echoflex
an ETC Company

Elaho Relay Panel Feedthrough

Installation Manual

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Introduction

Congratulations on your purchase of the Elaho Relay Panel Feedthrough (ERP-FT). The ERP-FT panel offers high value 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-FT panel include:

- EchoConnect, sACN, DMX-512, TimeClock, or stand-alone control
- Configuration using the web user interface
- Control for up to 48 relays
- 120V-277 V single-pole and 208 or 480 V double-pole switching
- 120 V and 277 V circuits can be wired into the same panel
- Voltage barriers available to separate normal and emergency branch circuits
- Option cards allow for DALI control, 0–10 V control, and contact closure input
- UL 924 listed Panic Input (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 field installation of the Elaho Relay Panel Feedthrough, and additional relays.

When viewing this document in electronic form (pdf file) with Adobe Acrobat® Reader, blue text is a link within the document. If you click on the link, Acrobat will navigate to that section or topic or open an external client for internet browsing or email.

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.*

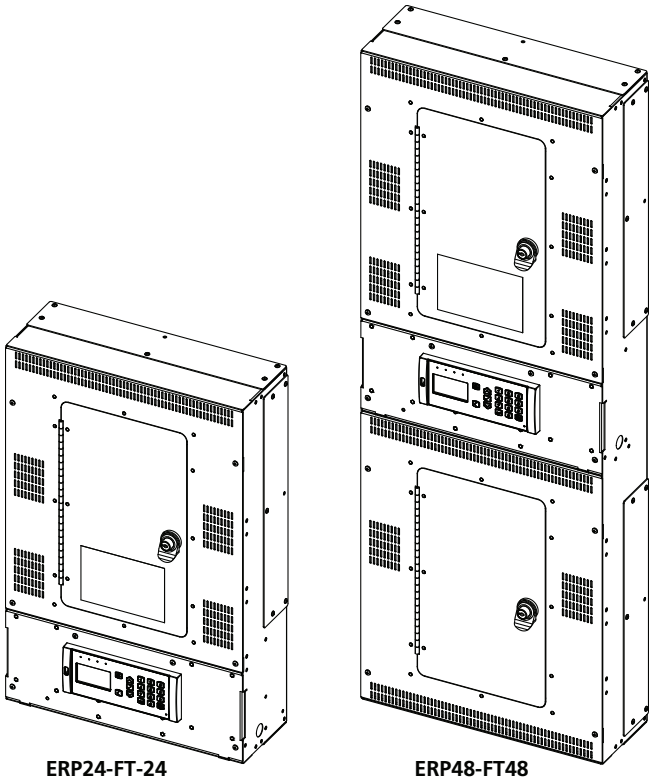
WARNING: A Warning statement indicates situations where damage may occur, people may be harmed, or there are serious or dangerous consequences of an action

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

All Echoflex documents are available for free download from our website: echoflexsolutions.com.

Product Variants

This manual contains the procedures for installation of the Elaho Relay Panel Feedthrough (ERP-FT). The panel is available with and without relays installed.



ERP24-FT-24 **ERP48-FT48**

Standard models include:

Model	Description
ERP24-FT	Elaho Relay Panel Feedthrough 24-way panel without relays
ERP48-FT	Elaho Relay Panel Feedthrough 48-way panel without relays
ERP24-FT-12	Elaho Relay Panel Feedthrough 24-way panel with 12 single-pole relays
ERP24-FT-24	Elaho Relay Panel Feedthrough 24-way panel with 24 single-pole relays
ERP48-FT48	Elaho Relay Panel Feedthrough 48-way panel with 48 single-pole relays
ERP48-FT482P	Elaho Relay Panel Feedthrough 48-way panel with 48 208 V double-pole relays

Relay Kits

As required, custom Elaho Relay Panel Feedthrough (ERP-FT) are available including a variable number of relays. For customer convenience a field-install relay kit is available and includes a relay and the low voltage control leads. Relay kits available for field-installation include:

Model	Description
ERP-FT-1PRK	120/277 V AC single-pole, single-space relay kit
ERP-FT-2PRK	120/277 V AC double-pole, single-space relay kit
ERP-FT-3PRK	480 V AC, double-pole, double-space relay kit

Reference the instructions provided in the relay kit packaging for installation instructions.

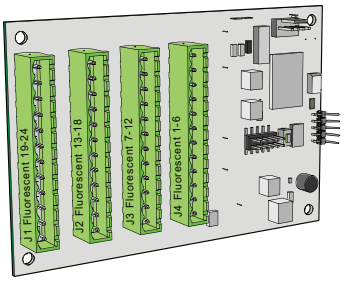
Option Cards and Accessories

Option cards and accessories are available for field-installation into the Elaho Relay Panel Feedthrough (ERP-FT).

Model	Part Number	Description	Notes
ERP-FT-RMK	7021K1000	19 in rack mount kit	* requires 15 rack units of space for both the 12- and 24-way relay panels * two rack mount kits are required for the 48-way relay panel
ERP-FT-VB	7023K1003	voltage barrier kit	use per local code to separate differing voltages in the panel and/or emergency circuits from normal circuits.
ERP-FT-TPH	7023K1004	Tamper-proof hardware kit	
ERP-FT-LVD	7123K1104	0-10V Dimming Control Option	Field installed option kit
ERP-FT-DALI	7123K1103	DALI Control Option	
ERP-FT-CI	7123K1105	Contact Input Option	
ERP-FT-RTO	7123K1017	Ride-Thru Option	

Each option adds another level of features and functions to the ERP-FT panel and the installation.

0-10V Dimming Control

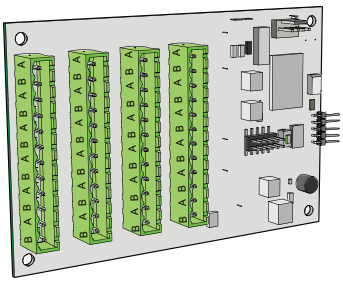


The 0-10V Dimming Control option card (ERP-FT-LVD) provides 24 outputs for control of 4-wire current-sink, 0-10 VDC or electronic loads.

- Each of the 24 outputs are rated to control a maximum of 400 mA per channel (up to 50 ballasts per channel).
- Loss of power at the ERP-FT panel controller results in releasing control levels to full.

For more information, see *0–10V Option Card on page 26*.

DALI Control



The Digital Addressable Lighting Interface Control card (ERP-FT-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.

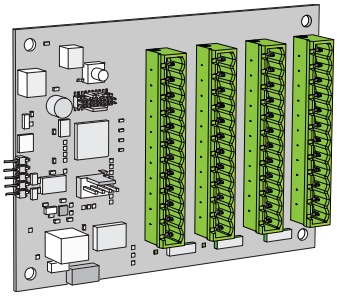
The DALI ballast must be powered by an external DALI loop power supply (supplied by others). This supply is connected externally of the panel. Each DALI loop requires its own power supply, and possibly more than one power supply depending on the ballast load.

- Installation is limited to 64 DALI compatible fluorescent ballasts per DALI loop.

For more information, see *DALI Option Card on page 30*.

Note: *A single ERP-FT panel supports the use of either the 0-10V output control option or a DALI option card, but not both in the same panel.*

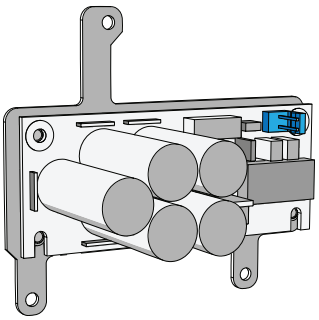
Contact Input



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

For more information, see *Contact Input Option Card on page 34*.

Ride-Thru Option



The Ride Thru Option (ERP-FT-RTO) maintains power to the ERP-FT panel controller for a minimum of 15 seconds in the event of a brown-out or power loss.

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

For more information, refer to the *Ride Thru Option Kit Installation Guide* provided with the option card and available for free download at echoflexsolutions.com.

Help from Echoflex Technical Services

If you are having difficulties and your problem is not addressed by this document, try the Echoflex website at echoflexsolutions.com. If none of these resources are sufficient, contact Echoflex 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

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Chapter 1

Prepare for Installation

The Relay Panel Feedthrough is intended for professional use only. **Read this entire document before using this product.**

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

Installation Environment

- Dry room (10–90% humidity, non-condensing), 0–40°C (32–104°F) ambient temperature, dust free.
- Elaho Relay Panel Feedthrough 24 is intended to be wall mounted (surface only) or installed in a standard 19 in (EIA) equipment rack utilizing the 19 in rack mount kit (ERP-FT-RMK).
  - The installation location must support a fully populated panel not exceeding 23 kg (50 lbs).
- Elaho Relay Panel Feedthrough 48 is intended to be wall mounted (surface only) or installed in a standard 19 in (EIA) equipment rack utilizing two 19 in rack mount kits (ERP-FT-RMK).
  - The installation location must support a fully populated panel not exceeding 46 kg (100 lbs).

