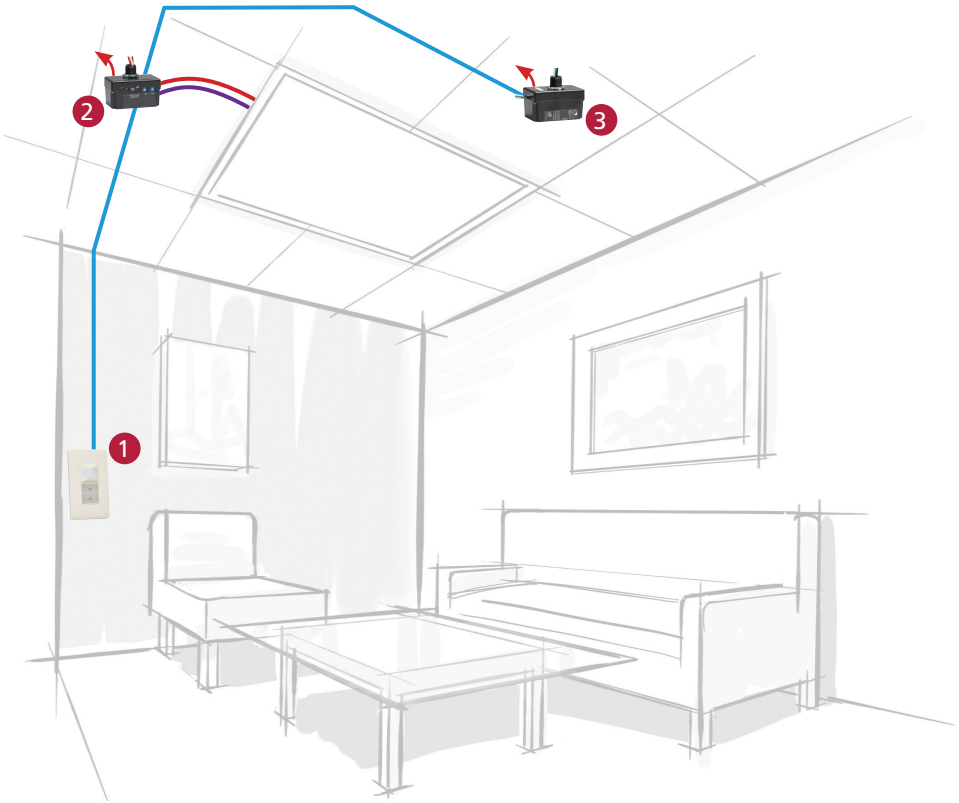
Lights:
- All lights are dimmable
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

Manual Control:
- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available



BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E-DOC-SM2	Echo Dual Tech Switch-Mount Sensor
2	1	ELD	Echo Single-Channel 0-10V Dimmer
3	1	E-SPS	Echo Station Power Supply

PUBLIC RESTROOM: 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.1h)

OPERATION DETAILS:

