



echoflex ELEDR Power Load Controller User Guide

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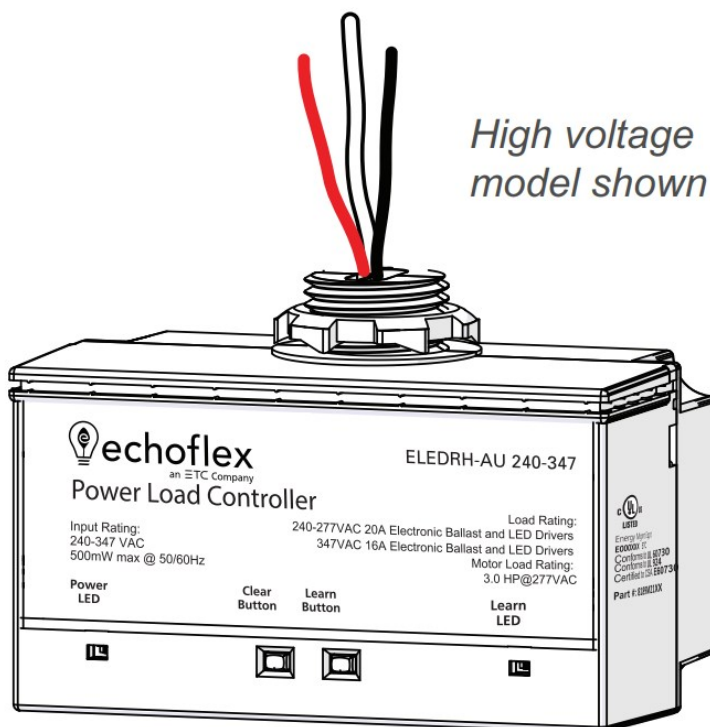
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Introduction

The Power Load Controller is a wireless lighting controller for electronic ballasts and LED drivers. It also provides a motor load specification to deliver process control for circuit or fan/curtain control applications, eliminating long wire runs. With the ELEDH or ELEDRH, highvoltage model, you can integrate lighting and automation control into one distributed wireless device.

Echoflex systems communicate by radio frequency in a point-to-point network and conform to an open standard. Echoflex controllers include functionality to allow the presetting of lighting scenes based on values for intensity and color temperature. Presets can be activated from scene stations, time clocks, or gateways. The lockout feature allows time clocks to schedule a controller's response to specific sensors or stations.

This guide describes the features of the Echoflex Power Load Controller models and how to use and configure them.



Features

- Single relay control output, 20 A at 120-277 VAC and 16 A at 347 VAC
- Motor load rating: 1.5 hp at 120 V and 3 hp at 277 VAC
- Occupancy control with auto ON/OFF, or vacancy control with manual ON ,auto OFF
- Use with wireless battery-free wall switches, photo sensors, occupancy sensors, and gateways
- Integrated daylight harvesting control with Photo Inhibit feature
- Range Confirmation allows optimal placement of linked sensors
- Pre-commissioning available when sold as a system through Echoflex
- Central command support for Building Energy Management Systems (BEMS) gateway control
- Easy installation on electrical junction boxes with 1/2 in mounting nipple
- Doubles as a message repeater
- Energy cod compliance including demand response, Partial-ON and Partial OFF control



Note: For information about Garibaldi Pro software or pre-commissioning services that provide complete system solutions (linked and configured), contact Echoflex. Garibaldi Pro software is available for download from the Echoflex website at echoflexsolutions.com

Document Conventions

Echoflex's user documentation is designed for print or electronic use. Cross-references highlighted in this document are links to the referenced section of the guide.

Configuration parameters are emphasized in italics. Switch actions (ON/OFF) and dimmer events (lights ON/OFF) are emphasized in ALL CAPS. Buttons are emphasized in **[Bold Bracket]**.

This document uses the following conventions to draw your attention to important information

Note: Notes are helpful hints and information that is supplemental to the main text.



CAUTION: A Caution statement indicates situations where there may be undefined or unwanted consequences of an action, potential for data loss or an equipment problem.



WARNING: A Warning statement indicates situations where damage may occur, people may be harmed, or there are serious or dangerous consequences of an action.



WARNING: RISK OF ELECTRIC SHOCK! This warning statement indicates situations where there is a risk of electric shock.

Please email comments about this manual to: TechComm@etcconnect.com.

