



# **Elaho Relay Panel Mains Feed Installation Manual**

Part Number: 8123M2100 Rev.E

Released: 2024-03

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# Introduction

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Congratulations on your purchase of the Relay Panel Mains Feed. This panel offers flexible power control with a small footprint, low heat dissipation, and low noise, allowing it to be installed in a variety of locations.

Features of the ERP include:

- Built-in preset, and DMX controls
- Built-in network interface provides control via streaming ACN (sACN)
- Control for up to 24 relays or 300W phase adaptive dimmers
- Optional main breaker
- 120V (1Ø available), 240V, and 277V
- Option cards allow for DALI control, 0–10V control, and contact closure input
- UL924 listed emergency dry contact input suitable for connection to external emergency systems

## IMPORTANT SAFEGUARDS

When using electrical equipment, basic safety precautions should always be followed including the following:

### READ AND FOLLOW ALL SAFETY INSTRUCTIONS

- Do not use outdoors.
- Do not let power supply cords touch hot surfaces.
- Do not mount near gas or electric heaters.
- Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- Do not use this equipment for other than intended use.

### SAVE THESE INSTRUCTIONS

## Using this Manual

This manual contains procedures for installation of the Relay Panel Mains Feed and the field installed options such as the 0–10V output control option card, contact input, and ride thru option.

When viewing this document in electronic form (pdf file) with Adobe Acrobat Reader, blue italicized text followed by a page number is a link within the document. If you click on the link, Acrobat will navigate to that section or topic.

## Document Conventions

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.*

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

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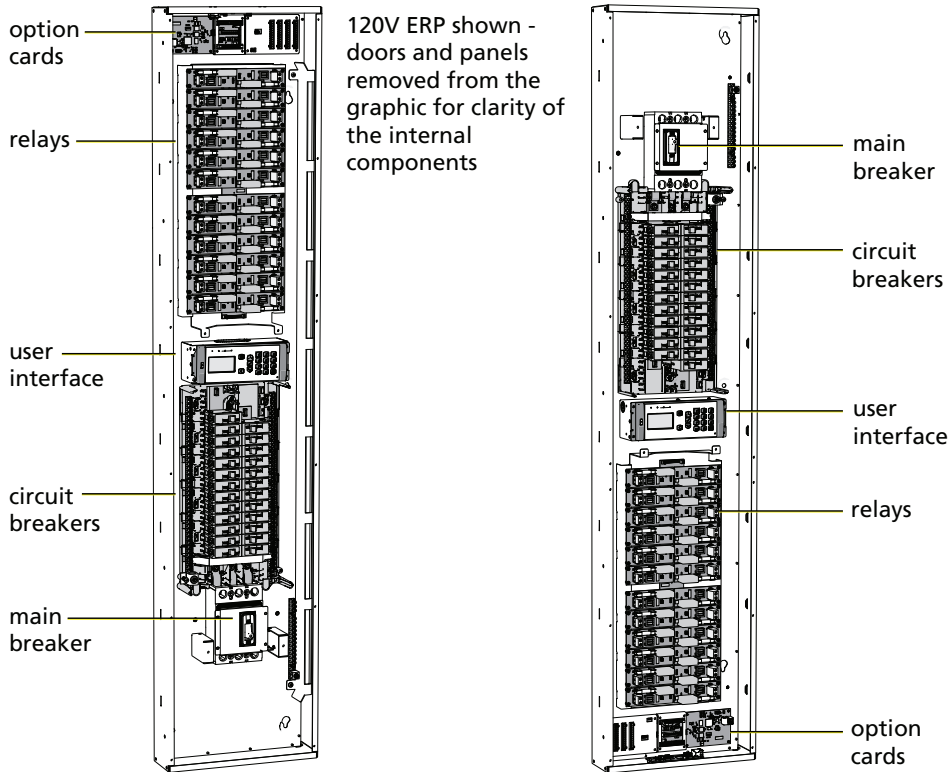
**WARNING: RISK OF ELECTRIC SHOCK!** This warning statement indicates situations where there is a risk of electric shock.

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# Product Variants


This manual contains the procedures for installation of the Relay Panel Mains Feed and the associated options.



The panel can be mounted with the breakers at the top or at the bottom. This allows flexibility when planning conduit entry and cable routing.

## 120V Panel Options

### 120V Main Lug Panel Models

	Model	Description
	ERP-24R1-24B1-ML1P	Elaho Relay Panel with 24 single-pole relays, 24 single-pole breakers, 120/240 V 1P 3W+G main lug input
	ERP-24R1-24B1-ML3P	Elaho Relay Panel with 24 single-pole relays, 24 single-pole breakers, 120/208 V 3P 4W+G main lug input
	ERP-24R-29B1-ML3P	Elaho Relay Panel with 24 single-pole relays, 29 single-pole breakers, 120/208 V 3P 4W+G main lug input
	ERP-12R1-12B1-ML3P	Elaho Relay Panel with 12 single-pole relays, 12 single-pole breakers, 120/208 V 3P 4W+G main lug input
	ERP-12R2-12B2-ML3P	Elaho Relay Panel with 12 double-pole relays, 12 double-pole breakers, 120/208 V 3P 4W+G main lug input



### 120V Main Circuit Breaker Kits

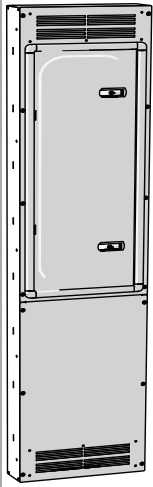
Model	Description
ERP-MB100A22K1P	120 V single-phase; 100 A; 22 kA SCCR main breaker
ERP-MB200A22K1P	120 V single-phase; 200 A; 22 kA SCCR main breaker
ERP-MB100A10K	120 V three-phase; 100 A; 10 kA SCCR main breaker
ERP-MB200A10K	120 V three-phase; 200 A; 10 kA SCCR main breaker
ERP-MB200A22K	120 V three-phase; 200 A; 22 kA SCCR main breaker
ERP-MB200A42K	120 V three-phase; 200 A; 42 kA SCCR main breaker

### 120V Door Models

Model	Description
ERP-FMD	120V flush-mount door assembly
ERP-SMD	120V surface-mount door assembly

### 277V Panel Options

#### 240/277V Standard Relay Panel Model

	Model	Description
	ERPA-R241-24B1-ML3P	24 single-pole relays, 24 single-pole breakers, 277/480 V* three-phase 4W+G main lug input

\*Also rated for use at 240/415 V

### 277V Main Circuit Breaker Kits

Model	Description
ERPA-MB150A14K	277/480 V three-phase; 150 A; 14 kA SCCR main breaker
ERPA-MB200A14K	277/480 V three-phase; 200 A; 14 kA SCCR main breaker
ERPA-MB200A65K	277/480 V three-phase; 200 A; 65 kA SCCR main breaker

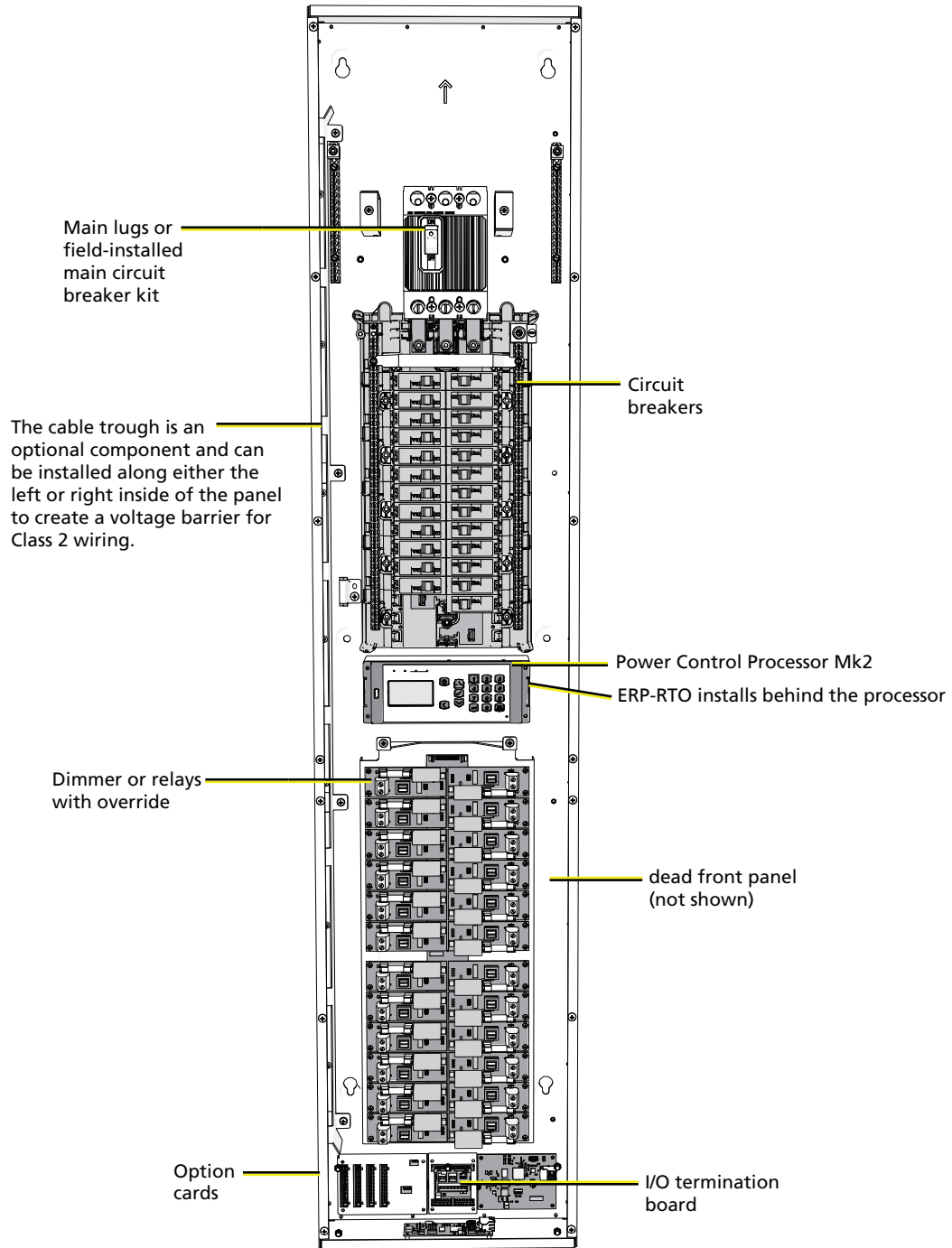
### 240/277V Door Models

Model	Description
ERPA-FMD	277 V flush-mount door assembly
ERPA-SMD	277 V surface-mount door assembly

## Option Cards and Accessories

Model	Description	Notes
ERP-CI	Contact Input option card	Field-installed option kit
ERP-LVD	0–10 V Dimming Control	
ERP-DALI	DALI Control (broadcast only)	
ERP-RTO	RideThru option	
ERP-TPH	Tamper-proof hardware kit	
ERP-Relay-1P	Single-pole relay card	
ERP-Relay-2P	Double-pole relay card kit	Field-installed kit Available for 120 V models only
ERP-Relay-3P	Three pole relay card kit	Field-installed kit Available for 120 V models only
ERP-DIM	300 W Phase-Adaptive Dimmer	Phase-adaptive dimmer operates forward or reverse phase as required. Available for 120 V models only.
ERP-DIM-MLV	300 W Forward-Phase Dimmer	Available for 120 V models only.

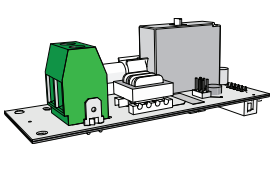
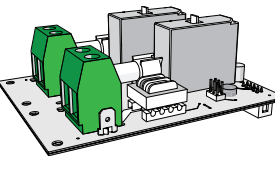
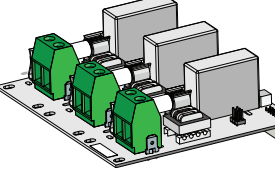
# Panel Overview



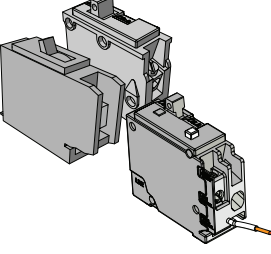
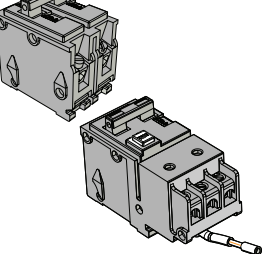
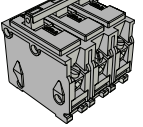
## Relays and Circuit Breakers

A 120 V Relay Panel Mains Feed ships standard fully populated and pre-wired with single pole or double pole 20 A relays and circuit breakers. Configured panels with combinations of single, double, three pole relays and breakers are available as custom order or as an field installed panel option. See [120V Panel Options on page 3](#) and [Relay and Dimmer Specifications on page 37](#).

A 240/277 V Relay Panel Mains Feed ships standard fully populated and pre-wired with single pole relays and breakers. See [277V Panel Options on page 4](#).