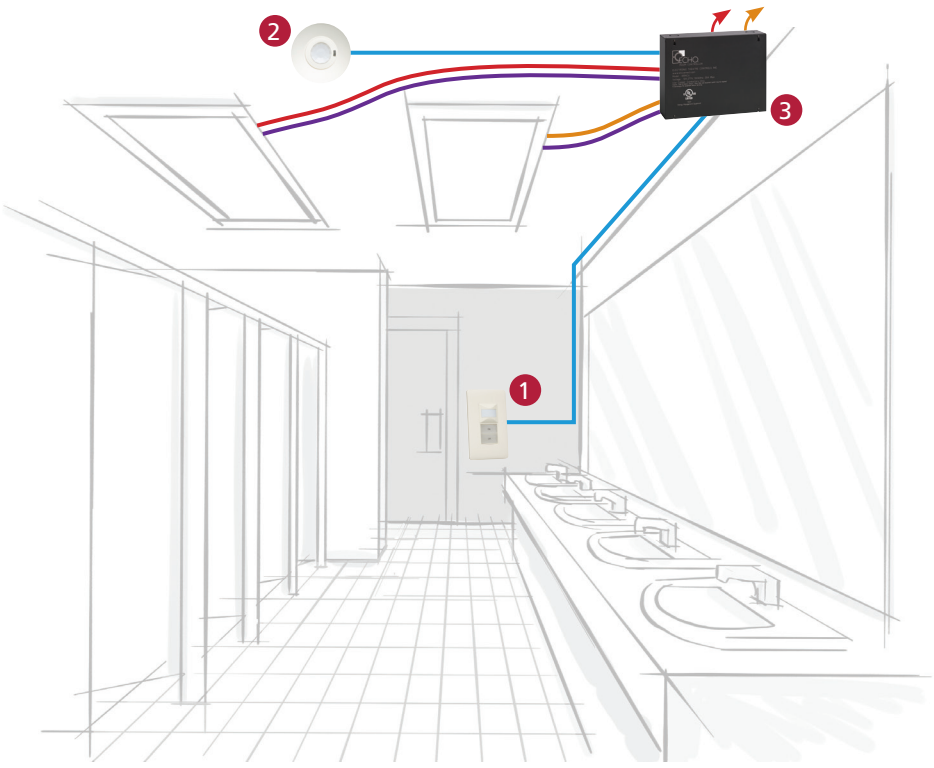
Lights:
- All lights are dimmable
- All fixtures are controlled together (per room)
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when room becomes vacant

Manual Control:
- On/off & raise/lower control of lights

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available
- For primary sidelight/toplight daylight zones with a load >150W, add Echo Light Sensors for daylight control (section 9.4.1.1[e/f])



EchoConnect
Line Voltage
0-10V
EMG Power

BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E-DOC-SM2	Echo Dual Tech Switch-Mount Sensor
2	1	E-DVAC-C	Echo Dual Tech Ceiling-Mount Vacancy Sensor
3	1	ERMC4	Echo Room Controller

CORRIDOR: 0-10V Dimming Fixtures

SUPPORTS THE FOLLOWING REQUIREMENTS:

- Local Control (Section 9.4.1.1a)
- Automatic Partial and Full-Off via Occupancy Sensor (Section 9.4.1.1g/h)

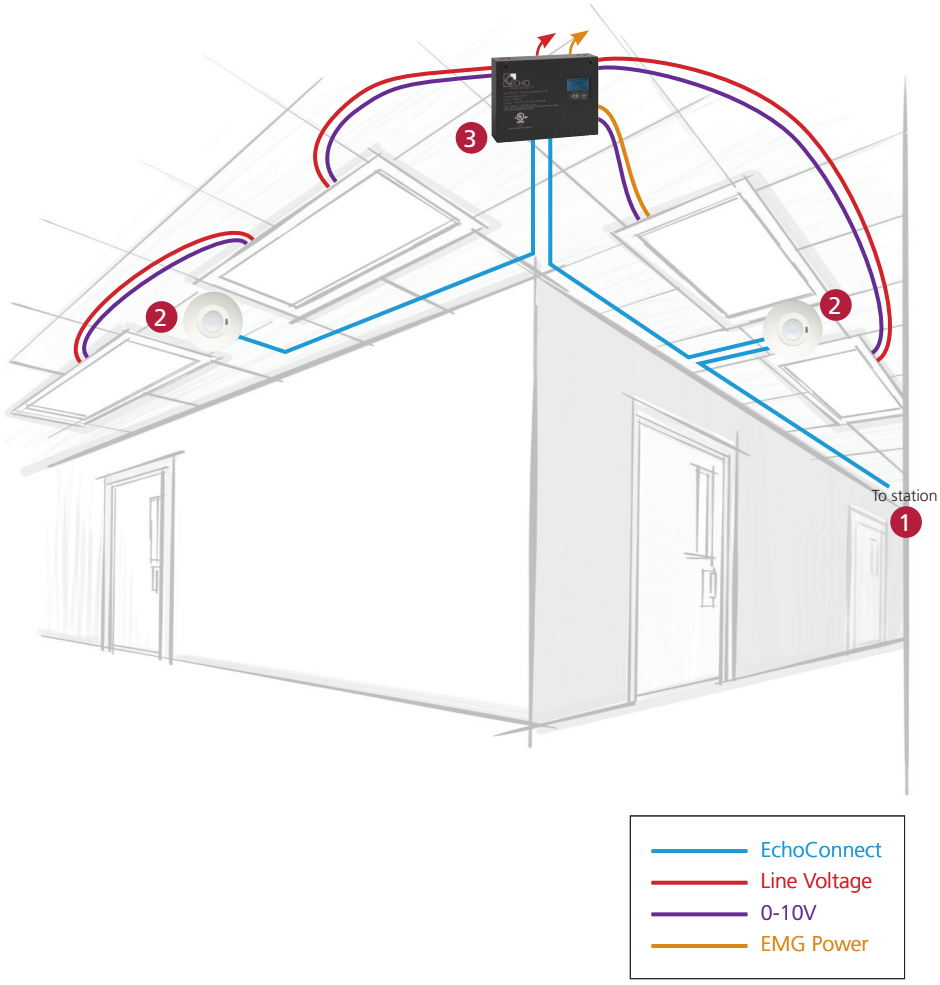
OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant (or optionally can be configured to dim to <50%)