Help from Technical Services

If you are having difficulties that are not addressed by this document, contact Echoflex support at service@echoflexsolutions.com or the main website at echoflexsolutions.com. If none of these resources are sufficient, contact Technical Services directly at the office identified below.

When calling for help, take these steps first:

- Prepare a detailed description of the problem
- Go near the equipment for troubleshooting
- Find your notification number if you have called in previously

Technical Services

3031 Pleasant View Road

Middleton, WI 53562

800-775-4382 (USA, toll-free)

+1-608 831-4116

service@echoflexsolutions.com

Configuration Options

The controller provides lighting control using input received from compatible Echoflex devices. It operates based on:

- Ambient light levels monitored by a wireless photo sensor
- Occupancy state monitored by a wireless occupancy sensor
- Switch action from a wireless wall or keycard switch
- Gateway control implementing scheduled or other events

This document describes the controller's features and explains how to use and configure them with Simple Tap. Some features can only be configured using Garibaldi Pro software.

Simple Tap Instructions

Simple Tap is a manual method of changing individual settings one at a time. There are no tools required, simply use your finger to activate the sensors and switches linked to the controller. The tap in Simple Tap means a quick press on a sensor's **[Teach]** button and/or a switch's ON/OFF. If the sensor is linked to multiple controllers and you do not want to make changes to all, turn off the controllers lights/loads to ignore the Simple Tap changes.

Radio Communications

The ELED(R) controller is equipped with a 902 MHz radio capable of transmitting and receiving wireless messages. The controller supports single-hop and dual-hop message repeating and controller status broadcast.

Repeater Function

The repeater function repeats received messages if:

- The message has not been repeated previously
- In the case of dual-hop repeating, the messages have been repeated previously only once

If single-hop or dual-hop repeating is needed, the repeater function can be enabled/disabled using Simple Tap instructions.

1. Press and hold the **[Clear]** button on the controller.

2. Tap the **[Learn]** button:
 - Once to **disable** repeating
 - Twice to **enable** single-hop repeating
 - Three times to **enable** dual-hop repeating
3. Release the **[Clear]** button. The Power and Learn LEDs blink the corresponding number of **[Learn]** button presses.

Status Message

The controller can broadcast a message per EEP: A5-11-01 Status Feedback Message. A message broadcasts every 100 seconds. The status message can be enabled/disabled using Simple Tap instructions.

1. Press and hold the **[Learn]** button on the controller.
2. Tap the **[Clear]** button once to disable, twice to enable.
3. Release the **[Learn]** button. The Power and Learn LEDs blink the corresponding number of **[Clear]** button presses.

Radio Range Confirmation

Echoflex sensors that are equipped with patented Range Confirmation technology work with ELED(R) controllers to facilitate optimal sensor placement. The Range Confirmation test is invoked at the sensor. It must be linked to the controller and during the test, any repeaters in the controller's vicinity must be disabled. The controller receives a unique message from the sensor, evaluates the signal strength and sends back a unique message containing the strongest signal value received. The sensor displays this value using color LEDs.

See the related device documentation to verify support for radio Range Confirmation testing and for test details.

Near-Cross Technology

The controller monitors the AC voltage waveform to prevent carbon build-up on contacts and ensure long relay life. The relay will open or close only when the waveform is close to zero

Switch Operation

The controller operates with single, dual-paddle wall, wave, and hand-held Echoflex switches as well as button station transmitters including the Multi-Button Interface (MBI) Switch Station and the Multi-Scene Station (MSS). Garibaldi Pro software is required to configure all the fade control settings.

- Press ON to increase the lights to the last manually set dimming level.
- Double-press ON to increase the lights to the output maximum level.
- Press OFF to decrease the lights to the output minimum level and then turns the lights off.
- Double-press OFF to turn the lights off.

Echoflex switches can also be used as dimmers when dimming output is enabled.

- Press and hold ON to increase to the maximum dimming level.
- Press and hold OFF to decrease to the minimum dimming level.

Timed Switches

The controller can be configured to make any linked wall switch station into a timed switch. Switching the lights ON starts the countdown timer for the configured period. One minute before the timer expires and the lights turn off, the lights blink once as a warning (Flick-Warn). Switching the lights ON at anytime resets the timer. Switching the lights OFF clears the timer. Garibaldi Pro software is required to configure the period for a timed switch.