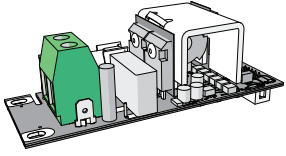
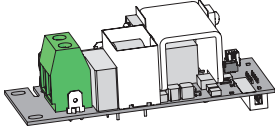
		
ERP-Relay-1P Single-pole, single space 20 A relay (fits both 120 V and 277 V panels)	ERP-Relay-2P Double-pole, double space 20 A relay (120 V panel only)	ERP-Relay-3P Three-pole, triple space 20 A relay (120 V panel only)

For customer convenience, breakers are available separately for field installation as required.

Single pole, single space breakers		Double pole, double space breakers	Three pole, triple space breakers
			
<b>120 V</b>	<b>240/277 V</b>	<b>120 V</b>	<b>120 V</b>
CB815 - 10 A	CB823 - 15 A	CB818 - 10 A	CB821 - 15 A
CB816 - 15 A	CB824 - 20 A	CB819 - 15 A	CB822 - 20 A
CB842 - 15 A GFCI		CB844 - 15 A GFCI	
CB814 - 20 A		CB820 - 20 A	
CB843 - 20 A GFCI		CB845 - 20 A GFCI	

## Dimmer

The 300 W dimmer installs in the same manner as a single pole relay. You will need to order dimmer kits individually or as part of a custom panel.

	
<p>ERP-DIM</p> <ul style="list-style-type: none"><li>• Single-pole, single space 300 W dimmer</li><li>• 120 V panels only</li><li>• Forward/reverse-phase dimmed loads (auto-switching)</li></ul>	<p>ERP-DIM-MLV</p> <ul style="list-style-type: none"><li>• Single-pole, single space 300 W dimmer</li><li>• 120 V panels only</li><li>• Forward-phase dimmed loads</li></ul>

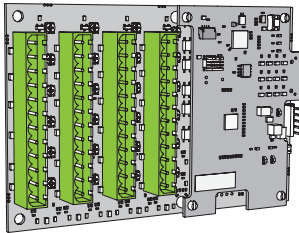


**Note:** Echoflex Solutions does not support the use of the ERP-DIM with magnetic loads. Use ERP-DIM-MLV with magnetic loads.

## Option Cards Overview

Option cards are available for field installation into the Relay Panel Mains Feed. Each option adds another level of features and functions to the panel and the installation.

### 0–10 V Dimming Control



The 0–10 V Dimming Control option card (ERP-LVD) provides 24 outputs for control of 4-wire current-sink, 0-10 VDC fluorescent or electronic loads.

- Each of the 24 outputs are rated to control a maximum of 100 mA per channel.
- Loss of power at the Relay Panel Mains Feed controller results in releasing control levels to full.
- The ERP-LVD option card installs by card edge connector to the left side of the I/O termination board.

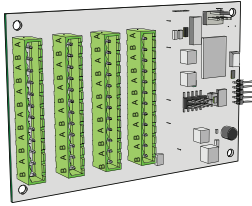
For more information, see [0–10V Option Card on page 38](#).



**WARNING: RISK OF DEATH OR INJURY BY ELECTRIC SHOCK! 0–10V wiring may not be fully isolated from high-voltage AC power. Do not assume that 0–10V wiring is safe to touch, even when run as an NEC Class 2 signal. Have a licensed electrician test for AC voltage to ground before terminating any 0–10V control wiring to the device.**

**AVERTISSEMENT : RISQUE DE MORT OU DE BLESSURE PAR ÉLECTROCUTION! Le câblage 0–10V peut ne pas être complètement isolé du courant alternatif haute tension. Ne supposez jamais que le câblage 0–10V peut être touché en toute sécurité, même s'il est utilisé avec un signal NEC de Classe 2. Faites tester par un électricien agréé la tension alternative par rapport à la terre avant de raccorder tout câblage de commande 0–10V à l'appareil.**

## DALI Control



The Digital Addressable Lighting Interface Control card (ERP-DALI) controls 24 loops of 64 DALI compatible ballasts in broadcast mode. Each loop of up to 64 ballasts are linked one to one with the relay panel circuit for power control.

The DALI ballast must be powered by an external DALI loop power supply (supplied by others). This supply is connected externally of the ERP. Each DALI loop requires its own power supply and possibly more than one power supply depending on the ballast load.

- Installation is limited to 64 DALI-compatible ballasts per DALI loop.
- The ERP-DALI Control card installs by card edge connector to the left side of the I/O termination board.

For more information, see [DALI Option Card on page 41](#).

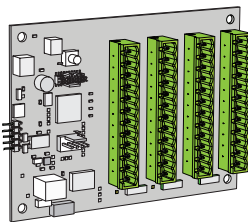


**Note:** A single, 24-position Elaho Relay Panel Mains Feed supports the use of either the 0–10V Dimming Control option card (ERP-LVD) or the DALI Control option card (ERP-DALI), but not both in the same panel.

### ERP-FT Option Card Combinations

ERP-LVD	-
ERP-LVD	ERP-CI
ERP-DALI	-
ERP-DALI	ERP-CI
ERP-CI	-

## Contact Input

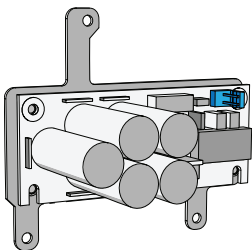


The Contact Input card (ERP-CI) provides the ability to directly control the relays using a momentary or maintained dry contact input.

- The ERP-CI card installs by card edge connector to the right side of the I/O termination board.

For more information, see [Contact Input Option Card on page 44](#).

## RideThru Option



The RideThru Option (ERP-RTO) maintains power to the Relay Panel Mains Feed controller for a minimum of 15 seconds in the event of a brown-out or power loss.

- The ERP-RTO option card mounts behind the user interface.

For more information, refer to the *RideThru Option Kit Installation Guide* provided with the option card and available for free download from [echoflexsolutions.com](http://echoflexsolutions.com).

## Help from Technical Services

If you are having difficulties and your problem is not addressed by this document, try the Echoflex Solutions website at [echoflexsolutions.com](http://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

Please have the following information handy:

- Product model and serial number (located on the product label)
- Type of relays and breakers used including the model number and quantity
- A list of all option cards installed in the panel
- Type of control stations used (if any) including model number and quantity
- DMX or network control source used for system-wide control, if any

### Technical Services

3031 Pleasant View Road

Middleton, WI 53562

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

+1-608 831-4116

[service@echoflexsolutions.com](mailto:service@echoflexsolutions.com)

# Chapter 1

## Prepare for Installation

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### Inspect the Shipment

Before you begin installation, check your shipment and confirm it arrived complete and undamaged.

1. Check the packaging for physical damage.
  - Document any damage found before opening in case of damage to equipment.
2. Inspect the order for completeness.
  - Check the box contents received against the packing list to ensure your order is received complete.
  - If you discover a problem with the contents of the shipment, contact the Systems Group. See [Help from Technical Services on page 10](#) for contact information.

### Unpack Panel

For best results, follow these instructions when unpacking the panel from the box.

1. Lay the box flat, top side up on a floor or flat horizontal surface. The top side of the box is labeled for your convenience.
2. Lift and remove the box lid. A standard model Relay Panel Mains Feed ships from the factory, pre-wired with low-voltage relay control. As you remove the Relay Panel from the shipping carton, confirm the following items are included:
  - A door, wrapped separately but packaged with the panel. The door will appear as a separate line item on the sales order but ships in the same box as the main panel. Check that the door is the correct model as ordered.
  - The relay panel with interiors (relay compartment and breaker compartment) and removable covers.
  - The quantity and type of relays and breakers ordered
  - DMX Preparation kit
  - This installation manual



**Note:** *All accessory options and option cards are packaged separately.*

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**Note:** *It is recommended to perform the next step with at least two people as the panel may be awkward and heavy to remove from the packaging.*

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3. To lift the panel from the packaging, one person lifts from the top side of the enclosure, indicated with an arrow on the panel interior. A second person lifts from the bottom side of the panel.
4. Rest the panel on a floor or flat horizontal surface until the installation personnel are ready to begin the installation procedure.



## Installation Environment

For proper operation of the Elaho Relay Panel Mains Feed, ensure that the intended installation location conforms to the following environmental and electrical requirements.

- Dry room (5%–95% humidity, non-condensing), 0°C–40°C (32°F–104°F) ambient temperature, dust free.
- A 120 V model of the Relay Panel Mains Feed can be either surface mounted or flush mounted between studs; assuming 8.9 cm (3.5 in) stud depth with 1.3 cm (1/2 in) surfacing material.
- A 277 V model of the Relay Panel Mains Feed has a width of 50.8 cm (20 in) and a depth of 14.7 cm (5.8 in). Custom framing construction will allow the panel to be recessed to the depth of the wall.
- The installation location must support a fully populated panel, not exceeding 54.5 kg (120 lbs).



**Note:** *The maximum weight, 54.5 kg (120 lbs), includes a fully populated relay panel as shipped from the factory and does not include the weight of installation conduit or cable.*

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## Electrical Input Requirements

- Refer to [Product Variants on page 3](#) for information on mains feed for each panel model.
- A single phase panel requires 192 A maximum continuous current to operate a fully loaded panel.
- A three phase panel requires 128 A maximum continuous current to operate a fully loaded panel.
- This equipment must be connected to a suitable safety earth/ground.

## Parts and Specialty Tools Required

The following parts and specialty tools are required, but not supplied, for this installation:

- Required mounting hardware (not supplied) six each 6–8 mm (1/4–3/8 in) bolts or screws 5–10 cm (2–4 in) long and suitable wall plugs are suggested.



**Note:** *Both the installation location and the mounting hardware must support a fully populated panel, including conduit and cable, approximately 54.5 kg (120 lbs).*

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- Torque wrench with 3/8 in, 5/16 in, 1/2 in, and 7/16 in hex sockets for feed wiring
- Lineman's pliers
- Set of screwdrivers, including both flatblade and Phillips head. Specifically, a small 3 mm (1/8 in) flatblade screwdriver is required for data terminations.
- Conduit punch or hole saw for providing access holes in the enclosure for conduit entry.
- Insulation stripping tool
- Precision wire stripper with self-adjusting blades or wire stripper that includes a fixed opening for 23–24 AWG

## Clearance

The Relay Panel Mains Feed can be surface or flush mounted to the installation location. In addition, panels can be installed side by side when sharing similar low-voltage (control) cable access for installation convenience. Allow clearances as described below.

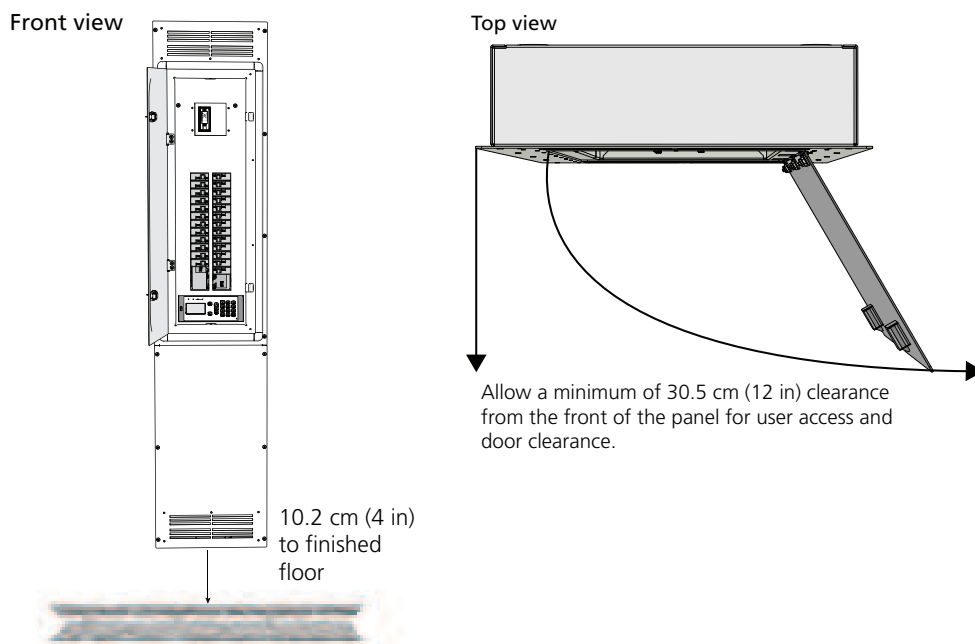
### Panel Dimensions

Models	Height	Width	Depth
120 V	171.5 cm (67.5 in)	36.6 cm (14.4 in)	10.2 cm (4 in)
240/277 V	171.5 cm (67.5 in)	50.8 cm (20 in)	14.7 cm (5.8 in)

### Door Dimensions

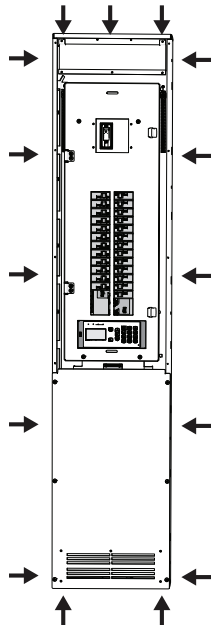
Model	Description	Height	Width
ERP-FMD	120 V Flush Mount Door assembly	174.3 cm (68.63 in)	39.4 cm (15.5 in)
ERP-SMD	120 V Surface Mount Door assembly	171.5 cm (67.5 in)	36.6 cm (14.4 in)
ERPA-FMD	240/277 V Flush Mount Door assembly	175.3 cm (69 in)	54.6 cm (21.5 in)
ERPA-SMD	240/277 V Surface Mount Door assembly	171.5 cm (67.5 in)	50.8 cm (20 in)

Echoflex Solutions recommends a mounting height for all panel models of approximately 10.2 cm (4 in) from floor (horizontal surface) to the bottom of the panel.