ADDITIONAL OPTIONS

- Echo Dual Tech sensors are available in wall-, ceiling-, and switch-mount options
- Time-based control available via TimeClock (see pg. 17 for more info)
- Unison Echo supports seamless connection to Paradigm control systems for facility-wide control and monitoring
- A complete range of UL924 and UL1008 emergency solutions are available
- For primary sidelight/toplight daylight zones with a load >150W, add Echo Light Sensors for daylight control (section 9.4.1.1[e/f])



BILL OF MATERIALS

PRODUCT	QTY	MODEL NUMBER	DESCRIPTION
1	1	E1001	Echo Inspire 1-Button Control Station
2	2	E-DOC-C	Echo Dual Tech Ceiling-Mount Occupancy Sensor
3	1	ERMC4-TC	Echo Room Controller with TimeClock

ADVANCED UNISON ECHO CONTROL OPTIONS

PROGRAMMABLE TIMECLOCK CONTROL

Although not included in each of the room design risers, every Echo Control System can be controlled with a TimeClock, assuring your system meets the ASHRAE 90.1 scheduled shutoff provision (Section 9.4.1.1i). The Echo TimeClock offers time-of-day and astronomical control, manual control via hold, override and event-recurrence modes, like "everyday," "weekday," "weekend," and "daily," as well as fully-configurable Daylight Saving Time, holiday schedules and special-event override.

ECHOACCESS™ APP

EchoAccess releases the full potential of your Echo system, offering custom control and configuration from an iOS or Android™ smartphone. The app connects to your Echo Control System via a Bluetooth connection with the EchoAccess interface.

In the app, users can set lighting levels, combine spaces, and control zones directly – as well as record, activate and deactivate presets, plus much more. Add an Echo DMX Scene Controller to your system, and the EchoAccess app can adjust DMX-controlled luminaires' hue, saturation, and intensity.

EchoAccess connects to any Echo system via the simple, two-wire Echo bus, and melds neatly in your design using the same stylish Inspire® faceplates.

APPENDIX: Requirements Overview

	Control Requirement	Code Provision	Code Summary	Recommendations for Compliance
On-Off Control	Automatic Full-Off via Sensor	9.4.1.1h	Spaces vacant for more than 20 minutes (maximum) require automatic shut off of lighting via occupancy or vacancy sensor.	Use vacancy sensors in all spaces.
	Automatic Partial-Off via Sensor	9.4.1.1g	Spaces vacant for more than 20 minutes (maximum) require automatic reduction of power consumption by at least 50%.	Use sensors in all designs with configuration to set dimmed fixtures to 50% on vacancy.
	Scheduled Shutoff (Timeclock)	9.4.1.1i	Interior lighting must be controlled with a time schedule that turns lighting off at programmed times. Note: Occupancy/Vacancy sensors and building control/alarm systems that indicate vacancy also meet this requirement.	TimeClocks maximizes energy efficiency by supporting astronomical, real-time and manual control events across multiple spaces from a single device.
	Local Control	9.4.1.1a	Enclosed spaces with ceiling-height partitions require a minimum of one readily accessible control device to control the lighting within the space.	Include manual control stations in all spaces.
Light Level Control	Bi-Level Lighting Control	9.4.4.1d	Controlled lighting requires a minimum of one step between 30% and 70%, as well as full on and full off. Note: Not required for spaces with a single luminaire rated at less than 100W or for spaces with lighting power allowance less than 0.6 W/sq.ft.	Include continuously dimmable LED fixtures and manual dimming controls.
	Automatic Daylight Responsive Controls for Sidelighting/Toplighting	9.4.1.1e/f	Daylight-responsive controls are required in spaces with sidelight (larger than 250 sq.ft.) and toplight daylight areas (larger than 900 sq.ft.) require independent contorl of at least one photo control.	Use light sensors and continously dimmable fixtures in all daylit spaces.
Additional Controls	Automatic Receptacle (i.e. Plug Load Control)	8.4.2	50% of all 120V receptacles, including those installed in modular partitions require automatic shut off control when a space is vacant.	Implement properly rated relay controllers to switch applicable plug loads.