Control Processor Power Requirements

- A dedicated circuit from the breaker panel is required for control electronics power
  - 120, 240, or 277 V AC, 50/60 Hz
- ERP24-FT - 8 A maximum current
- ERP48-FT - 15 A maximum current
- This equipment must be connected to a suitable safety earth/ground

Compliance

UL Listed

c UL us LISTED UL508 file #E92154, UL924 file #E242514

FCC

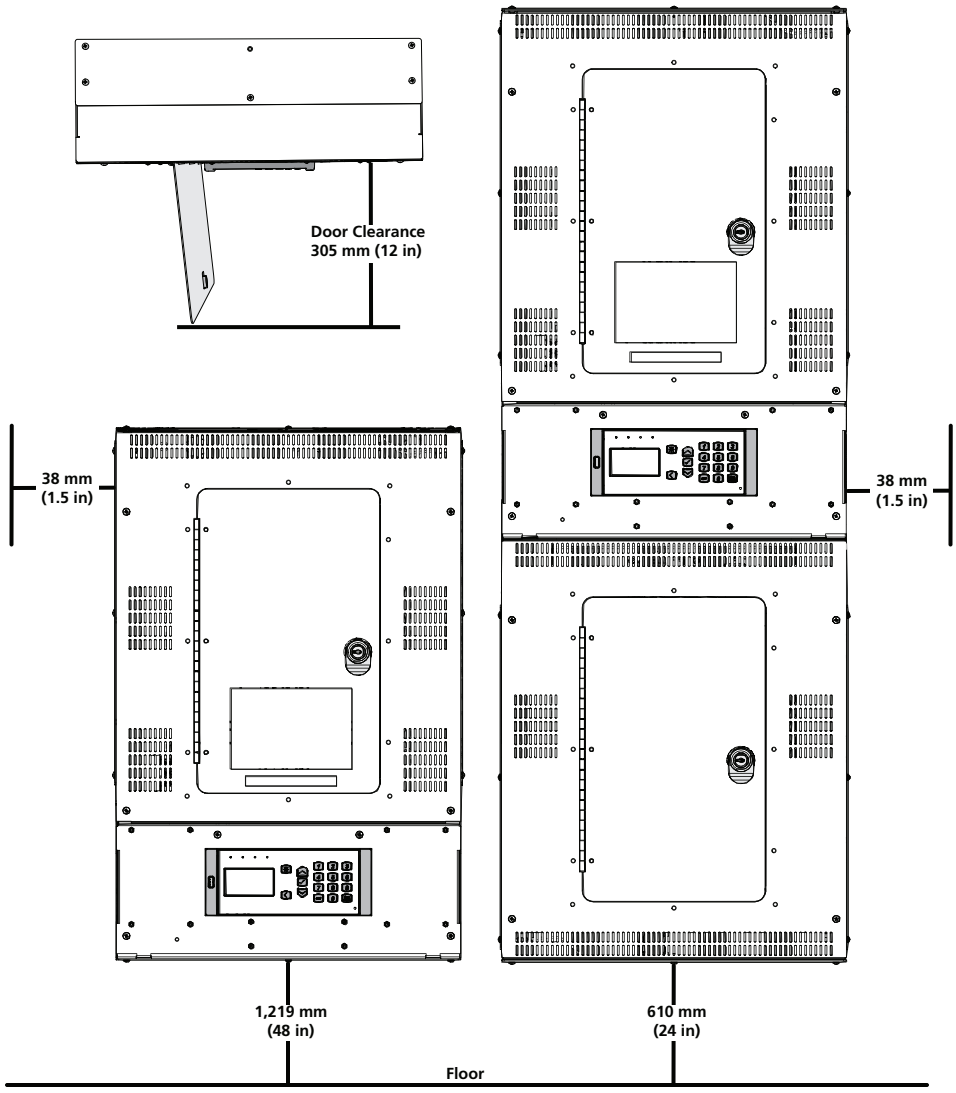
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Panel Dimensions

Models	Height	Width	Depth
ERP24-FT	666 mm (26.24 in)	435 mm (17.14 in)	157 mm (6.2 in)
ERP48-FT	1,195 mm (47.06 in)	435 mm (17.14 in)	157 mm (6.2 in)

Clearance

- ERP24-FT suggested mounting 1,219 mm (48 in) height to bottom of the panel.
- ERP48-FT suggested mounting 610 mm (24 in) height to bottom of the panel.
- Clearance on left and right side of the panel should be 38 mm (1.5 in). Zero clearance required if mounted next to another panel or dimming rack.
- Suggested door clearance is 305 mm (12 in) from front of the panel



Relay Specification

The Elaho Relay Panel Feedthrough (ERP-FT) ships standard with either 12, 24, or 48 relays installed and fully pre-wired for low voltage control. Reference *Relay Kits on page 3* for available models.

Single Pole HID Relay

CSA		UL Listed	
General Use	20 A @ 347 VAC	General Use	20 A @ 300 VAC
Ballast (Standard)	20 A @ 347 VAC	Ballast (Standard) Ballast (Electronic)	20 A @ 300 VAC 20 A @ 277 VAC
Tungsten	2400 W @ 120 VAC	Tungsten	2400 W @ 120 VAC
Motor Load	1/2 HP @ 110-125 VAC or 1-1/2 HP @ 220-250 VAC	Motor Load	1/2 HP @ 110-125 VAC or 1-1/2 HP @ 220-277 VAC
Short Circuit Rating	18,000 A 277 VAC	Short Circuit Rating	18,000 A 277 VAC

Double Pole HID Relay

CSA		UL Listed	
General Use	20 A @ 347 VAC	General Use	20 A @ 300 VAC
Ballast (Standard)	20A @ 347 VAC	Ballast (Standard)	20 A @ 300 VAC
Tungsten	2400 W @ 120 VAC	Tungsten	2400 W @ 120 VAC
Motor Load	1/2 HP @ 110-125 VAC or 1-1/2 HP @ 220-250 VAC	Motor Load	1/2 HP @ 110-125 VAC or 1-1/2 HP @ 220-277 VAC
Short Circuit Rating	5,000 A 277 VAC	Short Circuit Rating	5,000 A 277 VAC

Double Pole 480 V HID Relay

CSA		UL Listed	
General Use	20 A @ 347 VAC	General Use	20 A @ 480 VAC
Ballast (Standard)	20 A @ 347 VAC	Ballast (Standard)	20 A @ 480 VAC
Tungsten	2400 W @ 120 VAC	Tungsten	2400 W @ 120 VAC
Motor Load	1/2 HP @ 110-125 VAC or 1-1/2 HP @ 220-250 VAC	Motor Load	1/2 HP @ 110-125 VAC or 1-1/2 HP @ 220-277 VAC
Short Circuit Rating	5,000 A 277 VAC	Short Circuit Rating	5,000 A 277 VAC

Relay Ratings

- Inrush: 2000 amps
- Isolation: 2,500 V RMS
- Life: 60,000 cycles (operations) at full load
- Relay output terminals accept 2.5–6 mm^2 (14–10 AWG) copper wire

Verify the Contents of the Shipping Carton

Standard Elaho Relay Panel Feedthrough (ERP-FT) units ship complete and fully pre-wired with low-voltage relay control. As you remove the panel from the shipping carton, confirm the following items are included:

- ERP-FT with covers and locking doors attached with keys
- Panel interiors with the quantity and type of relays ordered
- DMX Preparation Kit - part number 4100A1002

Note: *Accessory options are packaged separately.*

Parts and Specialty Tools Required

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

- 6–8 mm (1/4–3/8 in) bolts or screws, 50–100 mm (2–4 in) long, and suitable wall plugs, are suggested for mounting.
- Conduit punch, conduit or bushings - 12.7 mm (1/2 in) diameter
- Phillips screwdriver
- Flat blade screwdriver
- Jeweler's flat blade screwdriver
- Wire strippers

Cable Specification for Data and Control

Purpose	Recommended Cable	Notes
Power Control Electronics AC Input	120 V, 240, 277 VAC 50/60 Hz 4 mm^2 (10 AWG) max, copper wire	A dedicated circuit is recommended. 8 A for the ERP24-FT and 15 A for the ERP48-FT. For installations utilizing UL 924 for emergency lighting loads, secure a dedicated normal/emergency circuit.
Relay Line / Load	Relay output terminals accept 2.5–6 mm^2 (14–10 AWG) copper wire	Maximum 20 A @ 300 VAC per relay
DMX In and DMX Pass-Thru (J4 and J5)	Belden 9729 or equivalent (contact Echoflex for a list of equivalents)	DMX is RS485 serial and must be installed in series (i.e. daisy-chain) topology
Ethernet (RJ45 connection)	Belden 1583A (Category 5e or better)	Install per EIA/TIA 568B. Test to TSB 67 standards. Ethernet card is factory installed and connected to termination board at J11.
Panic Input - Emergency UL 924 (J3)	2–1.5 mm^2 (16 AWG), twisted pair	Contact input for UL 924 emergency lighting functionality
Panic Output (J2)	2–1.5 mm^2 (16 AWG), twisted pair	LED indicator for displaying UL 924 emergency lighting status
EchoConnect Station Bus (J9)	Belden 8471 (or equivalent) plus one 2.5 mm^2) 14 AWG ESD ground wire	Topology-free. The total length of all signal wiring cannot exceed 500 m (1,640 ft).
Contact Input (Contact Input Option Card)	4–0.5 mm^2 (12–18 AWG) Class 2 wire	Maximum of 24 individual dry contact inputs. Option card connects to termination board at J7 or J8.
0-10V Dimming Control (0-10V Option Card)	4–0.25 mm^2 (12–24 AWG) Class 2 or Class 1 wire*	Maximum of 50 ballasts (400 mA) per channel. Option card connects to termination board at J7 or J8.
DALI	4–0.25 mm^2 (12–24 AWG) Class 2 or Class 1 wire*	Maximum of 24 loops and 64 ballasts per loop. Option card connects to termination board at J7 or J8.