## Cable Routing and Conduit Access

When planning conduit entry and cable routing to the panel, pay special attention to the following recommendations:



Purpose	Top Entry	Top Side Entry	Bottom Entry	Bottom Side Entry
Feed wiring	Yes	Yes	No	No
Load wiring	Yes	Yes	No	No
Control wiring (DMX, Network, etc.)	Yes	Yes	Yes	Yes
0-10V Output	Yes	Yes	Yes	Yes

### Notes:

Do not install conduit in conflict with the option card locations on the bottom panel or the low-voltage troughs specific to your installation.

For feed wiring, both copper and aluminum feeds are acceptable. For all other wiring, use copper wire only.



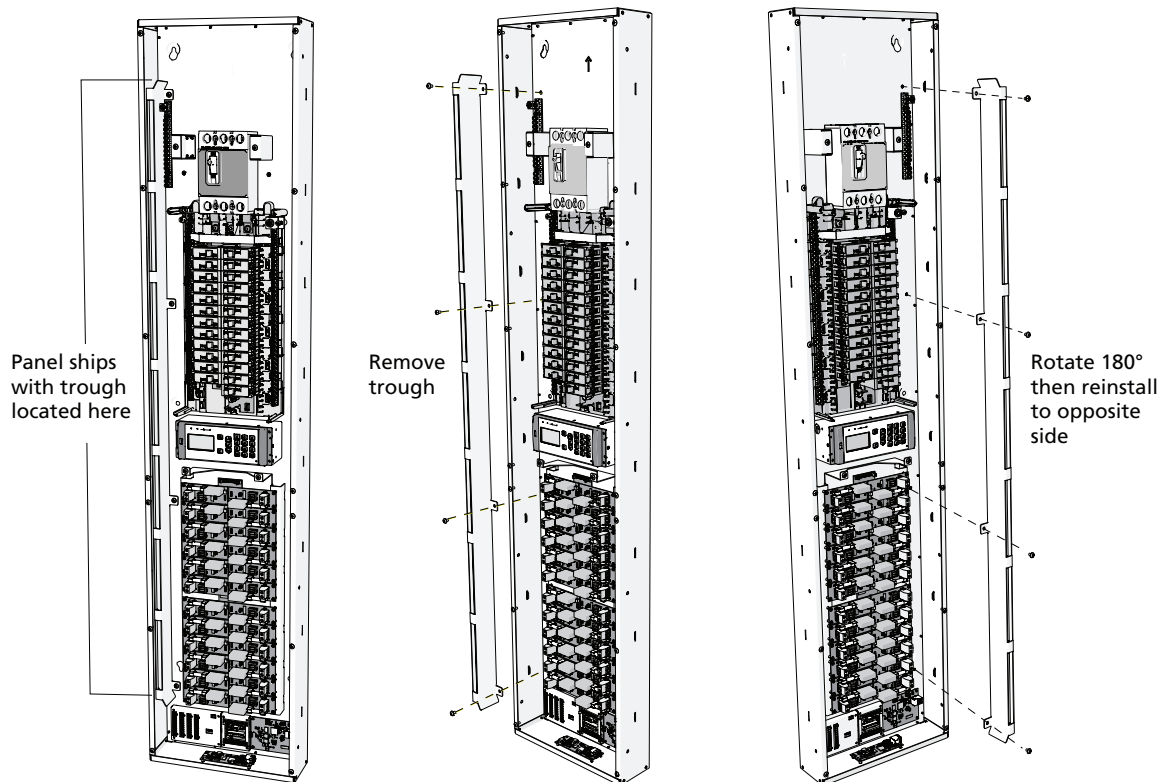
**Note:** Control wiring (DMX, Network, etc.) and power wiring must be run in separate conduit in accordance with local code.

## Low-Voltage Wiring Trough

One low-voltage wiring trough is preinstalled in the Relay Panel Mains Feed. This trough runs the length of one side of the panel, allowing data and low-voltage cable routing from a top entry installation. If required, you can move this trough to the opposite side of your panel.

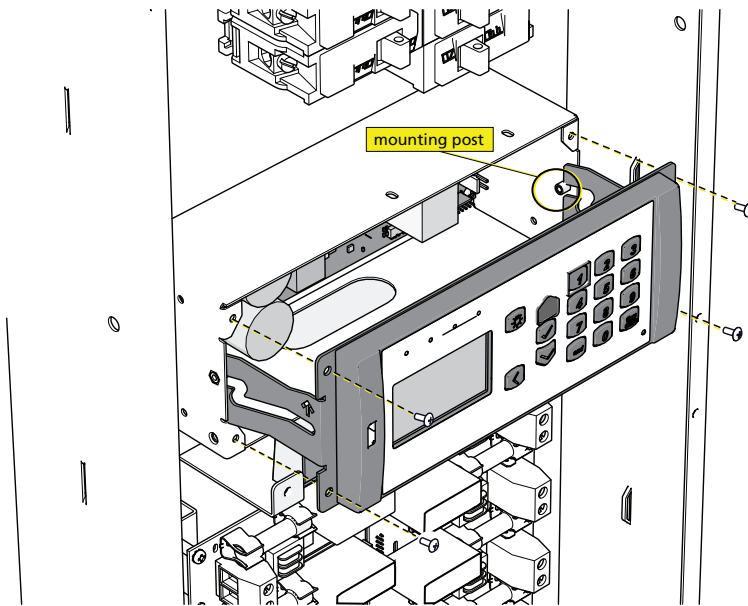
### *Move Trough to Opposite Side*

1. Remove the front covers to gain access to the low-voltage wiring trough. For information on removing covers, see [Installation on page 17](#).
2. Remove the four screws holding the trough in place.
3. Rotate the trough 180°.
4. Use the same four screws to reinstall the trough on the opposite side of the panel interior as shown below.



## User Interface Orientation

When the Relay Panel Mains Feed is mounted with the main breaker towards the bottom of the panel, you will need to rotate the user interface so the display text is in a readable orientation. When installed correctly, the display is to the left of the button pad.



1. Remove the four screws securing the user interface to its back box.
  - The user interface is attached to the backplane with a ribbon cable. This cable is long enough to stay attached during reorientation, but can be removed if preferred.
2. If preferred, disconnect the ribbon cable from the rear of the user interface.
  - a. Gently pull the locking tabs out and away from the ribbon cable.
  - b. Pull the cable gently off of the header and tuck it into the back box and out of the way.
3. Pull the user interface out, away from the panel.
4. Rotate the user interface so the LCD screen is positioned to the left of the button pad.
5. If previously removed, reattach the ribbon cable by pressing the connector firmly onto the header.
  - Take the connector orientation into consideration when reinstalling the ribbon cable.
6. Align the channel in the bracket arms to the metal posts inside the user interface back box.
7. Slide the user interface onto the metal posts and push until the faceplate is flush with the back box.
8. Reinstall the four previously removed screws.

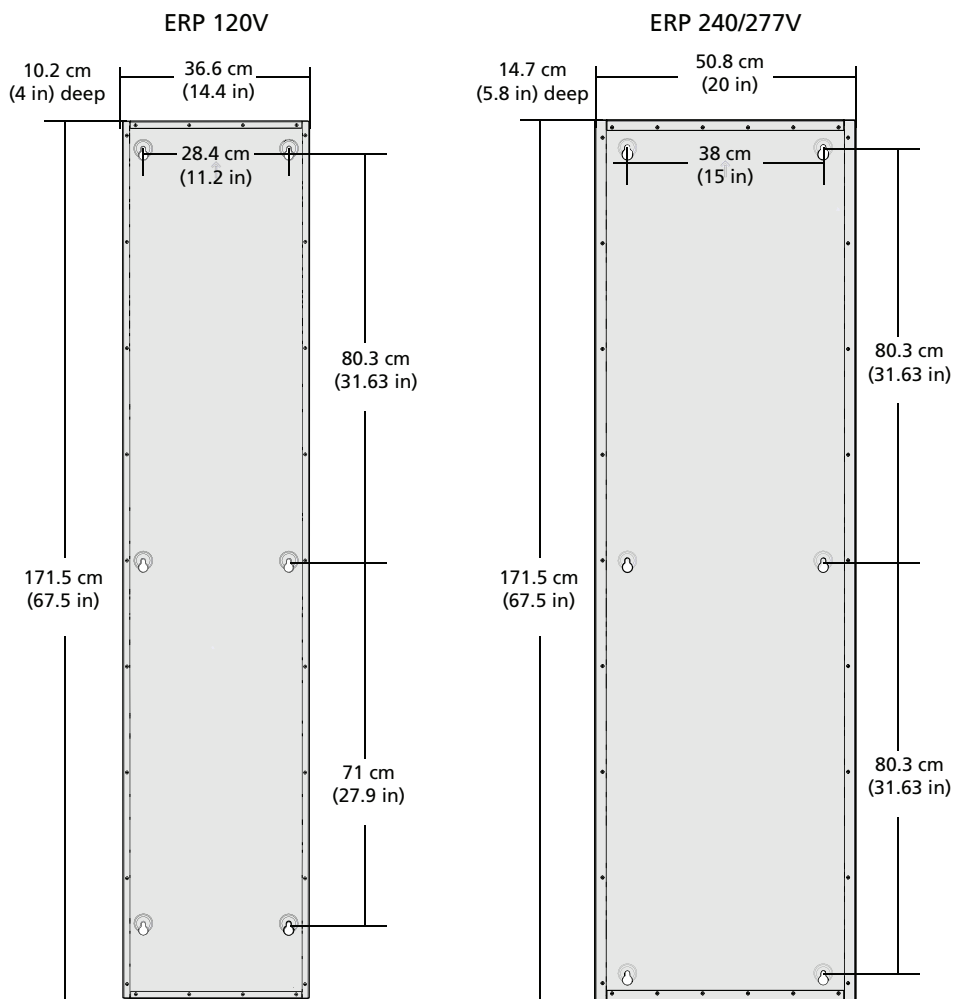
# Chapter 2

## Installation

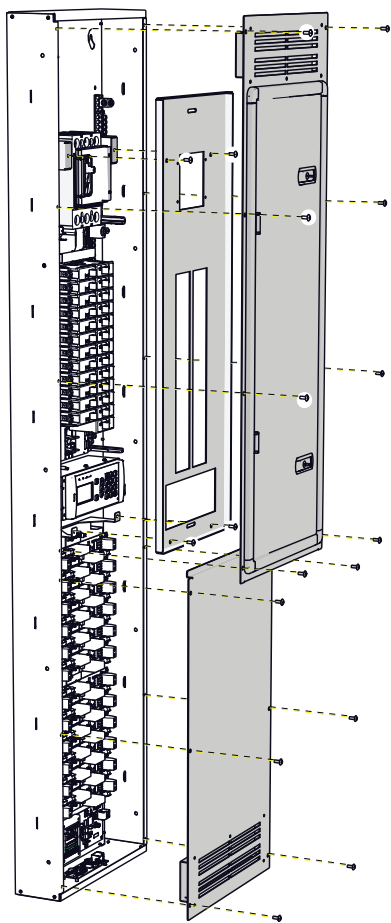
### Mount the Panel

The Relay Panel Mains Feed can be surface or flush mounted to the installation location.

1. Determine where your panel will be installed using the details outlined in [Installation Environment](#) and [Clearance on page 13](#).
2. Six mounting keyholes are provided on the rear of the panel. You must supply your own 3/8 inch mounting hardware (bolts are recommended). Mark and pre-drill the mounting holes to the mounting surface using the measured drawing below as a guide.



3. Install the mounting hardware. See [Parts and Specialty Tools Required on page 12](#). Leave at least 25 mm (1 in) of threads exposed for ease of mounting the panel.



4. Remove the door and covers from the panel to gain full-access to the mounting keyholes on the rear of the panel.
  - a. Remove the eight screws that secure the top door to the panel.
  - b. Remove the screws securing the top protective cover and the lower front cover to the rack.
  - c. Store the door, covers, and screws in a safe location until they are reinstalled at the end of the installation process.
5. Temporarily mount the panel to the installed mounting hardware.
6. With the panel installed (temporarily), mark the required conduit entry locations. See [Cable Routing and Conduit Access on page 14](#).



**Note:** *When punching holes for conduit, keep in mind that the low-voltage trough can be installed to run the length of either side of the relay panel.*

7. Remove the panel from the mounting hardware and cut the conduit entry into the panel.
8. Re-attach the panel to the mounting hardware and tighten the mounting bolts securely.
9. Attach and tighten the conduit to the enclosure.