Occupancy-Based Lighting Applications

When occupancy sensors linked to the controller do not detect motion, they send a vacancy message to the controller. After the occupancy auto-OFF timer expires, the controller turns the lights OFF or fades to a preset level. For information about coordinated control of a space, see

Occupancy Sensor Auto-OFF Timer

The occupancy auto-OFF timer is set to 15 minutes by default. The value can be changed using Simple Tap. Dual Tech sensors also have a built-in independent occupancy timer auto OFF. To use the occupancy timer on the sensor, not the controller, set the controller's occupancy timer to zero seconds.

To set the controller's occupancy auto-OFF timer value:

1. Turn the light ON.
2. Tap the **[Teach]** button on the sensor three times to edit the timer period, or to set it to zero seconds. The light ramps up to full ON and then dims to OFF to acknowledge the input

Taps	Occupancy Sensor Timer	Light Response
3 taps	0 seconds	1 blink

3. Set a number of minutes for the timer period. Tap the [Teach] button the number of times indicated in the table below to set the timer period. The light responds a number of times to confirm the change and then returns to normal operation.

Taps	Occupancy Sensor Timer	Light Response
1 tap	5 minutes	2 blinks
2 taps	10 minutes	3 blinks
3 taps	15 minutes	4 blinks
4 taps	20 minutes	5 blinks
5 taps	25 minutes	6 blinks

Save State

The controller saves its current operating state every ten minutes so when power is cycled, it returns to the last saved values. The save state function can be overridden with a value used to recall a particular dimming output value after a power cycle. Garibaldi Pro software is required to configure overrides.

Grace Timer

The occupancy sensor grace timer is a short period of time during which the controller returns the lights to the previous occupied state if triggered by motion, or audio in the case of Dual Tech sensors. The grace timer starts counting down after the occupancy auto-OFF timer has expired, providing a time period for an undetected occupant to signal that the space is occupied. Garibaldi Pro software is required to configure the grace timer. The default is 30 seconds.

Photo Inhibit

The photo inhibit feature requires a linked photo sensor and an occupancy sensor with partialON enabled. See When photo inhibit is enabled, the partial-ON feature is ignored when the natural light level measured by the photo sensor is above the lights ON set point. The photo inhibit feature does not turn lights OFF if the light is already ON. Garibaldi Pro software is required to configure the dimming to OFF set point.

Photo Inhibit Operation:

- Light level is < lights ON set point – the lights turn ON when motion is detected.
- Light level is > lights ON set point – the lights do not turn ON when motion is detected.
- Lights are ON and the light level increases past the lights ON set point – the lights stay ON.
- Lights are OFF and the light level decreases past the lights ON set point – the lights turn ON when motion is detected and increase to the dimming level defined in the partial-ON setting.

Dual Technology Occupancy Sensors

Dual Tech sensors have built-in occupancy timers that manage the transition from occupied to vacant state. To allow the Dual Tech sensor to control the vacancy action, the controller's occupancy sensor auto-OFF timer parameter should be set to 0 seconds.

Occupancy Sensors Only

If only occupancy sensors are linked to the controller, the sensors automate the lights both ON and OFF.

Occupancy Sensors with Switches

If switches and sensors are linked to the controller, Vacancy Sensor Mode (manual-ON, autoOFF) is active. The controller can be configured to turn the lights ON immediately when a sensor detects motion (partial-ON). When a switch is pressed ON or OFF, the occupancy sensor's auto-off timer resets the state to occupied, which allows the lights to stay OFF when they are switched OFF (for example, a slide show presentation).

Open-Plan Shared Occupancy

The open-plan shared occupancy feature provides energy saving control over large open spaces that have been segmented into zones to comply with local energy code requirements. It allows connected lighting controllers to share the occupancy state of the zone they control. Only after all the controllers in the space report a vacant state are the lights turned off at the same time. All Echoflex controllers support open-plan shared occupancy functionality to comply with current energy savings codes.



Note: Garibaldi Pro software is the ideal tool to set up your project and configure settings, or even to make edits if your project has been pre-commissioned. Garibaldi Pro is available for download at

There is no limit to the number of controllers that are connected to a shared occupancy, but each controller must be within radio range of at least one other controller to be able to send and respond to occupancy state messages.

A shared occupancy timer starts when a controller transitions from occupied to vacant. Controllers with the same shared occupancy ID that remain occupied will reset the shared occupancy timer of any controller reporting vacancy within the ID group. The vacant controllers will remain at the partial-OFF value until all controllers in the group report vacancy. For example, when one controller reports a vacant state, the lighting transitions to partial-OFF and stays at that value until all the controllers are also vacant. After the shared occupancy timer expires, the lighting for the whole space will turn off at the same time. The shared occupancy timer default is 60 seconds.