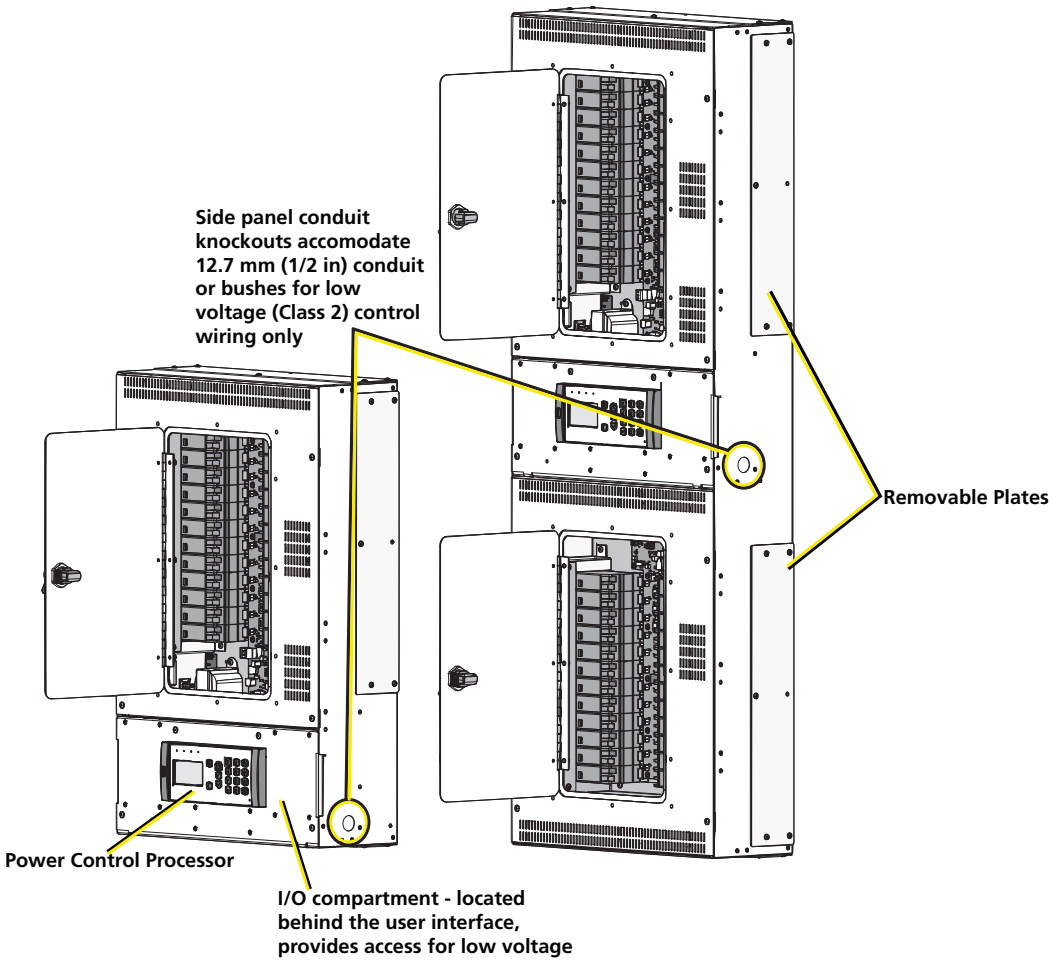
*See the white paper *Understanding 0-10V LED Drivers* for Class 2 and Class 1 wiring considerations.

Cable Routing and Conduit Access

Elaho Relay Panel Feedthrough has removable plates located on top, bottom and both sides to accommodate conduit fittings for line, load, and feed wiring. Two knockouts, one on each side of the user interface, are specifically provided for low voltage (control) wiring.

Note: *Class 2 control wiring must be run separately from line, load, and feed wiring.*

Note: *Remove a plate to punch conduit access as needed for line, load, and control wiring. It is acceptable to remove the plate permanently if the unit is mounted in direct contact with an adjacent Feedthrough panel.*



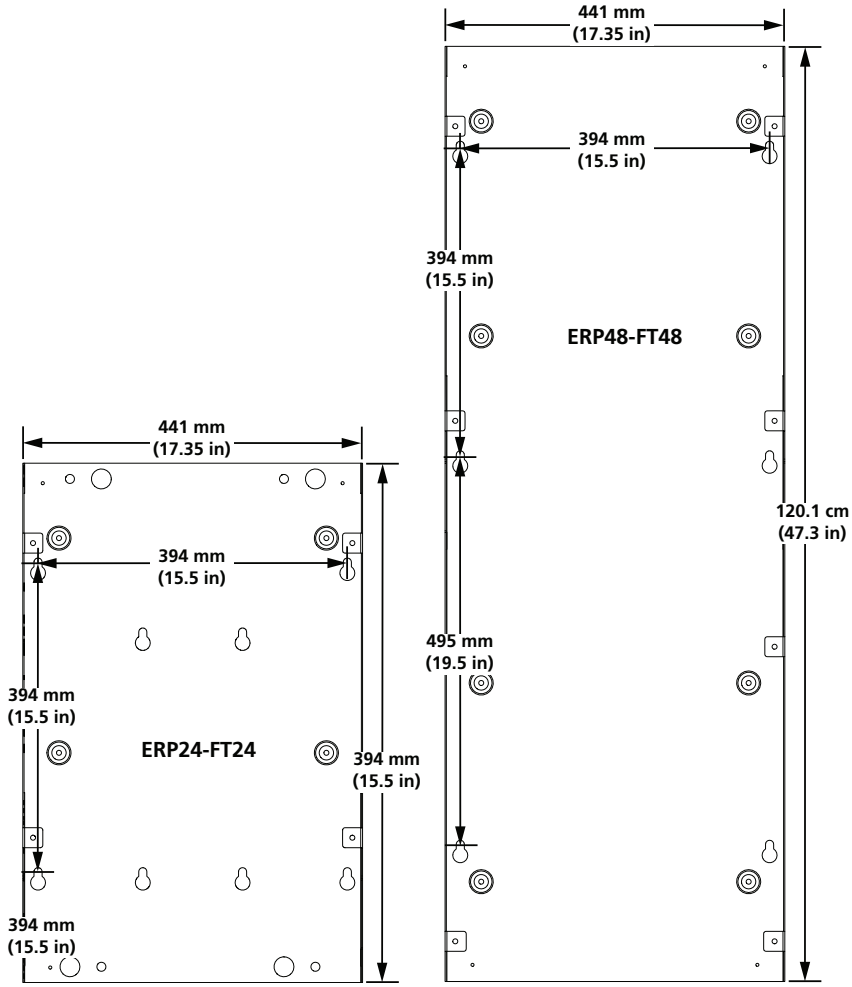
Chapter 2

Installation Procedure

Install Mounting Hardware

1. Remove the front covers with locking doors to reveal the panel interior.
2. Align the panel to the desired mounting location and mark all keyhole locations.
   - Install ERP24-FT up to two high.
   - Install any number of ERP24-FT or ERP48-FT panels side-by-side, in direct contact, with the removable plates on the shared sides removed as needed.

   Allow clearances as described on *page 8*.
3. Set the panel aside.
4. Pre-drill then install the required mounting hardware for mounting the panel using the previously marked reference points as a guide.



- ERP24-FT requires four 6–8 mm (1/4–3/8 in) bolts or screws, 50–100 mm (2–4 in) long and suitable wall plugs
  - Both the surface and mounting hardware must support 23 kg (50 lbs).
  - Expose at least 25 mm (1 in) of threads for mounting the panel.
- ERP48-FT requires six 6–8 mm (1/4–3/8 in) bolts or screws, 50–100 mm (2–4 in) long and suitable wall plugs.
  - Both the surface and mounting hardware must support 46 kg (100 lbs).
  - Expose at least 25 mm (1 in) of threads for mounting the panel.

Mount the Panel

1. Mount the panel to the installed mounting bolts.
2. Tighten the bolts securely.
3. Check for a plumb installation and follow all local code restrictions.

Rough-in Conduit and Cable

The Elaho Relay Panel Feedthrough has removable plates located on top, bottom and both sides to accommodate conduit fittings for line, load, and control electronics power wiring. Remove the plates to punch conduit access as required.

1. Install conduit for line, load and control wiring to the panels in the appropriate locations. See *Cable Routing and Conduit Access on page 12*.
   - Size conduit appropriately for the specified wire and expected loads at the panel.

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 electronic power and line feeds as required.*

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2. Install conduit as required for low voltage control wiring. All low voltage terminations are conveniently located behind the user interface of the panel. Two 12.7 mm (1/2 in) knockouts are provided for low voltage control wiring access.