## Install Main Circuit Breaker (optional)

The Relay Panel Mains Feed ships with main lugs, as standard. When a main circuit breaker is required, Echoflex Solutions offers main circuit breaker option kits for field installation as required.

Model	Description
ERP-MB100A22K1P	120 V single-phase; 100 A; 22 kA SCCR main breaker
ERP-MB200A22K1P	120 V single-phase; 200 A; 22 kA SCCR main breaker
ERP-MB100A10K	120 V three-phase; 100 A; 10 kA SCCR main breaker
ERP-MB200A10K	120 V three-phase; 200 A; 10 kA SCCR main breaker
ERP-MB200A22K	120 V three-phase; 200 A; 22 kA SCCR main breaker
ERP-MB200A42K	120 V three-phase; 200 A; 42 kA SCCR main breaker
ERPA-MB150A14K	277/480 V three-phase; 150 A; 14 kA SCCR main breaker
ERPA-MB200A14K	277/480 V three-phase; 200 A; 14 kA SCCR main breaker
ERPA-MB200A65K	277/480 V three-phase; 200 A; 65 kA SCCR main breaker

Refer to the installation instructions provided by the breaker manufacturer that are included with the main circuit breaker kit ordered. Main feed termination instructions are outlined below.

## Installing Relays and Dimmers

Single pole relays and dimmers have the same size foot print and install in the same manner. You may need to field install relays or dimmers into your panel if:

- the custom-ordered panel did not ship with them installed
- you are modifying the physical configuration after installation
- you are replacing damaged units

Relays and dimmers are numbered in the same manner as a branch circuit breaker panel; left to right, then down. A matching branch circuit breaker must be installed in the same numbered breaker slot as the related relay output position. i.e. breaker slot #1 should match output #1.



**Note:** *If the rack is installed for bottom feed, relay #1 and breaker #1 will be in the bottom-right corner rather than the top-left corner.*

---



**WARNING: RISK OF DEATH BY ELECTRIC SHOCK!** Failure to disconnect all power to the panel before working inside could result in serious injury or death.

**AVERTISSEMENT : RISQUE DE MORT PAR ÉLECTROCUTION!** Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entraîner des blessures graves, voire mortelles.

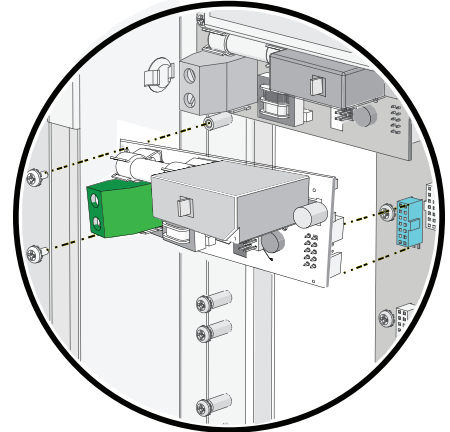
**De-energize main feed to the panel and follow appropriate Lockout/Tagout procedures as mandated by NFPA 70E. It is important to note that electrical equipment such as relay panels can present an arc flash hazard if improperly serviced. This is due to the high amounts of short-circuit current available on the electrical supply to this equipment. Any work must comply with OSHA Safe Working Practices.**

---



## Installation Procedure

1. If applicable, remove the door and lower protective cover.
2. If applicable, locate and remove the faulty hardware from the panel.
  - a. Loosen the terminal screws securing the relay Input and relay Output wire terminations to the faulty relay/dimmer.
  - b. Remove the Neutral wire spade from the faulty relay or dimmer.
  - c. Loosen and remove the screws securing the relay or dimmer card in place.
3. Locate the relay or dimmer module and hardware provided in the kit.
4. Install the module into the designated relay output (single, double, or triple space).
  - a. Modules include control connectors, located on the bottom side of the card, that connect to the ElahoRelay Panel Mains Feedcontrol card. Align the bottom mounted connectors to the designated receptacles on the control card.
  - b. Gently press down on the module until the connectors are fully seated.
  - c. Secure the card into the output position using the two provided screws.



1P relay shown

## Rough-In and Terminate Cable

The recommended cable for each termination is limited to the wire lugs and termination connectors provided in the panel. Refer to the chart included with each termination section for wire specification, strip length and torque settings.



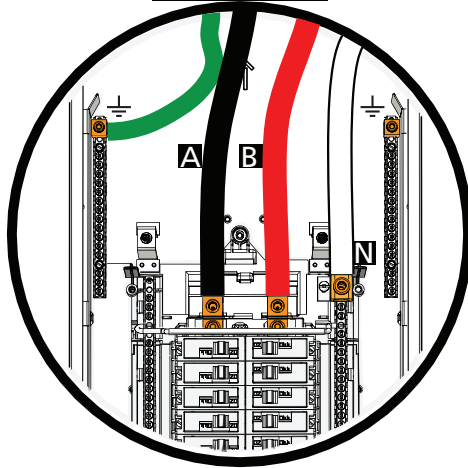
**WARNING: RISK OF DEATH BY ELECTRIC SHOCK!** Failure to disconnect all power to the panel before working inside could result in serious injury or death.

**AVERTISSEMENT : RISQUE DE MORT PAR ÉLECTROCUTION!** Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entraîner des blessures graves, voire mortelles.

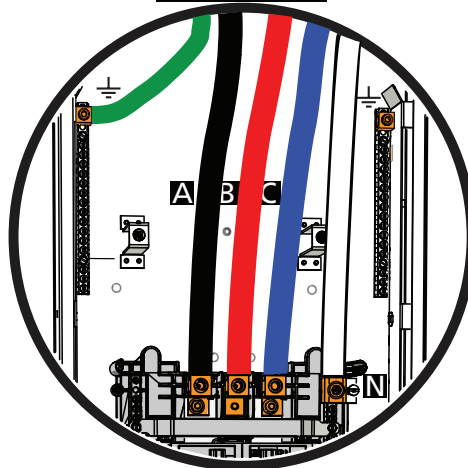
De-energize main feed to the panel and follow appropriate Lockout/Tagout procedures as mandated by NFPA 70E. It is important to note that electrical equipment such as relay panels can present an arc flash hazard if improperly serviced. This is due to the high amounts of short-circuit current available on the electrical supply to this equipment. Any work must comply with OSHA Safe Working Practices.

# Connect Main Feed

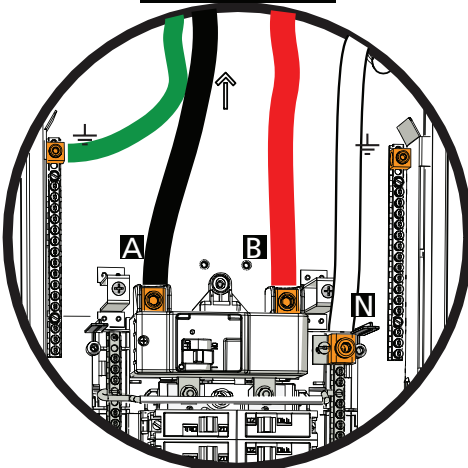
120V/1Ø ML



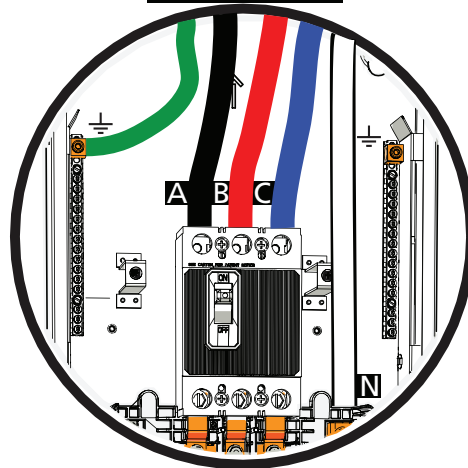
120V/3Ø ML



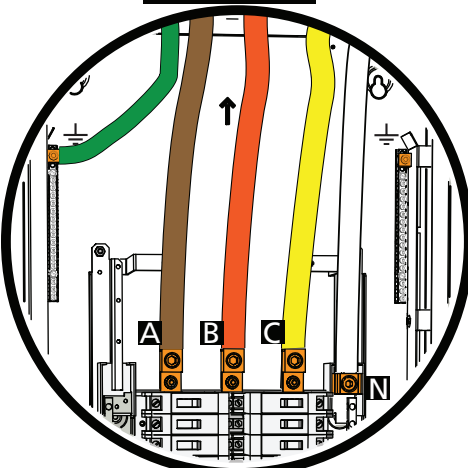
120V/1Ø MCB



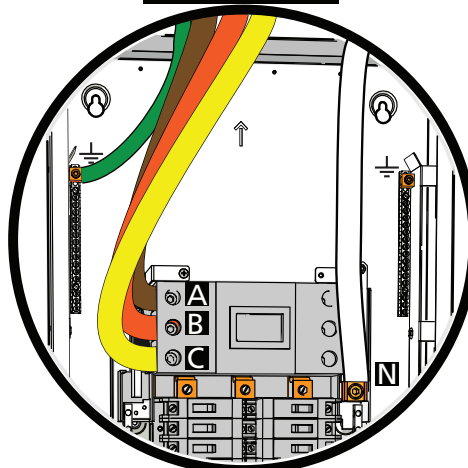
120V/3Ø MCB



277V/3Ø ML



277V/3Ø MCB



## Main Feed Cable Specification



**Note:** It is the installing contractor's responsibility to comply with all local electrical codes. For UL 924 emergency installation, secure an emergency power source for control power and line feeds as required.

Purpose and Type	Wire Range	Strip length	Torque (lb-in)	Wrench/Driver
Main Lugs 120/240V 1Ø	25–150 mm <sup>2</sup> (4 AWG–300kcmil)	20 mm (0.8 in)	28 N·m (250 in-lb)	5/16 in
Main Lugs 120/208V 3Ø				
Main Lugs 277/480V 3Ø				
Main Circuit Breaker 120V/240 1Ø, 100A, 22kA	50–150 mm <sup>2</sup> (1 AWG–300kcmil)	20 mm (0.8 in)	28 N·m (250 in-lb)	5/16 in
Main Circuit Breaker 120V/240 1Ø, 200A, 22kA	50–150 mm <sup>2</sup> (1 AWG–300kcmil)	20 mm (0.8 in)	28 N·m (250 in-lb)	5/16 in
Main Circuit Breaker 120/208V 3Ø, 200A, 10kA	95–150 mm <sup>2</sup> (3/0–300kcmil)	20 mm (0.8 in)	28 N·m (250 in-lb)	5/16 in
Main Circuit Breaker 120/208V 3Ø, 200A, 22kA				
Main Circuit Breaker 120/208V 3Ø, 200A, 42kA				
Main Circuit Breaker 120/208V 3Ø, 100A, 10kA	10–95 mm <sup>2</sup> (8 AWG–3/0)	0.8" (20 mm)	5.6 N·m (50 in-lb)	flatblade
Main Circuit Breaker 277/480V 3Ø, 200A, 14kA	16–185 mm <sup>2</sup> (6 AWG–350kcmil)	0.9" (23 mm)	6–1 AWG: 13.5 N·m (120 in-lb)	5/16 in
Main Circuit Breaker 277/480V 3Ø, 200A, 65kA			1/0–350 kcmil: 31 N·m (275 in-lb)	
Main Circuit Breaker 277/480V 3Ø, 150A, 14kA				
Ground Input Lug (all models)	25–150 mm <sup>2</sup> (4 AWG–300kcmil)	20 mm (0.8 in)	31 N·m (275 in-lb)	5/16 in

1. With the conduit in place, make sure the upstream source of power is off or isolated, then pull the incoming power cables, phase, neutral and ground, to the panel. Refer to the wire specification chart above for wire, strip length, torque and tool specification.
2. Strip back the cable jackets to the length indicated in the wire specification chart, depending on the connection.
3. Terminate the ground cable to the ground lug located on the top left or top right side of the panel.
  - Using a 5/16 inch hex key, tighten the lug to the torque indicated above.
4. Terminate the neutral cable to the neutral lug located on the right side of the panel.
  - Using a 5/16 inch hex key, tighten the lug to the torque indicated above.
5. Terminate the phase cables to the main lugs or main circuit breaker (if installed). Using the appropriate sized Allen wrench, tighten the lug to the torque indicated above.

## Connect Load Wiring

In fully loaded relay panels, all breaker to relay wiring connections are pre-terminated at the factory. Load terminations are made to the output side of the relay card.