Create a Shared Occupancy Space

A shared occupancy space is easy to create before the controllers are installed, during precommissioning, or manually on site if you have access to one of the controllers and the ability to activate Link mode on each of the other zone controllers in the space.

Controllers in a shared occupancy space have the same shared occupancy ID. Pressing a button sequence on one controller generates and sends a unique shared occupancy ID message that controllers in Link mode record to join and recognize the shared occupancy feature

Connect Controllers

You can select any controller to send a shared occupancy ID and connect other controllers. If the selected controller does not have a shared occupancy ID (default), it will generate one to send. If the controller has a shared occupancy ID, it will send the shared occupancy ID it has recorded.



Note: To reset a controller's shared occupancy ID to the default, zero (0), you can delete the shared occupancy ID field in Garibaldi Pro. To restore the default manually, you must reset the controller.

1. Identify one controller to send the shared occupancy ID.
2. Activate Link mode on the controllers you want to connect, using Garibaldi Pro or manually press each of the **[Learn]** buttons. Link mode times out after 60 seconds of inactivity.
3. Press and hold the **[Clear]** button and then press the **[Learn]** button four times on the sending controller. The controller sends a shared occupancy ID for controllers in Link mode to receive and record. Alternatively, if the project is set up in Garibaldi Pro, you can copy the sending controller's shared occupancy ID field to each of the controllers in the space.
4. Ensure an occupancy sensor is linked to each zone controller.

Configure Controller Settings

1. Set the vacancy partial-OFF value, if other than the default 20% is required.
2. Set the shared occupancy timer, if other than the default 60 seconds is required.
3. Set the vacancy fade-OFF rate, if other than the default two seconds is required.

Hospitality Applications

Hospitality is a specific kind of occupancy-based control. When the controller is used in a hotel or dormitory setting, it is typically linked to a keycard switch station or to both an entry door sensor and an occupancy sensor.

For example, when an occupant enters a room and inserts a key card into the keycard switch station an occupancy message is sent to linked controllers to power the room. Lights can be turned ON to a level (occupancy partial-ON) to create a welcoming environment.

For hospitality applications that do not use key cards for room access, an entry door sensor and occupancy sensor combination can be linked to the controller to confirm occupancy and therefore proper control. The occupancy sensor is used to monitor occupancy, not to turn lights OFF. Each time the door is opened and closed and the sensor detects motion, the room locks into an occupied state. If the door opens and closes, but no motion is detected before the occupancy auto-OFF timer expires, the room resumes an unoccupied state. If an occupancy message is sent when the room is in an unoccupied state, the room will lock into an occupied state until the entry door opens and releases the lock.



Note: If using the manual method to link a Magnetic Contact Sensor (MC -31) as a entry door sensor, link the sensor to the controller with the magnet placed next to the sensor (closed door position). If the magnet is not beside the sensor (open position), the MC -31 is linked as a window sensor.

Garibaldi Pro software is required to configure all the fade control settings.

Daylight Harvesting Applications

The controller turns the lights ON or OFF based on a set point and the ambient light level in the room when a photo sensor is linked to the controller. When the controller is configured for daylight harvesting, the set point is where the light turns ON. The set point to turn the light OFF is 20% of the sensor's full range greater than the light ON set point.



Note: The controller only supports one linked photo sensor.

Daylight harvesting does not affect the operation of wall switches or occupancy sensors when the light is ON. If the light is ON, either a switch or occupancy sensor can override with an OFF action or dim to below the daylighting control value.

Daylighting Control Override

The open or closed loop daylighting features can be temporarily overridden by enabling the daylighting manual override parameter. The override has a timer that releases the override once expired and daylighting control resumes.

If the override is enabled, a switch can turn lights ON and manually set the dimming level.

Garibaldi Pro software is required to configure both the daylighting manual override timer and daylighting manual override enable parameters.