Note: *All low voltage (Class 2) control wiring must be routed separately from high voltage (Class 1) wiring.*

---

3. Pull line, load, and control wiring through installed conduit to the panel.
   - Individual line feeds from branch circuit breaker to relays.
   - Individual load wires from the relays to the lighting loads.
   - A dedicated circuit for control electronics power.
4. Pull low voltage (control) wiring through the conduit to the I/O compartment knockouts. See *Cable Routing and Conduit Access on page 12*.

Connect Wiring

Relays - Each relay has staggered output terminals for easy access to line and load connection. A Phillips screwdriver and wire strippers are required for relay line and load terminations.

Control processor electronics AC input - A discrete circuit is required to power the control processor; refer to *Cable Specification for Data and Control on page 11* for details. Terminations require only a flat blade jeweler screwdriver and wire strippers.

I/O terminations - All low voltage control terminations are conveniently located behind the user interface. Fold the user interface panel down to reveal termination points for DMX, Network, Contact Input, 0-10V Control, and DALI control.

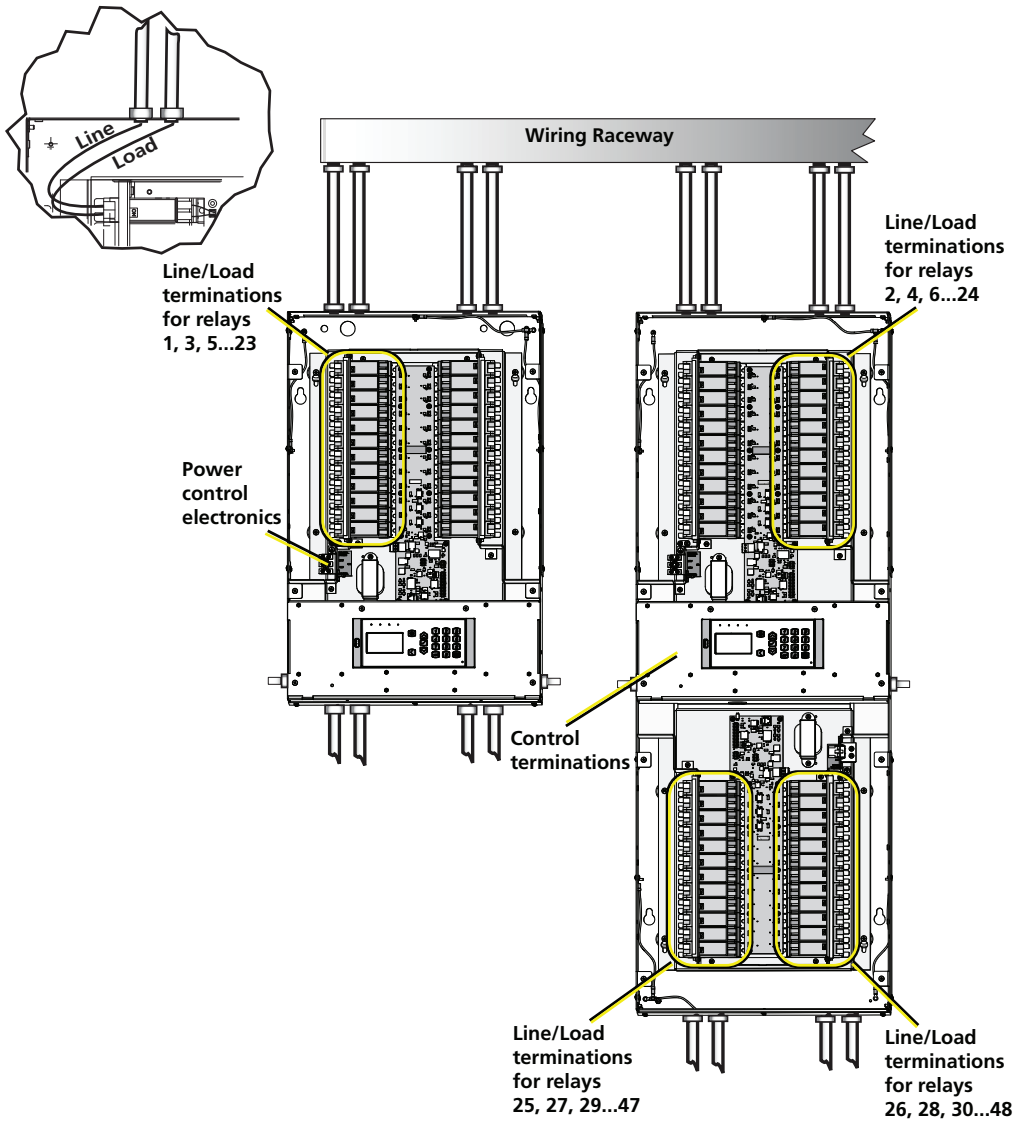
Connect Line and Load Wiring

ERP-FT is shipped standard with either 12, 24, or 48 relays installed. Depending on customer requirements the relay type and quantities may vary for custom orders. Three relay types are available for customer convenience, reference *Installation Environment on page 7* for specification.

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.

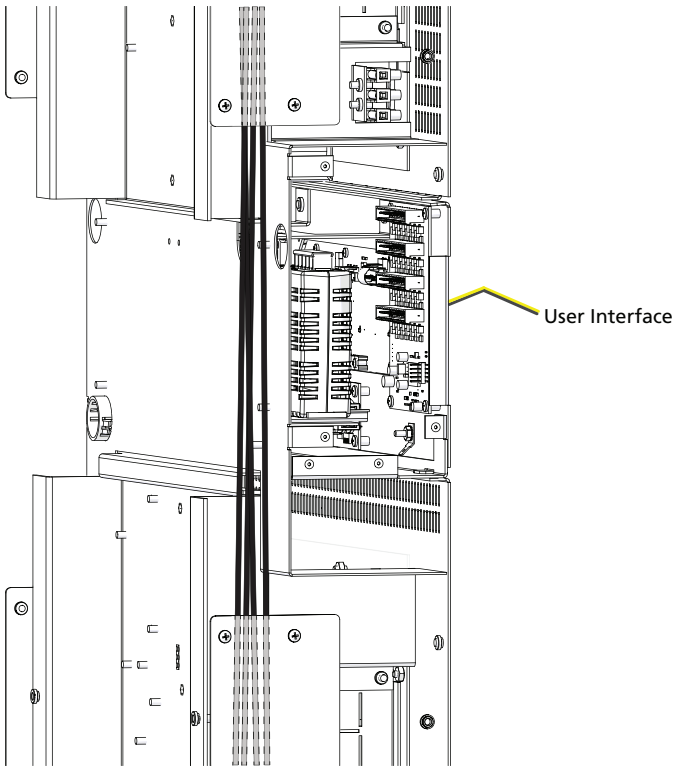
AVERTISSEMENT : RISQUE D'ELECTROCUTION! Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entrainer des blessures graves, voire mortelles.

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.



Wiring Channel

ERP-FT includes a channel located behind the UI that is specifically designed for running wires, including mains wiring. The channel is 45x62 mm (1-3/4x2-7/16 in).



1. Connect “Line” from the circuit breaker to the designated relay.

Note: *Reference the circuit panel schedule for accurate terminations from circuit breaker panel to ERP-FT panel then to lighting loads. The circuit panel schedule should be maintained and stored on the inside door of the ERP-FT panel at all times.*

   a. Strip 6 mm (1/4 in) of insulation from the end of the copper wire.
   b. Insert the bare end into the relay output screw terminal and secure.

2. Connect “Load” to the designated relay.
   a. Strip 6 mm (1/4 in) of insulation from the end of the copper wire.
   b. Insert the bare end into the remaining relay output screw terminal and secure.

Note: *A Voltage Barrier may be used to separate multiple voltages and/or emergency circuits from normal circuits within the Relay Panel. This is an accessory option, sold separately, and available for use when local code requires. Contact Echoflex for assistance.*

3. Repeat this process for the remaining Line and Load wires for the installation.

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

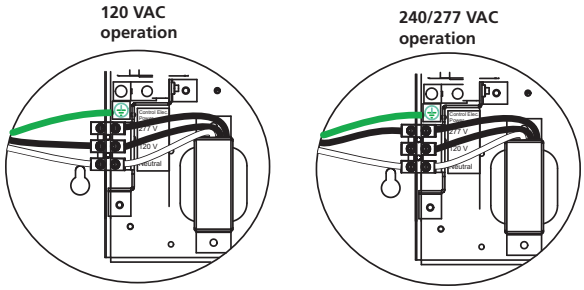
Connect Power Control Electronics AC Input

WARNING: RISK OF ELECTRIC SHOCK! Power must be off when you perform this procedure.

AVERTISSEMENT : RISQUE DE DÉCHARGE ÉLÉCTRIQUE! L'alimentation doit étre éteinte avant d'exécuter cette procédure.

Control electronics input power connects in the ERP-FT on screw terminals. The transformer is a multi-tap transformer with winding for 120 VAC and 240/277 VAC at 50/60 Hz.