### Load Cable Specification

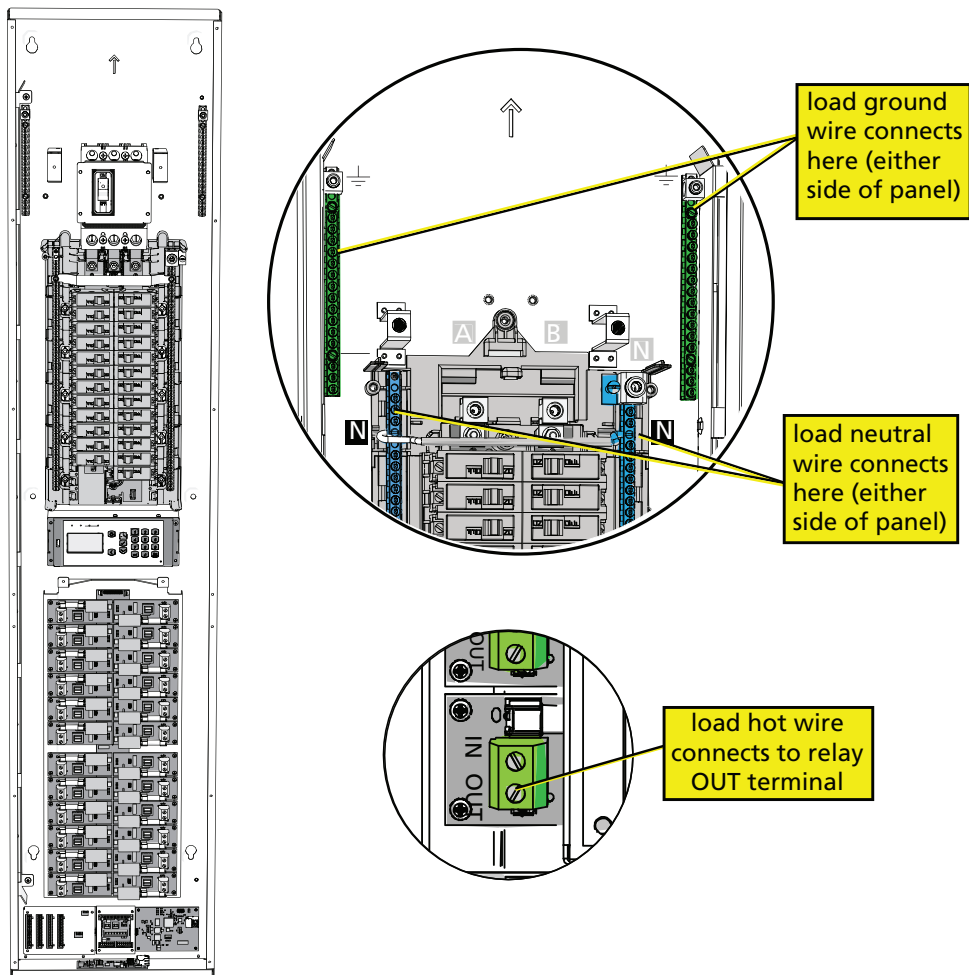
Purpose and Type	Wire Range	Strip length	Torque (lb/in)		Driver
Load to relay and dimmer output	.50–16 mm <sup>2</sup> (20–6 AWG)	12.7 mm (1/2 in)	15.6 in-lb (1.8 N·m)		flatblade
Load to ground (all models) Neutral bars 120 V models	2.5–25 mm <sup>2</sup> (14–4 AWG)	12.7 mm (1/2 in)	2.5–6 mm <sup>2</sup> (14–10 AWG)	2.3 N·m (20 in-lb)	flatblade
			10 mm <sup>2</sup> (8 AWG)	2.8 N·m (25 in-lb)	
			10–16 mm <sup>2</sup> (6–4 AWG)	4.0 N·m (35 in-lb)	
Load to neutral bars 240/277 V models	Small hole: 2.5–25 mm <sup>2</sup> (14–6 AWG)  Large hole: 20–50 mm <sup>2</sup> (3–1/0 AWG)	12.7 mm (1/2 in)	2.5–6 mm <sup>2</sup> (14–10 AWG)	2.3 N·m (20 in-lb)	flatblade
			10 mm <sup>2</sup> (8 AWG)	2.8 N·m (25 in-lb)	
			10–16 mm <sup>2</sup> (6–4 AWG)	4.0 N·m (35 in-lb)	
			50 mm <sup>2</sup> (1/0 AWG)	5.6 N·m (50 in-lb)	
Circuit breaker output	6 mm <sup>2</sup> (10 AWG)	10 mm (3/8 in)	25 in-lb (2.8 N·m)		flatblade
Relay and dimmer card input (from circuit breaker)	6 mm <sup>2</sup> (10 AWG)	12.7 mm (1/2 in)	15.6 in-lb (1.8 N·m)		flatblade



**Note:** Prepare enough cable length to pull the load hot wire to the relays and neutral and ground wires to the top of the panel.



**WARNING: RISK OF ELECTRIC SHOCK! Check power is OFF to the circuit breakers prior to proceeding with wiring.**



- The relays are numbered in the same manner as a circuit breaker panel; left to right, then down.
- Neutral and ground terminal bars are located near the top of the panel.



**Note:** If the rack is installed for bottom feed, relay #1 and breaker #1 will be in the bottom-right corner rather than the top-left corner.



**Note:** All low-voltage (control) wiring must be routed separately from high-voltage wiring.

1. Pull individual load wiring (load hot, neutral, and ground per circuit) through conduit to the panel. It is best practice to label each conductor with load and circuit designation.
2. Connect the ground wire from the load to the ground bar located at the top of the panel. No specific designation is required for connection location.
  - a. Loosen a ground screw terminal using a flatblade screwdriver.
  - b. Strip 12.7 mm (1/2 in) of insulation from the wire.
  - c. Insert the wire into the terminal and secure to the torque specified in [Load Cable Specification on the previous page](#).

3. Connect the neutral wire from the load to the neutral bar located at the top of the panel. No specific designation is required for connection location.
  - a. Loosen a neutral screw terminal using a flatblade screwdriver.
  - b. Strip 12.7 mm (1/2 in) of insulation from the wire.
  - c. Insert the wire into the terminal and secure to the torque specified in the [Load Cable Specification on page 23](#).
4. Locate the module designated for the circuit and loosen the output screw terminal (labeled "Out"). When terminating to a double pole or triple pole relay, loosen the output screw terminal for each output for that circuit.
5. Connect the hot wire from the load to the to the designated module.
  - a. Strip 12.7 mm (1/2 in) of insulation from the end of the copper wire(s).
  - b. Insert the bare end into the module output screw terminal (labeled "Out"). When terminating more than one conductor, insert a conductor into each output terminal for that circuit.
  - c. Torque the terminal to 1.8 Nm (15.6 in-lb).
6. Repeat this process for the remaining circuits in the installation.

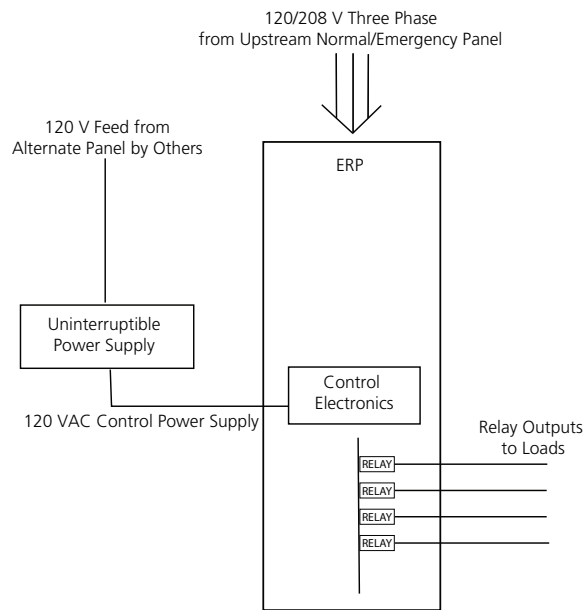


**CAUTION:** *Dress the wire bundles neatly and remove all cuttings and debris before proceeding with the installation. Debris left in the panel may short the electronics at power up and void the factory warranty.*

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## Wire the User Interface to a UPS (Optional)

You can connect an auxiliary source of power to the User Interface to allow relays to change state as needed in emergency lighting control systems where the panel must shed loads to avoid overloading the emergency power source.



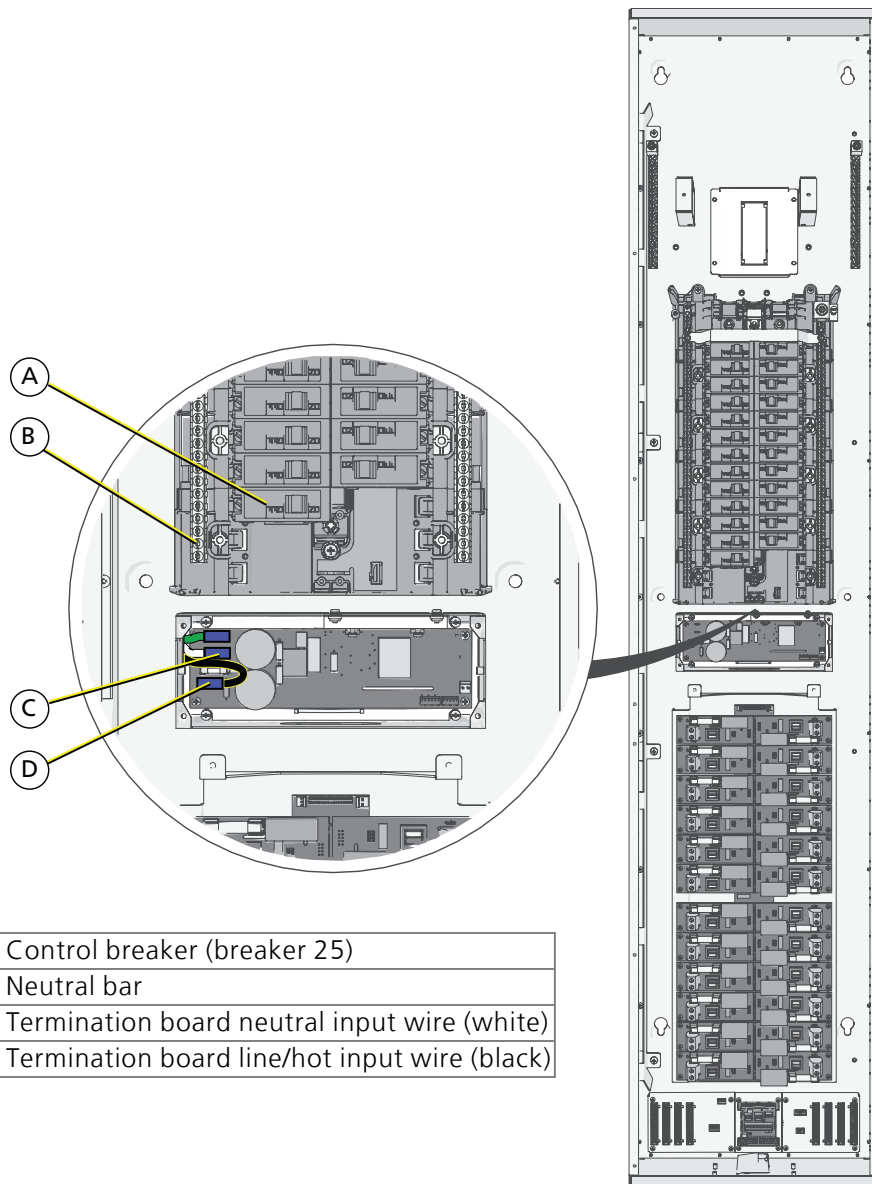
Typical Top-feed Installation



**WARNING:** After you connect the user interface termination board to the auxiliary power source, the Power Control Processor Mk2 will be energized by the auxiliary feed regardless of the state of the main feed to the panel. The control breaker (breaker 25) will not be functional and you will remove it.



**CAUTION:** *The UPS for this application must be UL924 Listed and rated for a minimum of 200 W peak load.*



A	Control breaker (breaker 25)
B	Neutral bar
C	Termination board neutral input wire (white)
D	Termination board line/hot input wire (black)

1. Remove the black line/hot output from the control breaker (breaker 25).
  - Leave the wire connected to the termination board (D in the illustration above).
2. Remove the control breaker (breaker 25).
3. Determine where the termination board neutral input wire (white) is connected to the neutral bar and disconnect it from the neutral bar.
  - Leave the neutral input wire connected to the termination board (C in the illustration above).
4. Use wire nuts to connect an external UL924 Listed UPS to the termination board line/hot and neutral input wires.



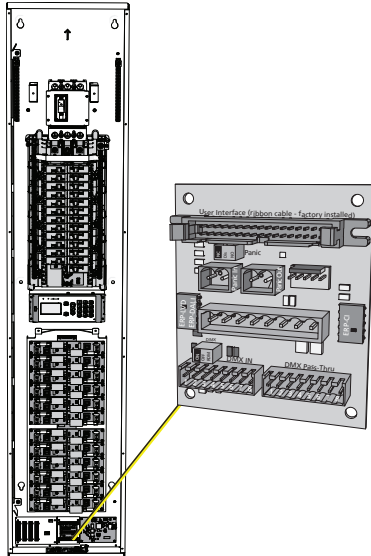
**Note:** Install a filler plate (part number HW6726) in the breaker 25 slot in the top cover when you get to [Final Installation on page 34](#).



## Install Option Cards

Option cards, including the 0–10V Dimming Control card, DALI Control, Contact Input option card, and the Ride-Thru Option card are available for field installation into the Relay Panel Mains Feed. Installation instructions for each card are provided in the appendix of this manual.