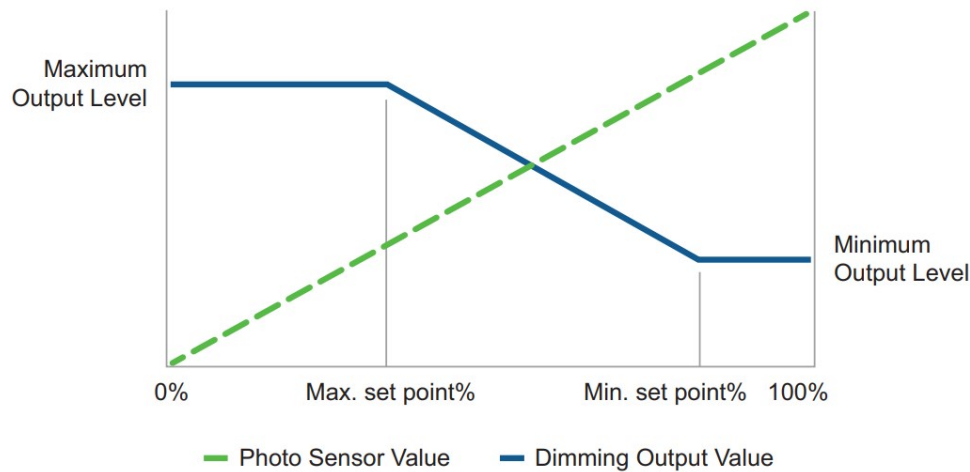
Open Loop Control

Open loop daylighting becomes active when a photo sensor with a maximum detectable range of light greater than 2500 lux is linked to the controller. In open loop daylighting, the sensor monitors the natural light contribution and should be mounted so it is not affected by the controlled fixture's light output.

When the light level monitored by the photo sensor is below the open-loop maximum output set point, dimming output is at the maximum output level. When the light level is above the open-loop minimum output set point,

dimming output is at the minimum output level.

In the diagram below, the solid line (blue) indicates dimming output. It begins lowering as the natural light level increases, dashed line (green). When the monitored light level is between the set points it modulates dimming output proportionally.



The rate that dimming output changes is defined by the parameter open loop dimming rate which defines the time for dimming to go from 0% to 100% or vice versa (default 65 seconds).

To set the open loop maximum output set point and minimum output set point using Simple Tap, a photo sensor with monitoring range greater than 2500 lux must be linked to the controller.

Note: The set points are calculated as a percentage of the photo sensor's full scale range.

1. Turn the light ON.
2. Tap the [Teach] button on the sensor three times. The light ramps up to full ON and then dims to OFF once.
3. Tap the [Teach] button the number of times indicated in the table below to set the open loop set points. The light responds the number of times tapped to confirm the change. After five seconds it returns to normal operation.

Sensor Range of > 2500 lux to < 11000 lux

Taps	Max. Output Set point	Min. Output Set point	Light Response
0 tap	20%	100%	1 blink
1 tap	30%	100%	2 blinks
2 taps	40%	100%	3 blinks
3 taps	50%	100%	4 blinks
4 taps	60%	100%	5 blinks

Sensor Range of > 11000 lux

Taps	Max. Output Set point	Min. Output Set point	Light Response
0 tap	5%	30%	1 blink
1 tap	10%	35%	2 blinks
2 taps	15%	40%	3 blinks
3 taps	20%	50%	4 blinks
4 taps	25%	55%	5 blinks

Controller Presets

Preset values are used to determine the dimming intensity and color temperature of different lighting scenes that are part of a designed solution made up of connected devices. A scene is a coordinated combination of controllers configured and grouped to light a space according to specific requirements. Groups, scenes, and event masking can be created in a Wireless TimeClock, and activated from a Wireless TimeClock or a scene station.

Echoflex controllers have 15 configurable presets (and one reserved for zero, or OFF). Preset values can be configured and saved to a controller using Garibaldi Pro software. Presets 1 through 8 cover a graduated range of values from full ON (100%) to OFF (0%). Presets 9 through 15 are a repetition of the values 1–7 and provide the opportunity to create custom values. A default ramp time of two seconds is given for the lighting to reach the preset value.

User Interface



Note: Garibaldi Pro software is the ideal tool to set up your project and configure settings, or even to make edits if your project has been pre-commissioned. Garibaldi Pro is available for download at echoflexsolutions.com.

Two buttons on the controller can be used to activate features and set specific configurations directly on the device. Two LEDs beside the buttons provide feedback about stored information and activities.

Power LED and Learn LED

The Power LED (red) and Learn LED (green) indicate the controller's device count information via blink codes or feedback for other activities.

Learn Button

The [Learn] button initiates Link mode for manually linking compatible Echoflex devices to the controller. See the relevant switch or sensor documentation for information on linking. Link mode times out after 60 seconds of inactivity.



Note: The manual linking process can be used both to link a device to a controller and to unlink a linked device from a controller.

Devices can be linked to a controller manually, using Garibaldi Pro, or during the Echoflex precommissioning process.