1. Connect line, neutral and ground wiring on the designated screw terminals. Use the diagrams below to determine where each wire lands depending on voltage.
   a. Strip 7 mm (1/4 in) of insulation from the end of each copper wire.
   b. Insert the bare end of each wire into the appropriate screw terminal.
2. Tighten the screws firmly onto each wire.



Note: *When installing the ERP48-FT Relay Panel, input power connects to the transformer in the top panel as indicated above. Standard ERP48-FT ships from the factory with a power pigtail connected between the two transformers in the panel. To confirm an accurate installation, reference* *Connect Power Pigtail for ERP48-FT on the next page*.

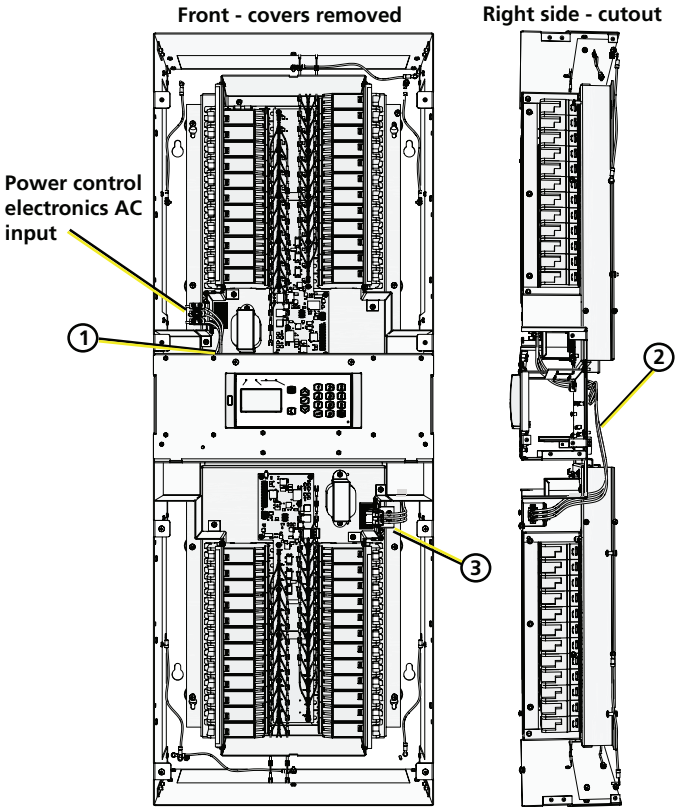
Connect Power Pigtail for ERP48-FT

In a standard model 48-way Elaho Relay Panel Feedthrough, a spiral wrapped power pigtail cable is hard wired to the transformer in the top panel and connected to the transformer in the lower panel. This connection is made at the factory prior to shipment.

When a non-standard ERP48-FT unit is shipped from the factory, this connection must be completed by the installing contractor. The spiral wrapped power pigtail cable is hard wired to the transformer in the top panel.

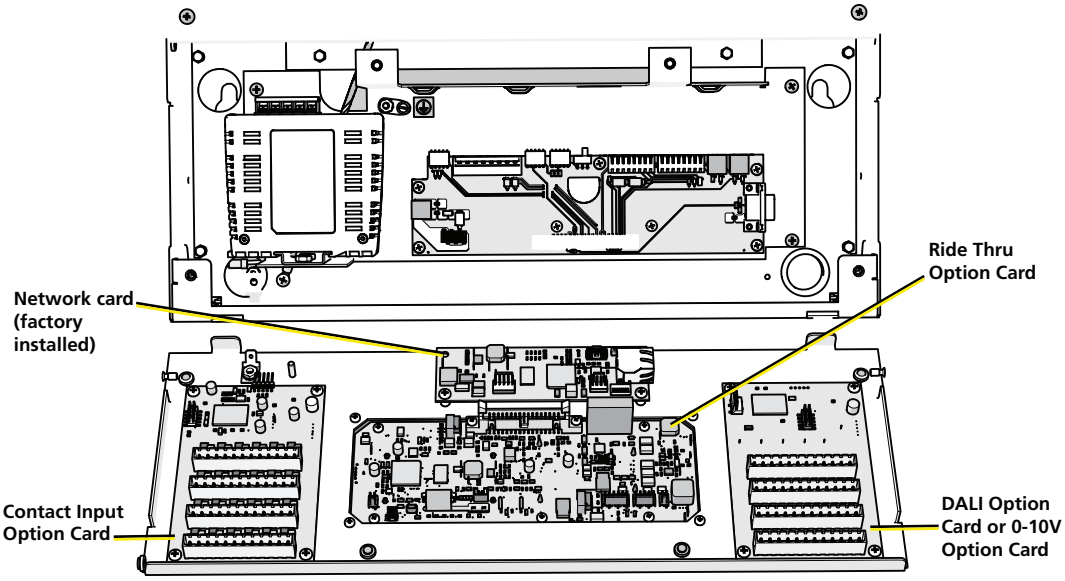
Reference the graphic that follows for indication of cable routing and connection of the free end of the pigtail.

1. Feed the free end of the power pigtail through the plenum area.
2. Pull the power pigtail through the plenum area to the lower transformer.
3. Connect the Mate-N-Lok™ connector to the receptacle.



Install Option Cards

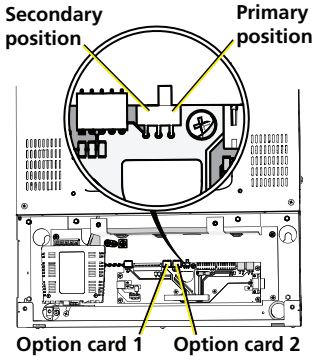
Each option card is packaged separately. Review the graphic below for option card placement.



Primary/Secondary Switch (ERP48-FT Only)

When using any combination of two 0–10V, DALI, or Contact Input option cards in an Elaho Relay Panel you will need to position the Primary/Secondary switch prior to startup. The Primary/Secondary switch controls which set of breakers responds to each option card.

Option Card 1 will always control circuits 1-24. If the Primary/Secondary switch is in the "Primary" position, Option Card 2 will also control circuits 1-24. If the Primary/Secondary switch is in the "Secondary" position, Option Card 2 will control circuits 25-48. See the examples in the tables below.



Example 1: Single Card Configurations

If you are using a single option card, the following configurations are possible:

Option Card 1	Option Card 2	Primary/Secondary Switch Position
0-10V (outputs 1–24)	-	Primary/Secondary
-	0-10V (outputs 1–24)	Primary
-	0-10V (outputs 25–48)	Secondary

Example 2: Two Card Configuration (Same Card Type)

If you are using two option cards of the same type (e.g. two 0–10V option cards), the following configuration is required:

Option Card 1	Option Card 2	Primary/Secondary Switch Position
0-10V (outputs 1–24)	0-10V (outputs 25–48)	Secondary

Example 3: Two Card Configurations (Different Card Types)

If you are using two options cards of different types (e.g. one DALI card and one Contact Input card), the following configurations are possible:

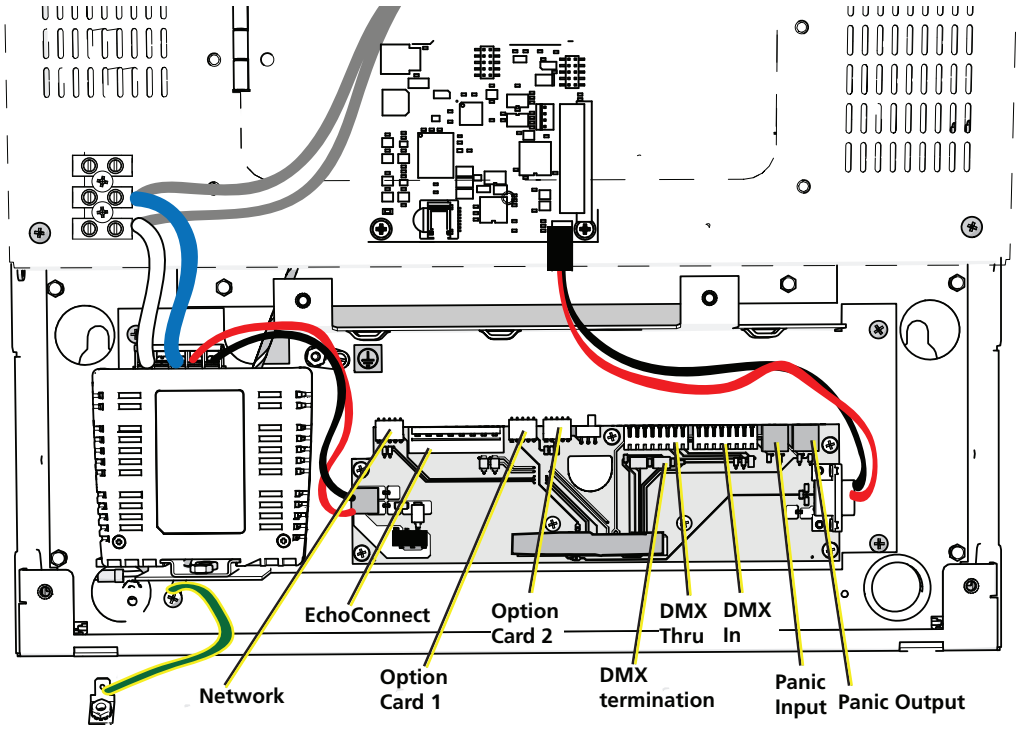
Option Card 1	Option Card 2	Primary/Secondary Switch Position
0-10V (outputs 1–24)	Contact Input (outputs 1–24)	Primary
Contact Input (outputs 1–24)	0-10V (outputs 1–24)	Primary
Contact Input (outputs 1–24)	0-10V (outputs 25–48)	Secondary
DALI (outputs 1–24)	Contact Input (outputs 1–24)	Primary
Contact Input (outputs 1–24)	DALI (outputs 1–24)	Primary
Contact Input (outputs 1–24)	DALI (outputs 25–48)	Secondary
0-10V (outpus 1–24)	DALI (outputs 25–48)	Secondary
DALI (outputs 1–24)	0-10V (outputs 25–48)	Secondary

Connect Control Wiring

Reference *Cable Specification for Data and Control on page 11* for a complete listing of control wire specification. The following images show the low voltage board connectors.