## Connect Data Wiring



The Relay Panel Mains Feed termination board is located at the bottom of the panel. Termination options include:

- DMX In and DMX Pass-Thru: Connects the panel to a DMX512 control source. See [Data and Control Wire Specification on the next page](#).
- Emergency In and Emergency Out (Panic): Allows override of the lighting control for specified loads by emergency systems, such as a fire alarm system.
- ERP-CI: Card edge connector available for connection of the optional Contact Input Card (optional). The contact input connections allow simple, direct control of relays using a dry contact closure.
- ERP-LVD or ERP-DALI: Card edge connector available for connection of either a 0–10V Dimming option card or DALI Control card.

## Data and Control Wire Specification

Purpose	Recommended Cable	Notes
DMX In and DMX Pass-Thru (J8 and J9)	Belden 9729 (or equivalent)	DMX is RS485 serial and must be installed in series (i.e., daisy-chain) topology.
Ethernet (RJ45 connection)	Belden 1583A (Category 5e or better)	RJ45 connection per EIA/TIA 568B. Test to TSB 67 standards.
Emergency In and Out UL 924 emergency contact input (J2 and J3)	1.5–2 mm <sup>2</sup> (16 AWG), twisted pair	Contact input for UL 924 emergency lighting loads.
Contact Input Option Card	0.5–4 mm <sup>2</sup> (18–12 AWG) Class 2 wire	Maximum of 24 individual dry contacts terminate to a removable pluggable connector. Option card connects to the termination I/O board.
0–10V Option Card	0.25–4 mm <sup>2</sup> (24–12 AWG) Class 2 or Class 1 wire*	Maximum of 100 mA per channel. Option card connects to the termination I/O board.
DALI Option Card	0.25–4 mm <sup>2</sup> (24–12 AWG) Class 2 or Class 1 wire*	Maximum of 64 ballasts per loop. Option card connects to the termination I/O board.

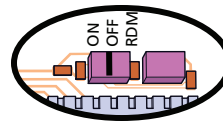
\*See the white paper *Understanding 0-10V LED Drivers* for Class 2 and Class 1 wiring considerations.

## DMX Control Wiring and Termination

Follow the DMX termination kit instructions provided with the product to terminate the control wiring.

DMX termination is made to J8 and J9 on the termination board. Use the DMX Pass-Thru if you are daisy-chaining to another panel or DMX device.

After completing the DMX data connections, you must properly terminate the DMX line using the termination switch (S2) on the relay panel termination board. Data termination eliminates reflections at the end of the DMX data run.



Turn on DMX termination in the last panel/device that is physically connected in the DMX chain.

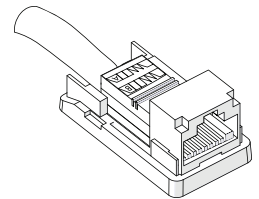
## Terminate the Network Connection

The Power Control Processor Mk2 in the Elaho Relay Panel Mains Feed has an integrated network interface and ships with a network termination kit containing a two-part surface-mount connector.

### *Wire the Connector*

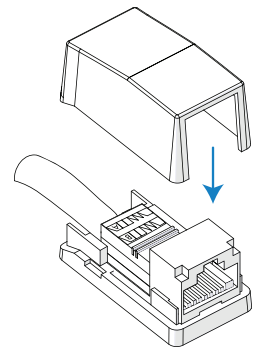
The Category 5 surface-mount connector consists of two pieces: a base unit and a cap. The cap has colored markings on one end to indicate where to insert each of the cable's color-coded wires. Follow the T568B wiring scheme, as illustrated on the cap sticker, for compatibility with ETC network wiring conventions.

1. Pull Cat5 (or equivalent) cable to the panel.
2. Leave a length of about 25 cm (10 in) in the panel for connecting and for slack for future service needs.
3. Follow standard Cat5 installation procedures to remove the end of the cable jacket and expose the conductors:
  - Remove about 13 mm (1/2 in) of the end of the outer cable jacket using a sheathing tool or cutter, making sure not to damage the insulation of the inner conductors. If one or more of the conductors are damaged during this process, cut the cable off squarely and start again.
4. Untwist the conductors and line them up according to the T568B color-coded markings. Insert the conductors into the connector cap. The cable jacket should come close to the edge of the connector with as little of the conductors visible as possible. Otherwise, cut off the cable squarely and start again.
5. If any conductors extend beyond the edge of the connector cap, trim the excess so that the ends of the conductors are flush with the edge of the connector cap.
6. Press the cap firmly on the connector base until the two pieces snap together. Use slip joint pliers to apply pressure evenly across the cap and to secure the connection, but make sure not to break the plastic while applying pressure.



### *Attach the Connector to the Box and Assemble*

1. Insert the front edge of the connector into the mounting box so that the slot in the front edge of the connector aligns with the tab in the bottom section of the box.
2. Push down on the back of the connector to snap it into the box.
3. The rear of the cover has a small U-shaped cutout. Remove this cutout to allow the cable to pass through without getting pinched. Route the cable through the box's guide as shown.
4. Align the cover with the bottom section and snap the two pieces together.

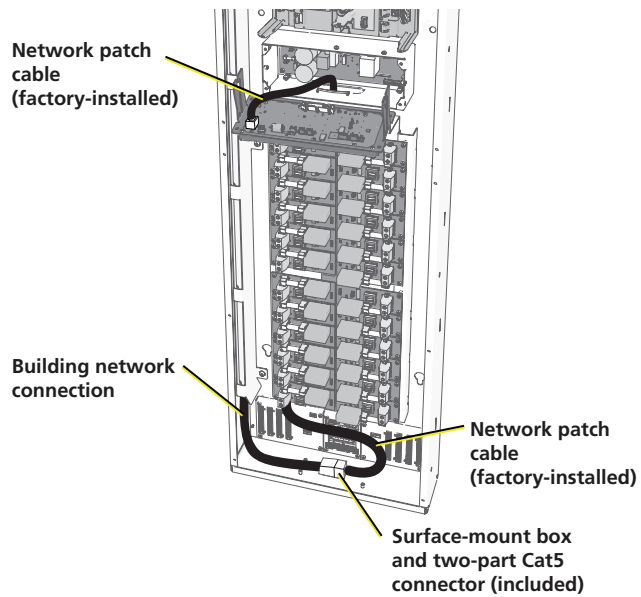


### *Install the Connector in the Panel*

Use the double-sided tape provided in the network termination kit to attach the bottom of the surface-mount box to your panel. See the following illustration.

## Connect the Patch Cable

The Elaho Relay Panel Mains Feed includes a factory-installed network patch cable. Connect the patch cable to the surface-mount box.

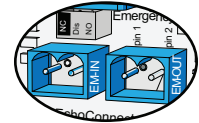


**Note:** *The panel shown above is in top-feed orientation.*

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## Connect and Configure Emergency Contact

The Relay Panel Mains Feed can connect to an external emergency circuit. Emergency can be triggered by a maintained contact input that can be configured as normally open or normally closed. The panel also has an optional +24 VDC (maximum 25 mA) Emergency Out that provides a feed to a lamp or LED, indicating emergency activity.



### ***Connect Emergency Input***

1. Pull two 1.5 mm<sup>2</sup> (16 AWG) wires from your Emergency contact location to the panel through conduit. See [Cable Routing and Conduit Access on page 14](#).
2. Strip 5 mm (3/16 in) of insulation from the ends of each wire.
3. Remove the two pin Emergency Input connector from J2 on the termination I/O board.
4. Loosen the terminal screws.
5. While maintaining the wire twist as close to the connection as possible, insert each wire into the terminals on the connector.
6. Tighten the screws firmly to secure the wires into the connector.
7. Replace the connector to the termination board.

### ***Determine Emergency Switching***

Set the Emergency switch, S1 on the termination I/O board, to indicate the Emergency Input contact closure type: Normally Open Closure (NO), Disabled (Dis), or Normally Closed Closure (NC).

### ***Connect Emergency Output (optional)***

1. Pull two 1.5 mm<sup>2</sup> (16 AWG) wires from your external emergency indication lamp to the panel through conduit. See [Cable Routing and Conduit Access on page 14](#).
2. Strip 5 mm (3/16 in) of insulation from the ends of each wire.
3. Remove the two pin Emergency Output connector from J3 on the termination I/O board.
4. Loosen the terminal screws.
5. Insert the and insert the negative wire into pin 1 and insert the positive wire (this carries 24 VDC, maximum current draw of 25 mA, to the lamp) into pin 2 of the terminals on the connector.
6. Tighten the screws firmly to secure the wires into the connector.
7. Replace the connector to the termination board.

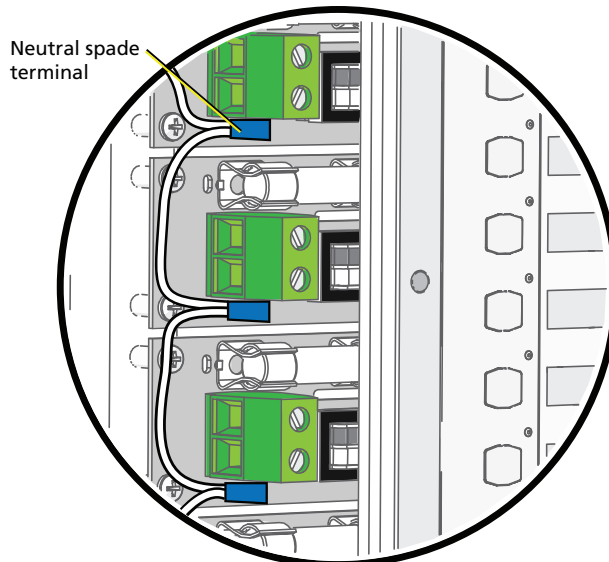
# Chapter 3

## Final Installation and Power Up

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### Verify Installation

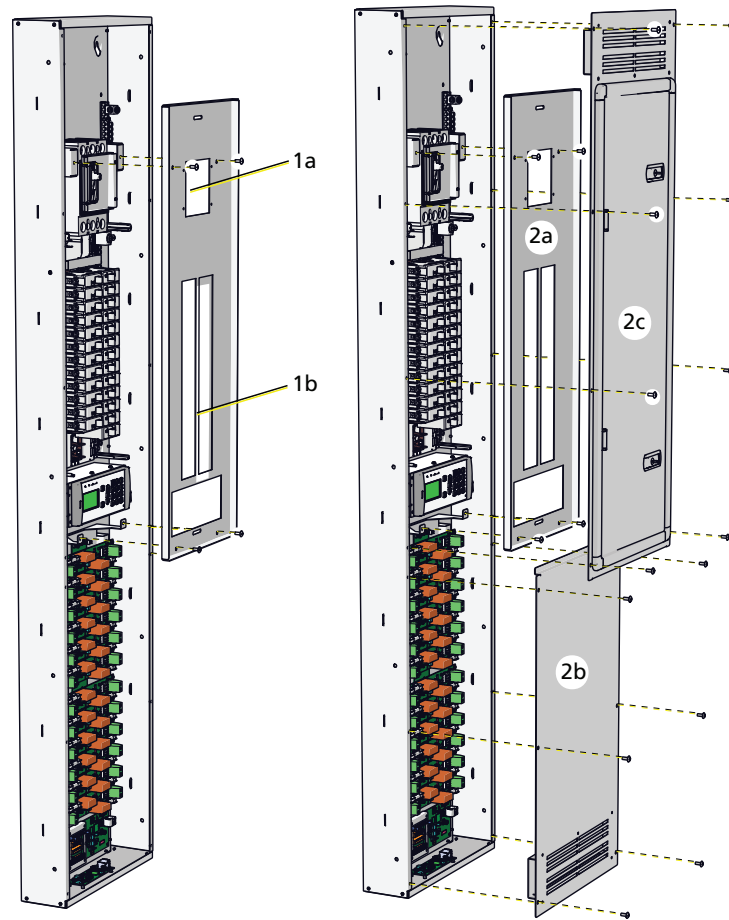
- Check that the panel is securely mounted with all mounting hardware tight.
- Remove all metal shavings and debris from the unit.
- Is there sufficient clearance in the front of the unit for door access?
- Check wiring:
  - Are all load wires terminated to the correct module? See [Load Cable Specification on page 23](#).
  - Are all load circuits free of short circuits?
  - Do all control cables meet specifications? See [Data and Control Wire Specification on page 29](#).
  - Are all low-voltage control cables routed separately from high voltage cables?
  - Are all data terminations terminated? See [Connect Data Wiring on page 28](#).
- Check that each relay is fully seated by pressing down on each relay near the center of the panel. Also check that all fuses are fully seated.
- For each module in the panel, check the factory wiring to ensure that all terminations are secure.
  - Press down firmly on each neutral spade terminal (typically blue).



- Are all circuits properly labeled for identification by service personnel?