	ETC Product Solutions	
	Echo PIR Vacancy Sensors	Dual Tech Occupancy/Vacancy Sensors
	Vacancy Sensors use passive infrared detection to ensure lights automatically turn off when a space is empty, in areas up to 2,000 square feet.	Dual Tech Sensors couple passive infrared (PIR) detection with acoustic detection to insure a space is empty before turning off lights. Dual Tech Sensors offer ceiling-, wall-, or switch-mount installation.
	TimeClock	
	Echo TimeClock features an intuitive six-button interface and large backlit display that allow for simple set-it-and-forget-it operation. In addition to time-based events, manual control via hold, override and event-recurrence modes, like "everyday," "weekday," "weekend," and "daily," as well as fully-configurable Daylight Saving Time, holiday schedules and special-event override make the TimeClock station adaptable to any application.	
	Inspire® Control Stations	Preset Stations
	Inspire stations can be easily programmed for preset lighting looks and offer the capability of setting zone- and space-combine functions. They can be installed anywhere they're needed throughout a space, for maximum convenience.	Unison Echo Preset Stations - available in two sizes and a variety of colors - provide easy access to lighting scenes with just the simple touch of a button.
	Phase-Adaptive Dimmer	Relay Controller w/ 0-10V dimming
	The Echo Phase-Adaptive Dimmer provides reverse- or forward- phase dimming for loads up to 600 watts. It is compatible with all Echo control products, including daylight and occupancy sensors and manual control stations, providing flexibility and energy savings.	Unison Echo 0-10V Dimming Controllers offer fully-rated 20-amp relays coupled with 0-10V dimming for direct control of compatible LED drivers and fluorescent dimming ballasts. Controllers are available for single- or dual-zone configurations, allowing for added flexibility in your installation.
	Unison Echo Light Sensor	Unison Echo Light Sensor - Remote Head
	Unison Echo Light Sensors are able to detect and measure the amount of natural light in an area, and raise or lower the output of lighting fixtures accordingly, to maintain a consistent lighting level. Echo Light Sensors have a single head option for interior, exterior, and atrium use. They also support two-sensor averaging, so if you have a large space, you can locate sensors in different locations to light the entire area evenly. The head of the Sensors can be detached and located apart from the controller, allowing you the most flexibility for your facility.	
	Echo Relay Controller	
	All Echo Relay controllers are rated for 20A loads and may be used for lighting or plug load control as required within a project. Offering a single relay option simplifies installation by utilizing a single product across all applications.	

ADDITIONAL RESOURCES

ASHRAE

www.ashrae.org

Use the following sections of the ASHRAE 90.1 2016 code as reference:

Section 8.4.2 – Automatic Receptacle Control
Section 9.4.1.1a – Local Control
Section 9.4.1.1b – Manual On
Section 9.4.1.1c – Partial Automatic On
Section 9.4.1.1d – Bi-Level Lighting Control
Section 9.4.1.1e – Automatic Daylight Responsive Control for Sidelighting
Section 9.4.1.1f – Automatic Daylight Responsive Controls for Toplighting
Section 9.4.1.1g – Automatic Partial Off
Section 9.4.1.1h – Automatic Full Off
Section 9.4.1.1i – Scheduled Shutoff

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