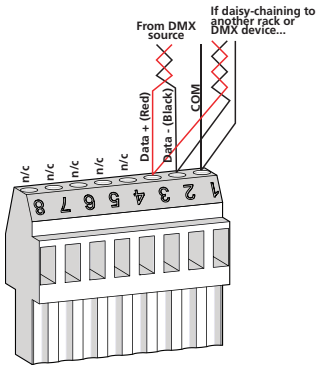
WARNING: RISK OF DEATH OR INJURY BY ELECTRIC SHOCK! 0–10V wiring may not be fully isolated from high-voltage AC power. Do not assume that 0–10V wiring is safe to touch, even when run as an NEC Class 2 signal. Test for AC voltage to ground before terminating any 0–10V control wiring to the device.

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. Testez la tension alternative par rapport à la terre avant de raccorder tout câblage de commande 0–10V à l'appareil.



DMX Control Wiring and Termination

DMX wire preparation will vary with the type of wire and termination kit being used. Please refer to the instructions provided with the DMX termination kit for specifics on the wire preparation. DMX termination is made to J8 and J9 on the termination I/O board.

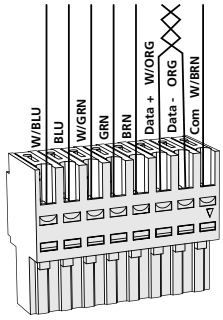


The graphic on the left illustrates DMX termination using screw terminal connectors that are intended for use with Belden 9729 cable (or approved equal).

Screw terminal connectors are supplied in the DMX Preparation Kit w/ Screw Connector, part number 4100A1012, and shipped with your panel.

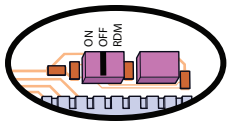
Be aware that cable other than Belden 9729 may have a different color code for its wire pairs.

The graphic on the right illustrates DMX termination using IDC connectors that are intended for use with Category 5E solid core cable (or equivalent cable types). IDC connectors are supplied in the Cat5 Preparation Kit w/ IDC Connector, part number 4100A1013, and shipped only when ordered separately.



Use a second connector on the DMX Thru receptacle if daisy-chaining to another panel or DMX device.

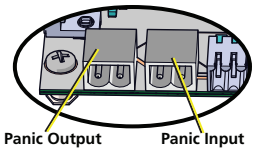
After completing the DMX data connections, you must properly terminate the DMX line using the termination switch (S1) on the termination I/O board. Data termination eliminates reflections at the end of the DMX data run.



Switch on DMX termination in the last panel (device) that is physically connected in the DMX chain.

Connect Panic Input/Panic Output

The Elaho Relay Panel Feedthrough offers a panic capability that complies with the UL 924 standard. When the ERP Feedthrough is properly connected and has a panic "look" stored, it will automatically play the recorded look when it receives a signal over the panic contact input.



Panic can be triggered by a maintained contact input that can be configured as normally open or normally closed. In addition, the relay panel optionally offers a +24 VDC (maximum 25 mA) panic output that provides a feed to a lamp or LED, which indicates emergency activity.

Connect Panic Input

1. Pull two 1.5 mm^2 (16 AWG) wires from your emergency contact location to the conduit previously installed. See *Cable Routing and Conduit Access on page 12*.
2. Strip 5 mm (3/16 in) of insulation from the ends of each wire.
3. Remove the two pin Panic Input connector from position J3 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 connector screws firmly onto the wires.
7. Replace the connector to the termination I/O board.

Determine Panic Switching

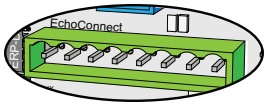
Slide the Panic switch, labeled "S2 Panic" on the termination I/O board, to set the Panic Input contact closure type:

- For a normally open closure, slide the switch to N/O.
- To disable the Input, slide the switch to Off (center position).
- For a normally closed closure, slide the switch to N/C.

Connect Panic Output (optional)

1. Pull two 1.5 mm^2 (16 AWG) wires from your external emergency indication lamp to the conduit previously installed. See *Cable Routing and Conduit Access on page 12*.
2. Strip 5 mm (3/16 in) of insulation from the ends of each wire.
3. Remove the two pin Panic Output connector from J2 (labeled Emergency Indicator) on the termination I/O board.
4. Loosen the terminal screws.
5. 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 connector screws firmly onto the wires.
7. Replace the connector to the termination I/O board.

Connect EchoConnect



The Elaho Relay Panel Feedthrough connects to the EchoConnect station communication bus. Termination is available for up to four separate EchoConnect data runs to the eight position connector on the termination board.

EchoConnect is a bi-directional protocol that uses one pair of wires (data+ and data-) for both data (and bus power as needed). Echoflex recommends using Belden 8471 (or approved equal) Class 2 wire. EchoConnect is topology free, you may install the wires in any combination of bus, star, loop, or home-run. The total combined length of an EchoConnect wire run (using Belden 8471, or equal) may not exceed 500 m (1,640 ft), with a maximum distance of 400 m (1,313 ft) between any two devices.

For systems utilizing additional Elaho devices, Echoflex recommends terminating the station data run to the panel with the station power supply enabled.

CAUTION: ***Enable only one EchoConnect power supply per system. Reference the Power Control Processor Configuration Manual, Station Power menu, for instructions to enable or disable the power supply. Enabling more than one power supply per Elaho system may disrupt communication and cause undesirable results.***

Note: *If you are using Cat5 (or Cat5e) wiring, an external Cat5 Termination Box is required. Contact Echoflex for ordering details. Control wiring instructions between the termination box and this Elaho Relay Panel Feedthrough will be provided with the Cat5 Termination Box installation instructions. For restrictions while using*

1. Pull Belden 8471 (or an equal type) control wiring and a 2.5 mm^2 (14 AWG) ground into the Elaho Relay Panel Feedthrough through conduit.
2. Strip 8 mm (5/16 in) of insulation from the ends of each wire.
3. Remove the EchoConnect connector (J9) from the termination I/O board.
4. Loosen the terminal screws for as many wire pairs as you are terminating.
5. Insert the data + (typically white) wire from the pair into a "+" terminal on the connector, then tighten the screw firmly onto the wire.
6. Insert the data - (typically black) wire from the pair into the "-" terminal on the connector, then tighten the screw firmly onto the wire.
7. Repeat steps 5 and 6 for each wire pair.
8. The 2.5 mm^2 (14 AWG) ground wire can terminate in one of three ways:
   - Connected between stations using WAGO Lever-Lock connectors.
   - Grounded to metal conduit.
   - If grounded metal conduit is not installed, connect the ground wire to the Elaho Relay Panel Feedthrough ground bus (same as the loads are grounded) and to the green/yellow striped wire connected to the Elaho device earth/ground pigtail using a WAGO Lever-Lock connector. Reference the related Elaho device installation instructions for details.
9. Replace the EchoConnect connector to J9 on the termination I/O board.

Using Category 5 Cable

When using EchoConnect over Cat5 cable, the bus uses all pairs in the Cat5 cable plus a separate ESD ground wire. The combined length of an EchoConnect wire run using Cat5 cable cannot exceed 300 m (1000 ft). To terminate Category 5 cable to the Elaho Relay Panel Feedthrough, order the EchoConnect Cat5 ERP Termination Kit, part number 8186A1208. Installation instruction are provided with the termination kit and are available for download from the Echoflex website echoflexsolutions.com.

Chapter 3

Final Installation and Power Up

Verify Installation

- Is the Elaho Relay Panel Feedthrough securely mounted with all mounting hardware?
- Is there sufficient clearance in the front of the unit for door access?
- Check wiring:
  - Is the power pigtail connected properly from the top panel transformer to the lower panel transformer? See *Connect Power Pigtail for ERP48-FT on page 18*.
  - Are all line and load cables landed to the appropriate relay and secure? See *Connect Line and Load Wiring on page 14*.
  - Are all load circuits free of short circuits?
  - Are all emergency lighting circuits separated from normal circuits with a voltage barrier if required by local code?
  - Are all cable access openings covered with plugs and all removable plates reinstalled?
  - Do all control cables meet specifications? See *Cable Specification for Data and Control on page 11*.
  - Are all low voltage control cables routed separately from high voltage cables?
  - Are all low voltage harnesses from the relay to the control board seated properly?
  - Are all data terminations in the I/O compartment terminated?
  - Remove all metal shavings and debris from unit.