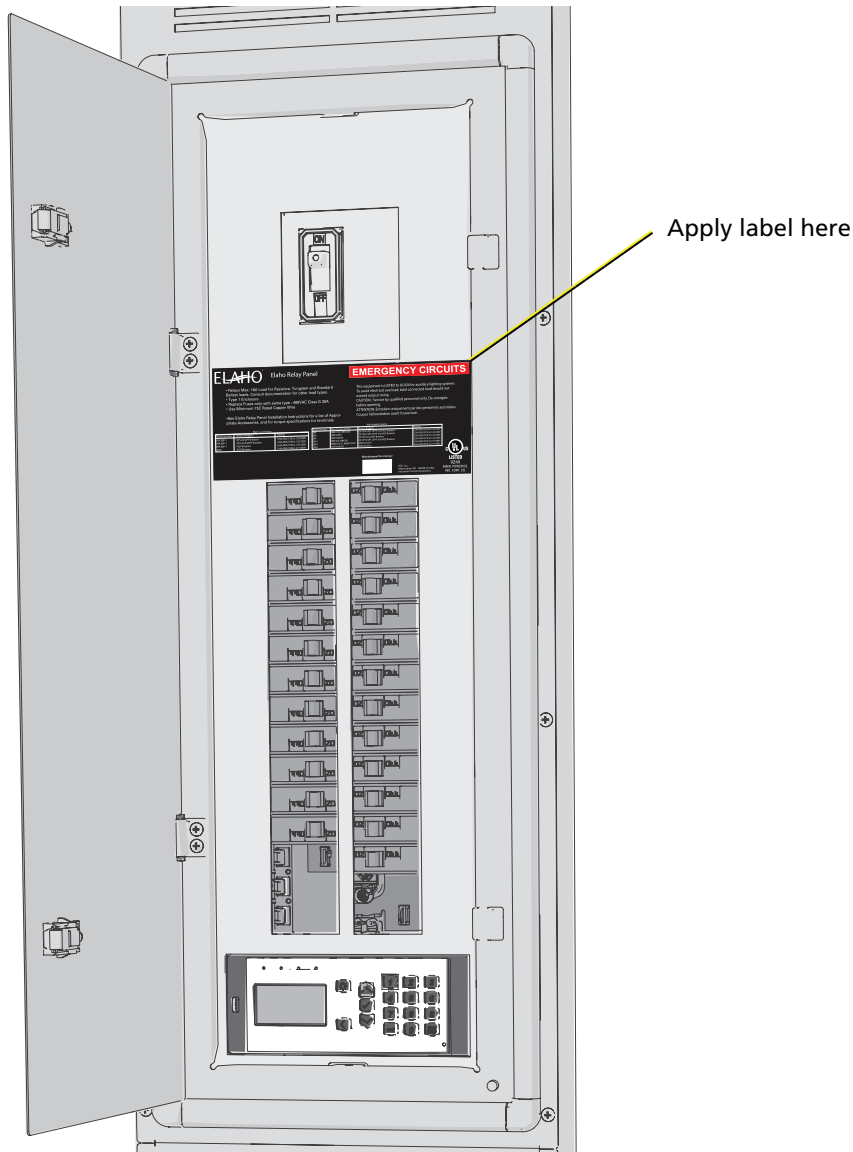
# Final Installation

## Replace covers and door



1. Before attaching covers and the door to the relay panel, check the following:
  - a. When a main circuit breaker kit is installed, remove the main breaker knockout from the top cover.
  - b. When the breaker panel is not fully populated with circuit breakers, install a filler plate (part number HW6726) in each unpopulated breaker slot.
2. Using the provided screws, re-attach the front cover(s) to the unit, keeping in mind the installation order.
  - a. Install the top cover first.
  - b. Install the bottom cover. The top edge of this piece overlaps the top cover.
  - c. Install the top locking door. The bottom edge of the door overlaps the bottom cover.

## Emergency Circuits Label



The relay panel ships with an "EMERGENCY CIRCUITS" label for application only to equipment connected to circuits designated for emergency power, in accordance with NEC Article 700 or an equivalent applicable installation code.

If the relay panel will be connected to circuits designated for emergency power, apply the "EMERGENCY CIRCUITS" label inside the panel, on the blank space on the product label.

The "EMERGENCY CIRCUITS" label shall be applied to the equipment in a location that will be visible after installation.




## Power Up and Test

---



**WARNING: RISK OF DEATH BY ELECTRIC SHOCK! Make sure both front panels and the door have been installed before turning on the power to the rack.**

---

1. Turn off all branch circuit breakers and the main circuit breaker (if installed).
2. Turn on the power source to the panel.
3. Turn on the main circuit breaker (if installed).
4. Turn on the breaker in the panel that is feeding the control electronics. This breaker is labeled "Control".
5. Verify that the Power Control Processor Mk2 display and LED indicator illuminate.
  - If the display does not illuminate, check the incoming power feed and terminations.
6. Turn on the remaining branch circuit breakers in the panel.
7. Verify each load can be controlled by the panel.
  - a. Press the Test button () on the Power Control Processor Mk2 to access the Test Menu.
  - b. Set all levels to 100%.

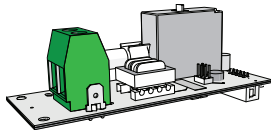
If you have any difficulties installing your system, please contact Technical Services at the office nearest you. See [Help from Technical Services on page 10](#).

Reference the *Power Control Processor Mk2 Configuration Manual* for operation instructions and maintenance information. Documentation is available for free download on our website [echoflexsolutions.com](http://echoflexsolutions.com).

# Appendix A

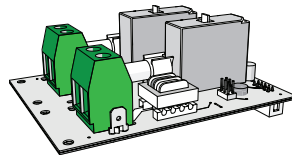
## Relay and Dimmer Specifications

The Relay Panel Mains Feed uses mechanically latching relay and dimmer modules for operations.



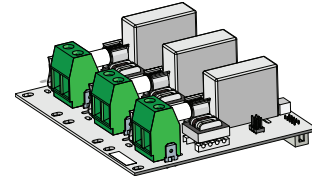
**ERP-Relay-1P (part number 7123K1010)**

- Single pole, single space 20 A relay
- Used in both 120 V and 277 V panels



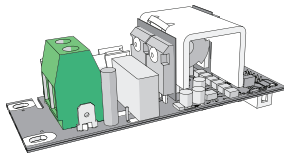
**ERP-Relay-2P (part number 7123K1011)**

- Double pole, double space 20 A relay
- 120 V panel only



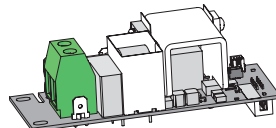
**ERP-Relay-3P (part number 7123K1012)**

- Three pole, triple space 20 A relay
- 120 V panel only



**ERP-DIM (part number 7123K1018)**

- Single pole, single space 300W dimmer
- 120 V panel only
- Forward/reverse phase dimmed loads (auto-switching)



**ERP-DIM-MLV (part number 7123K1025)**

- Single pole, single space 300 W dimmer
- 120 V panel only
- Forward-phase dimmed loads

### Relay and Dimmer Technical Specifications

Load Type	Relay	Dimmer
General Purpose Loads	20 A @ up to 300 VAC	Phase-Adaptive Dimmer (ERP-DIM) 300 W @ 120 VAC (2.5 A max)
Ballasts (HID, Electronic)	20 A @ up to 300 VAC	Phase-Adaptive Dimmer (ERP-DIM) 300 W @ 120 VAC (2.5 A max)
Tungsten Lighting Loads	2400 W @ 120 VAC 4800 W @ 230 VAC	Phase-Adaptive Dimmer (ERP-DIM) 300 W @ 120 VAC (2.5 A max)
Motor Loads	1/2 HP @ 120 VAC 1-1/2 HP @ 220–277 VAC	not recommended
Magnetic Loads	20 A @ up to 300 VAC	Forward-Phase Dimmer (ERP-DIM-MLV) 300 W @ 120 VAC (2.5 A max)



**Note:** Echoflex Solutions does not support the use of the ERP-DIM with magnetic loads. Use ERP-DIM-MLV with magnetic loads.

### Relay and Dimmer Ratings

Rating	Relay	Dimmer
Isolation	5000 Vrms	5000 Vrms
Life	60,000 cycles at full load	N/A

# Appendix B

## 0–10V Option Card

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### Overview

The 0–10V Dimming Control option card (ERP-LVD) is designed for LED drivers and fluorescent ballasts. It sinks up to 100 mA current on each of its 24 outputs. Each channel output is linked one-to-one with a relay circuit for power control.

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**Note:** A single, 24-position Elaho Relay Panel Mains Feed supports the use of either the 0–10V Dimming Control option card (ERP-LVD) or the DALI Control option card (ERP-DALI), but not both in the same panel.

#### ERP-FT Option Card Combinations

ERP-LVD	-
ERP-LVD	ERP-CI
ERP-DALI	-
ERP-DALI	ERP-CI
ERP-CI	-

---



**Note:** You cannot assign the same 24 control circuits to both a 0-10V Option Card and a DALI Option Card. Each group of 24 control circuits may be assigned to a single low-voltage dimming control option card (0–10 V or DALI) and/or to a Contact Input Option Card.

---

### Installation



**WARNING: RISK OF DEATH BY ELECTRIC SHOCK!** Failure to disconnect all power to the panel before working inside could result in serious injury or death.

**AVERTISSEMENT : RISQUE D'ELECTROCUTION!** Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entraîner des blessures graves, voire mortelles.

De-energize main feed to the panel and follow appropriate Lockout/Tagout procedures as mandated by NFPA 70E. It is important to note that electrical equipment such as relay panels can present an arc flash hazard if improperly serviced. This is due to the high amounts of short-circuit current available on the electrical supply to this equipment. Any work must comply with OSHA Safe Working Practices.

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**WARNING: RISK OF DEATH OR INJURY BY ELECTRIC SHOCK!** 0–10V wiring may not be fully isolated from high-voltage AC power. Do not assume that 0–10V wiring is safe to touch, even when run as an NEC Class 2 signal. Have a licensed electrician test for AC voltage to ground before terminating any 0–10V control wiring to the device.

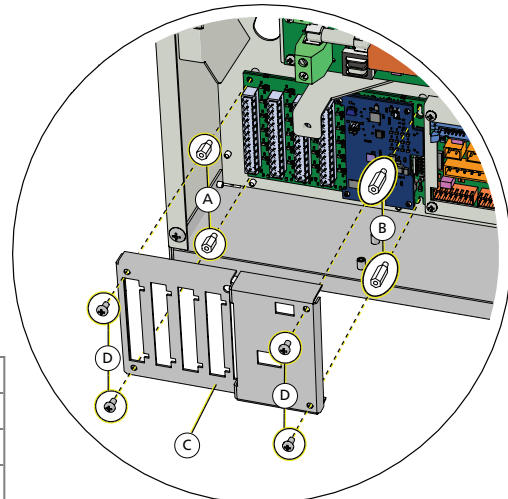
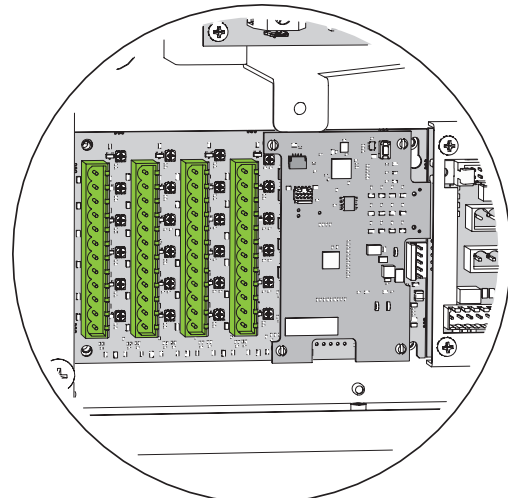
**AVERTISSEMENT : RISQUE DE MORT OU DE BLESSURE PAR ÉLECTROCUTION!** Le câblage 0–10V peut ne pas être complètement isolé du courant alternatif haute tension. Ne supposez jamais que le câblage 0–10V peut être touché en toute sécurité, même s'il est utilisé avec un signal NEC de Classe 2. Faites tester par un électricien agréé la tension alternative par rapport à la terre avant de raccorder tout câblage de commande 0–10V à l'appareil.



**Note:** *It is best to install any panel option kits after conduit rough-in and load and control terminations are complete to reduce the likelihood of damage to the option card.*

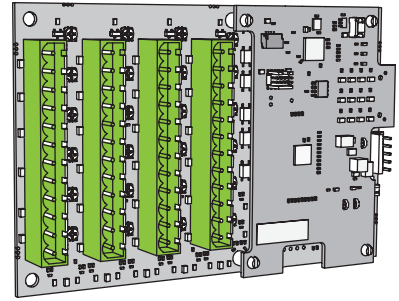
1. Turn off power to the relay panel.
2. Align the option card to the mounting studs located on the left side of the relay panel termination I/O board.
3. Insert the card edge connector into the receptacle on the relay panel termination I/O board.
4. Find the two shorter (6-32x0.375 inch) standoffs from the kit.
  - Install one standoff on each of the two corners of the option card with a single layer of circuit board (A in the illustration).
5. Find the two longer standoffs (6-32x0.625 inch) from the kit.
  - Install one standoff on each of the two corners of the option card with the double layer of circuit boards (B in the illustration).
6. Install the provided protective cover over the installed board (C in the illustration).
7. Secure the ERP-LVD and the protective cover in place using the four 6-32x1/4 inch screws provided in the installation kit (D in the illustration).