To link a device:

1. Press the [Learn] button to activate Link mode. The Learn LED turns ON and the Power LED blinks. Do one of the following:
 - To link a wall switch, press the switch paddle ON three times.
 - To link a sensor, press the sensor's [Teach] button. Refer to the sensor's documentation for more information.

The Power LED remains lit for four seconds while it links the new device, then resumes toggling. You can link up to 20 devices to the controller.

Remote Linking Solution

Use the following method to link the first switch if you cannot access the [Learn] button on a controller that has not been pre-commissioned and you do not have Garibaldi Pro software.

This method only works if there are no switches linked to the controller. You cannot link a scene station using this method.

1. Ensure you are within wireless range of the controller and have a wireless paddle switch.
 - **a.** If the controller has a linked sensor, you must press the [Teach] button on the sensor and complete step 2 within 60 seconds.
2. Click the switch paddle ON three times, OFF three times, and ON three times quickly, for a total of nine consecutive clicks. The relay will toggle and the Power LED will indicate the switch is linked.

Clear Button

The [Clear] button can be used to reset the controller either to its pre commissioned state or to its factory default state.

To reset to pre-commissioned state:

1. Press and hold the [Clear] button until the red Power and green Learn LEDs start blinking.
2. Release the [Clear] button. The Power LED blink codes indicate the type and count of devices linked at pre-commissioning.

To reset to factory default state:

1. Press and hold the [Clear] button until the red Power and green Learn LEDs start blinking, and continue to hold for 15 seconds until the LEDs stay on solid.
2. Release the [Clear] button. The Power LED displays solid red to indicates factory default state.

LED Display

The LED Display setting enables or disables the LEDs. Blinking LEDs are informative but not suitable for every location. The display can be disabled or enabled as required.

1. Remove the faceplate to access the buttons.
2. Press and hold both the [Learn] and [Clear] buttons until the LEDs turn Off. To re-enable the LEDs, press and

hold both buttons until the LEDs turn On.

Blink Indications

The tables below describe the LED codes that identify linked devices and the LED indications that describe linking activities.

Device Count Codes

The following codes provide a visible report of the devices that are linked to the controller. The Power LED repeats a code of blinks that represent the type and number of linked devices. Long blinks = type. Short blinks = count. If the controller does not have any linked devices, the Power LED remains on solid.

Device Type	Power LED	Learn LED
Switches	1 long blink followed by short blinks that count the switches	Off
Occupancy sensors	2 long blinks followed by short blinks that count the sensors	Off
Photo sensor (maximum of 1)	3 long blinks followed by short blink that counts the sensor	Off
Gateways and TimeClocks	4 long blinks followed by short blinks that count the devices	Off
Demand response	5 long blinks followed by short blinks that count the devices	Off
Entry door sensors	6 long blinks followed by short blinks that count the sensors	Off
Window sensors	7 long blinks followed by short blinks that count the sensors	Off
Keycard switches	8 long blinks followed by short blinks that count the switches	Off

Linking Activities

Activity	Power LED	Learn LED	Light Response
Link mode	Blinking	On solid	Cycles ON and OFF
Store link ID	On for 4 seconds, and then blinking	On solid	ON for 4 seconds, and then cycles
Clear link ID	Off for 4 seconds, and then blinking	On solid	OFF for 4 seconds, and then cycles

Compliance

For complete regulatory compliance information, see the Echoflex Power Load Controller datasheet at echoflexsolutions.com.

FCC Compliance

Echoflex Power Load Controller
(For any FCC matters):
Echoflex Solutions, Inc.
3031 Pleasant View Road
Middleton, WI 53562
+1 (608) 831-4116
echoflexsolutions.com

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Any modifications or changes to this product not expressly approved by Electronic Theatre Controls, Inc. could void the user's authority to operate the product. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Contains FCC ID: SZV-STM300U

ISED Compliance

This device contains a license-exempt transmitter/receiver that complies with Innovation, Science, and Economic Development Canada's license-exempt RSSs. Operation is subject to the following two conditions:


1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Contains IC ID: RSS 210

Support

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Documents / Resources

 Power Load Controller Models: ELEDH and ELEDH Configuration Guide <small>Part Number: 8189M2430 Rev A Release: 10/22</small>	echoflex ELEDH Power Load Controller [pdf] User Guide ELEDH Power Load Controller, Power Load Controller, ELEDH Controller, Controller, ELEDH, ELEDH
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References

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