Final Installation

1. Attach the ground wire with the ring terminal from the chassis to grounding stud on the User Interface panel and secure.
2. Close the User Interface panel and secure with four screws. Take care to not pinch or crimp any wire harnesses or cables while closing.
3. Switch all relays to the OFF position.
4. Re-attach the front covers to the unit.

Power Up and Test

Note: *Manually switch all relays to the OFF position prior to applying power.*

Apply power to the control electronics and relay circuits. The User Interface will turn on.

Reference the *Power Control Processor Configuration Manual* for configuration and system test information.

If you have any difficulties installing your system, please contact Echoflex Technical Services at the office nearest you. Echoflex contact information is located in *Help from Echoflex Technical Services on page 6*.

Appendix A

0–10V Option Card

Overview

The 0–10V Dimming Control option card (ERP-FT-LVD) is designed for LED drivers and fluorescent ballasts. It sinks up to 400 mA current on each of its 24 outputs. Each channel output is linked one-to-one with a relay circuit for power control and can control up to 50 ballasts.

Note: *A single Relay Panel Feedthrough supports the use of up to two 0–10V Dimming Control option cards (ERP-FT-LVD) or DALI Control option cards (ERP-FT-DALI) in the same panel.*

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 entrainer 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.

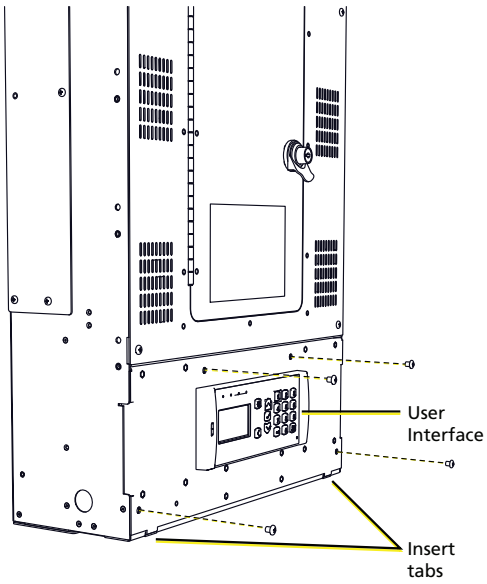
WARNING: RISK OF DEATH OR INJURY BY ELECTRIC SHOCK! 0–10 V wiring may not be fully isolated from high-voltage AC power. Do not assume that 0–10 V wiring is safe to touch, even when run as an NEC Class 2 signal. Test for AC voltage to ground before terminating any 0–10 V control wiring to the device.

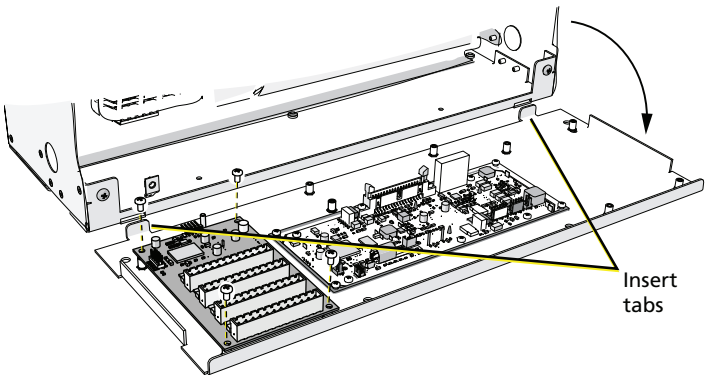
AVERTISSEMENT : RISQUE DE MORT OU DE BLESSURE PAR ÉLECTROCUTION! Le câblage 0–10 V peut ne pas être complètement isolé du courant alternatif haute tension. Ne supposez jamais que le câblage 0–10 V peut être touché en toute sécurité, même s'il est utilisé avec un signal NEC de Classe 2. Testez la tension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

Images in this section show a 24-channel panel (ERP24-FT).

1. Turn off power to the relay panel.
2. Remove the four screws securing the front panel to the ERP-FT.
3. Fold down the User Interface panel, taking care to leave all wire harnesses connected. This panel has two tabs that, when inserted, provide additional support for the fold-down panel.
4. Align the option card to the mounting studs located to the left of the User Interface.
5. Use the four screws provided to secure the option card to the mounting studs.

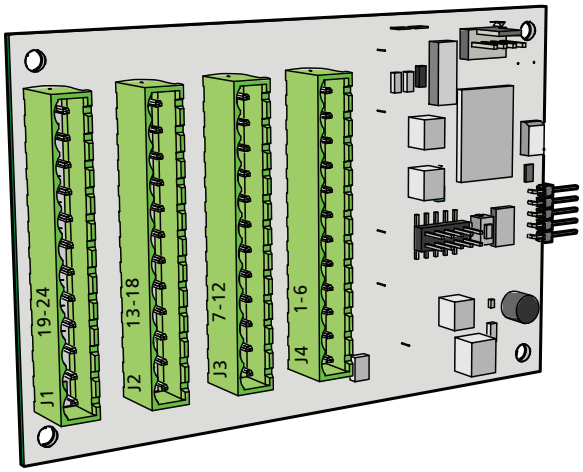




Connect Wiring

Each output connection is clearly labeled on the removable screw terminal bus connectors. The removable connectors accept 0.25–4 mm^2 (24–12 AWG) wire. 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 connector is provided for each bus, and is labeled for ease of identification of each output. Terminals accept 0.25–4 mm^2 (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 Configuration Manual.

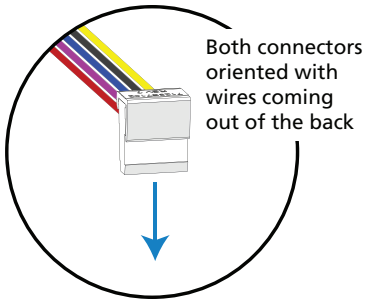
Note: *See the white paper* Understanding 0-10V LED Drivers *for Class 2 and Class 1 wiring considerations.*

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 12* 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.

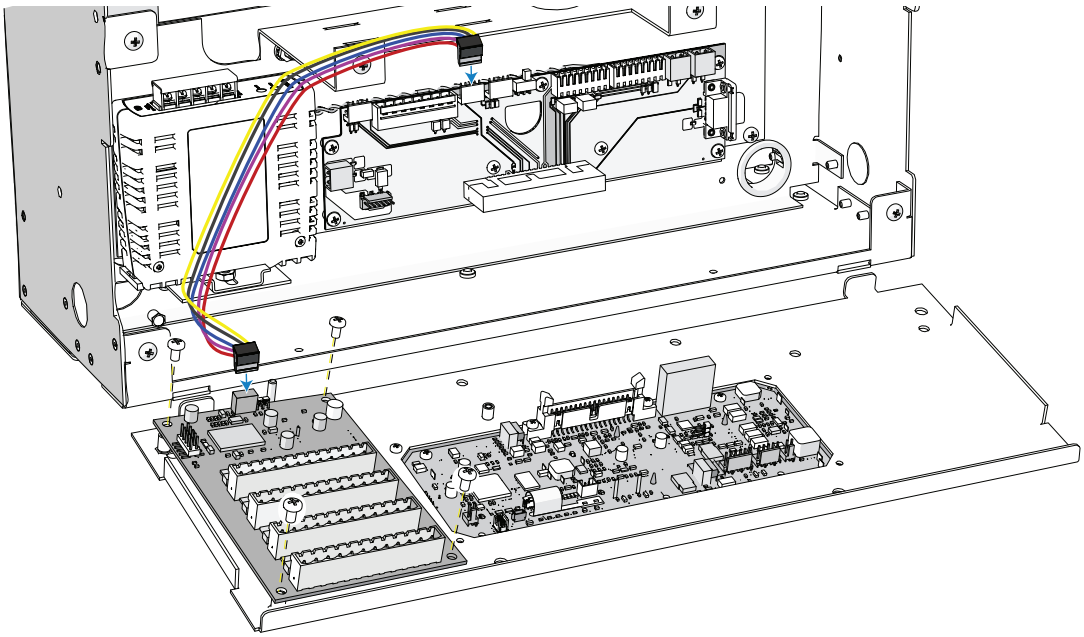
Note: *This connection is polarity dependent. All 24 "-" (common) terminals are tied together.*

   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.

Connect the Wire Harness



1. Connect one end of the provided wire harness to the five-pin connector on the option card. The harness end should be oriented with the wires coming out of the back.
2. Connect the opposite end of the wire harness to the connector on the termination board, to the left of the Primary/Secondary switch. The harness end should be oriented with the wires coming out of the back.
3. Set the Primary/Secondary switch as necessary. See *Primary/Secondary Switch (ERP48-FT Only)*.
4. Fold the User Interface panel up into place, taking care not to pinch any wires or cables.
5. Secure the panel using the four screws previously removed.