A	6-32x0.375 inch standoffs (qty 2)
B	6-32x0.625 inch standoffs (qty 2)
C	Protective cover
D	6-32x1/4 inch Phillips-head screws (qty 4)



## Connect Wiring

The 0–10V Dimming Control option card provides four bus connections for termination of six 0–10 V outputs each (24 channels). A pluggable screw-terminal connector is provided for each bus, and is labeled for ease of identification of each output. The removable connectors accept 0.25–4 mm<sup>2</sup> (24–12 AWG) wire.



**Note:** By default, the associated output loop terminal number matches the relay circuit number inside the relay panel. For example, if relay 1 is connected to a 4-wire fluorescent dimmer, ballast control wiring would terminate to the output terminals labeled "+ 1 -" on the 0–10 V Dimming Control option card.

To customize the links between relay and 0–10 V control, see the Power Control Processor Mk2 Configuration Manual.



**Note:** See the white paper *Understanding 0-10V LED Drivers for Class 2 and Class 1 wiring considerations*.

- 
1. Pull 0–10 V ballast control wiring pairs into the relay panel according to the wire entry plan. See [Cable Routing and Conduit Access on page 14](#) for cable routing and conduit access information.
  2. Strip the insulation from each wire pair back 6 mm (1/4 in).
  3. Remove the pluggable screw connector for the 0–10 V output bus that matches the relay circuit.
  4. Notice that the connector is labeled for your wire termination reference. Using a 3 mm (1/8 in) flatblade screwdriver, loosen the terminals and insert each of the data + and data - wire set into the appropriate terminal for the circuit.
    - a. Terminate the violet (typical) control wire of the first pair into the "+" terminal associated with the power circuit.
    - b. Terminate the gray (typical) control wire of the first pair into the "-" terminal associated with the power circuit.



**Note:** This connection is polarity dependent. All 24 "-" (common) terminals are tied together.

- 
- c. Tighten each screw terminal until the wire is secure.
5. Repeat steps 1–4 for the remaining 0–10 V outputs in the panel.

# Appendix C

## DALI Option Card

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### Overview

The DALI Control option card (ERP-DALI) controls 24 loops of 64 DALI compatible ballasts in broadcast mode. This appendix provides instructions for the installation of this card.

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**Note:** A single, 24-position Elaho Relay Panel Mains Feed supports the use of either the 0–10V Dimming Control option card (ERP-LVD) or the DALI Control option card (ERP-DALI), but not both in the same panel.

#### ERP-FT Option Card Combinations

ERP-LVD	-
ERP-LVD	ERP-CI
ERP-DALI	-
ERP-DALI	ERP-CI
ERP-CI	-

---



**Note:** You cannot assign the same 24 control circuits to both a 0-10V Option Card and a DALI Option Card. Each group of 24 control circuits may be assigned to a single low-voltage dimming control option card (0–10 V or DALI) and/or to a Contact Input Option Card.

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### Installation

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**WARNING: RISK OF DEATH BY ELECTRIC SHOCK!** Failure to disconnect all power to the panel before working inside could result in serious injury or death.

**AVERTISSEMENT : RISQUE D'ELECTROCUTION!** Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entraîner des blessures graves, voire mortelles.

De-energize main feed to the panel and follow appropriate Lockout/Tagout procedures as mandated by NFPA 70E. It is important to note that electrical equipment such as relay panels can present an arc flash hazard if improperly serviced. This is due to the high amounts of short-circuit current available on the electrical supply to this equipment. Any work must comply with OSHA Safe Working Practices.

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**Note:** It is best to install any panel option kits after conduit rough-in and load and control terminations are complete to reduce the likelihood of damage to the option card.

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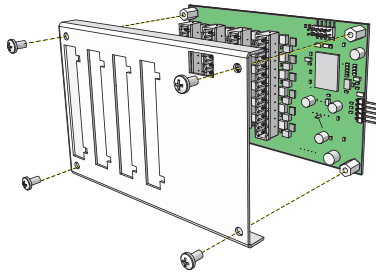
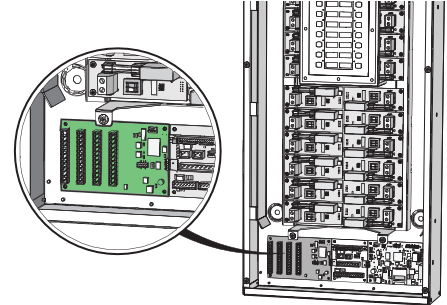
- The DALI ballast is powered by an external DALI loop power supply which is supplied by others. This supply is internally connected to the Elaho Relay Panel Mains Feed. The number of power supplies needed for each DALI loop, is based on the connected load.
- The ERP-DALI can control up to 64 DALI compatible ballasts per DALI loop.

- Each of the 24 DALI loops are linked one-to-one with a relay panel circuit for power control.

Each output connection is labeled on the removable screw terminal bus connectors. The removable connectors accept 0.25–4 mm<sup>2</sup> (24–12 AWG) wire.

## Install the ERP-DALI Option Card

1. Turn off power to the relay panel.
2. Align the ERP-DALI option card to the mounting studs located to the left of the relay panel termination I/O board.
3. Insert the card edge connector from the ERP-DALI into the receptacle on the relay panel termination I/O board.

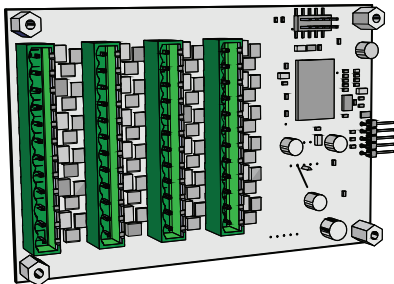


4. Fit the provided protection cover over the installed board.
5. Secure the ERP-DALI and the protective cover in place using the four screws provided in the installation kit.

## Connect Wiring



**Note:** Control wiring must be routed in separate conduit from the line-voltage wiring for DALI ballasts.



- The DALI Control Option board provides four bus connections for termination of up to 24 DALI loops total.
- A pluggable screw connector is provided for each bus, and is labeled for ease of identification of each output.
- Terminals accept 0.25–4 mm<sup>2</sup> (24–12 AWG) wire.



**Note:** See the white paper *Understanding 0-10V LED Drivers for Class 2 and Class 1 wiring considerations*.



**Note:** The associated output loop terminal number should always match the relay circuit number inside the relay panel. Relays are numbered in the same manner as a branch circuit breaker panel; left to right, then top to bottom.

For example: If relay 1 is connected to a DALI ballast load, control wiring would terminate to the ERP-DALI option board output terminals labeled "+ 1 -".



**Note:** *DALI wiring can be run in the same conduit as the power wiring for the same ballast.*

---

1. Pull DALI ballast control wiring pairs into the Elaho Relay Panel , per the wire entry plan. See [Cable Routing and Conduit Access on page 14](#).
2. Strip the insulation back from each wire pair 6 mm (1/4 in).
3. Remove the pluggable screw connector for the DALI loop matching the circuit.
4. Using a 3 mm (1/8 in) flatblade screwdriver, loosen the terminals and insert each of the data + and data - wire set into the appropriate terminal for the circuit.
  - Notice the connector is labeled for your wire termination reference.
  - Data wires in the set are polarity independent.
5. Tighten each screw terminal until the wire is secure.
6. Reattach the DALI pluggable screw connector to the board.
7. Repeat steps 1–4 for the remaining DALI outputs in the panel.
  - Connect up to 24 DALI loops per system.

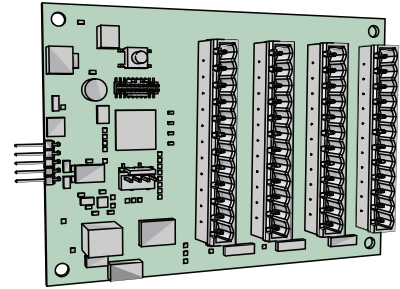


# Appendix D

## Contact Input Option Card

### Overview

The Contact Input Option Card (ERP-CI) provides the ability to directly control the relays of the Elaho Relay Panel using a momentary or maintained dry contact input.



### Installation



**WARNING: RISK OF DEATH BY ELECTRIC SHOCK!** Failure to disconnect all power to the panel before working inside could result in serious injury or death.

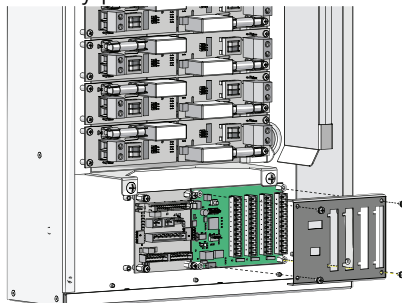
**AVERTISSEMENT : RISQUE D'ELECTROCUTION!** Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entraîner des blessures graves, voire mortelles.

De-energize main feed to the panel and follow appropriate Lockout/Tagout procedures as mandated by NFPA 70E. It is important to note that electrical equipment such as relay panels can present an arc flash hazard if improperly serviced. This is due to the high amounts of short-circuit current available on the electrical supply to this equipment. Any work must comply with OSHA Safe Working Practices.



**Note:** *It is best to install any panel option kits after conduit rough-in and load and control terminations are complete to reduce the likelihood of damage to the option card.*

1. Turn off power to the relay panel.
2. Align the ERP-CI option card to the mounting studs located at the base of the rack to the right of the relay panel termination I/O board.

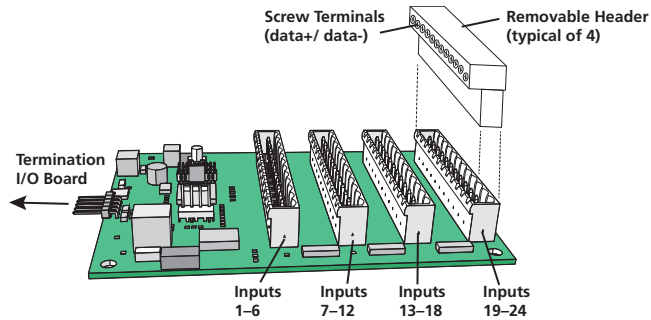


3. Insert the card edge connector from the ERP-CI into the receptacle on the right of the relay panel termination board.

4. Fit the provided protection cover over the installed board.
5. Secure the cover and ERP-CI in place using the four screws provided in the kit.

## Connect Wiring

The contact input card provides four bus connections for termination of up to 24 individual dry contact inputs. A screw connector is provided for each input and accepts 0.5–4 mm<sup>2</sup> (18–12 AWG) Class 2 wire. Each connector is labeled for ease of identification of each input.



1. Pull wire from the device supplying the contact closure into the Elaho Relay Panel, per the wire entry plan. See [Cable Routing and Conduit Access on page 14](#).
2. Strip the insulation back from each wire pair 6 mm (1/4 in).
3. Remove the pluggable screw connector header on the Contact Input board.
4. Using a 3 mm (1/8 in) flatblade screwdriver, loosen the terminals and insert each of the data + and data - wire set into the appropriate terminal for the circuit.
  - Notice the connector is labeled for your wire termination reference.
  - Data wires in the set are polarity independent.
5. Tighten each screw terminal until the wire is secure.
6. Repeat steps 4 and 5 for the remaining dry contact closures.
7. Reattach the Contact Input pluggable screw header to the board and repeat the process for any additional contact inputs.

## Programming

The ERP-CI is programmable through the Elaho Relay Panel user interface. This setting determines how each relay responds to a dry contact input signal.

1. When in the **Main Menu**, select **Arch Setup**.
2. Within the **Arch Setup** menu, select **Contact Inputs**.

When the Contact Input card is installed, you will have the following options within the **Contact Inputs** menu:

- **Contact** displays the number of contact being configured, 1–24.
- **Space** determines the space in which the selected action will happen.
- **On Open** determines the action that occurs when the contact is opened. The following options are available:
  - *None* (default): No action will be taken when the contact opens.
  - *Off*: Off will be activated in the selected **Space** when the contact opens.
  - *Preset*: The selected **Preset** will be activated in the selected **Space** when the contact opens.
  - *Sequence*: The sequence configured for the selected **Space** will be activated when the contact opens.
  - *Output to Full*: When you select this option, you are able to select a range of **Outputs** on the bottom line of the **Contact Input** screen. The selected range of **Outputs** will be driven to full when the contact opens.
  - *Output to 0%*: When you select this option, you are able to select a range of **Outputs** on the bottom line of the **Contact Input** screen. The selected range of **Outputs** will be driven to 0% when the contact closes.
- **On Close** determines the action that occurs when the contact is closed. The same actions are available as listed for **On Open**, above.

For additional information on Contact Input card setup and programming, see the *Power Control Processor Mk2 Configuration Manual* which is available for download at [echoflexsolutions.com](http://echoflexsolutions.com).

# Appendix E

## Compliance

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### FCC Compliance

#### Elaho Relay Panel Mains Feed

(For any FCC matters):

Electronic Theatre Controls, Inc.  
3031 Pleasant View Road  
Middleton, WI 53562  
+1 (608) 831-4116  
[etconnect.com](http://etconnect.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. Visit [etconnect.com/products](http://etconnect.com/products) for current and complete compliance information including FCC compliance.



**Note:** *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.*

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