Appendix B

DALI Option Card

Overview

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

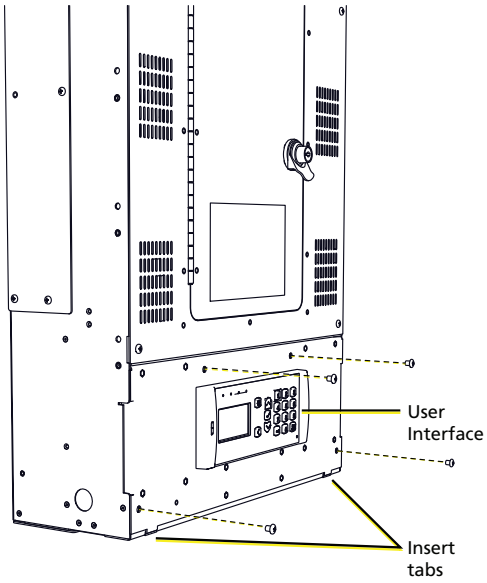
- The DALI ballast is powered by an external DALI loop power supply which is supplied by others. This supply is internally connected to the Elaho Relay Panel FT. The number of power supplies needed for each DALI loop, is based on the connected load.
- The ERP-FT-DALI can control up to 64 DALI compatible fluorescent ballasts per DALI loop.
- Each of the 24 DALI loops are linked one-to-one with a relay panel circuit for power control.

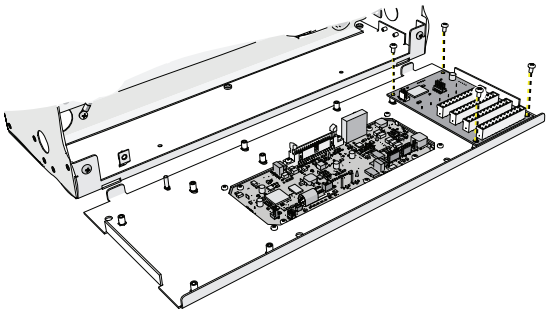
A single Relay Panel Feedthrough supports the use of up to two 0–10V Dimming Control option cards (ERP-FT-LVD) or DALI Control option cards (ERP-FT-DALI) in the same panel.

Install the ERP-FT-DALI Option Card

Images in this section show a 24-channel panel (ERP24-FT).

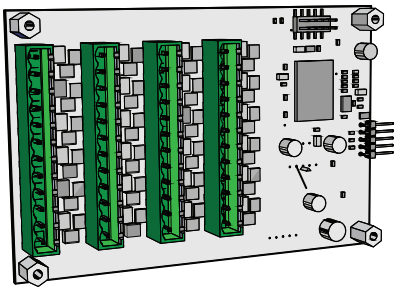
1. Turn off power to the relay panel.
2. Remove the four screws securing the front panel to the ERP-FT.
3. Fold down the User Interface panel, taking care to leave all wire harnesses connected. This panel has two tabs that, when inserted, provide additional support for the fold-down panel.
4. Align the option card to the mounting studs located to the right of the User Interface.
5. Use the four screws provided to secure the option card to the mounting studs.





Connect Wiring

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

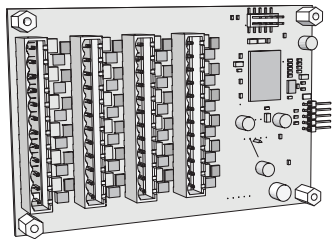


Note: *The associated output loop terminal number should always match the relay circuit number inside the relay panel.*
For example: If relay 1 is connected to a DALI ballast load, control wiring would terminate to the ERP-FT-DALI option board output terminals labeled "+ 1 -".

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

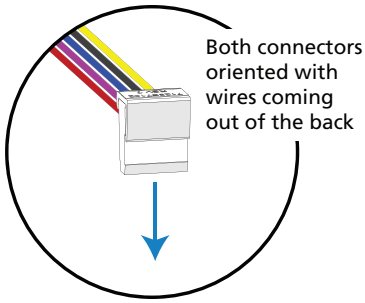
1. Pull DALI ballast control wiring pairs into the Elaho Relay Panel FT, per the wire entry plan. See *Cable Routing and Conduit Access on page 12*.

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

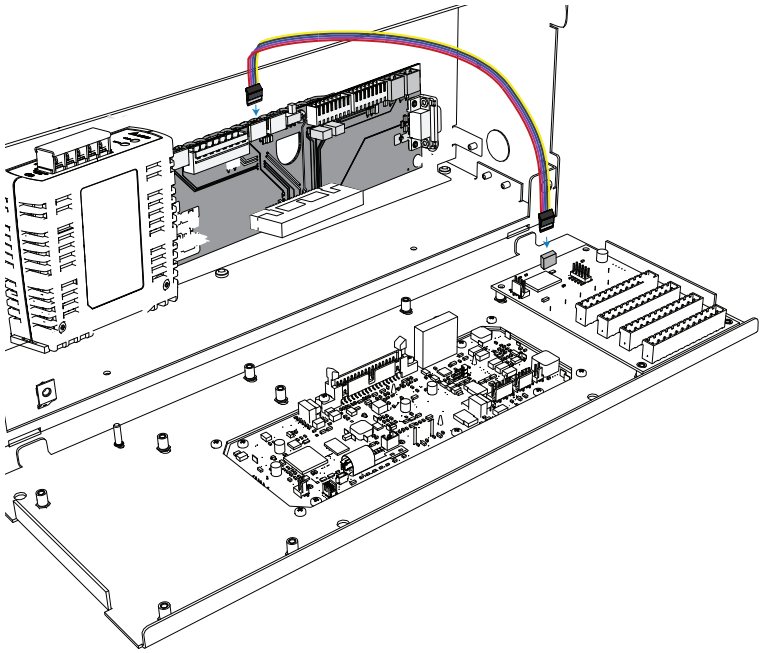


2. Strip the insulation back from each wire pair 6 mm (1/4 in).
3. Remove the pluggable screw connector for the DALI loop matching the relay circuit.
4. Notice the connector is labeled for your wire termination reference. Using a 3 mm (1/8 in) flatblade screwdriver, loosen the terminals and insert each of the data + and data - wire set into the appropriate terminal for the circuit. Data wires in the set are polarity independent.
5. Tighten each screw terminal until the wire is secure.
6. Repeat steps 1–4 for the remaining fluorescent outputs in the panel.
7. Reattach the DALI pluggable screw connector to the board and repeat for the remaining DALI loops in the system (up to 24).

Connect the Wire Harness



1. Connect one end of the provided wire harness to the five-pin connector on the option card. The harness end should be oriented with the wires coming out of the back.
2. Connect the opposite end of the wire harness to the connector on the termination board, to the left of the Primary/Secondary switch. The harness end should be oriented with the wires coming out of the back.
3. Set the Primary/Secondary switch as necessary. See *Primary/Secondary Switch (ERP48-FT Only)*.
4. Fold the User Interface panel up into place, taking care not to pinch any wires or cables.
5. Secure the panel using the four screws previously removed.

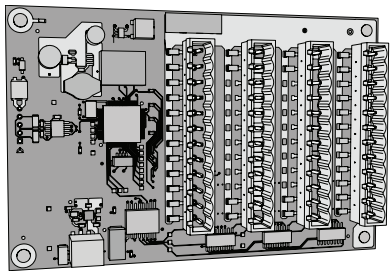


Appendix C

Contact Input Option Card

Overview

The Contact Input Option Card (ERP-FT-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.

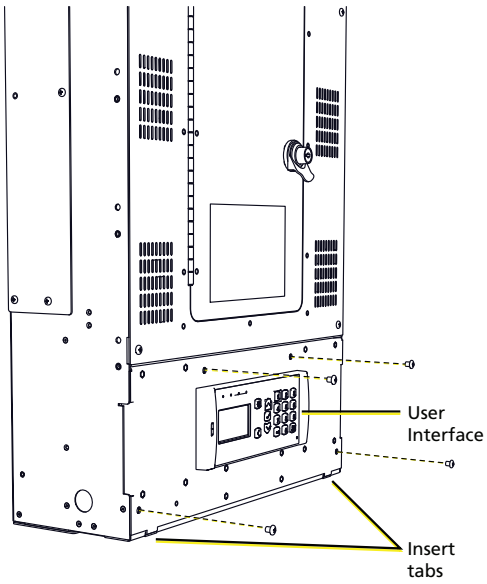
AVERTISSEMENT : RISQUE D'ELECTROCUTION! Travailler à l'intérieur du panneau sans avoir déconnecté le courant peut entrainer des blessures graves, voire mortelles.

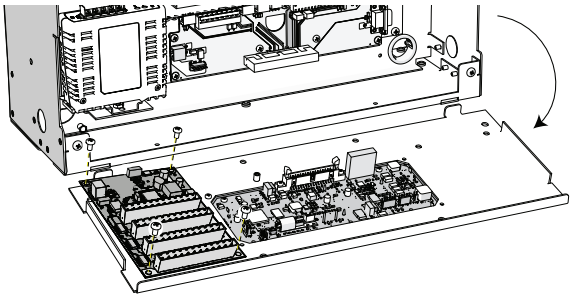
De-energize main feed to the panel and follow appropriate Lockout/Tagout procedures as mandated by NFPA 70E. It is important to note that electrical equipment such as relay panels can present an arc flash hazard if improperly serviced. This is due to the high amounts of short-circuit current available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

Images in this section show a 24-channel panel (ERP24-FT).

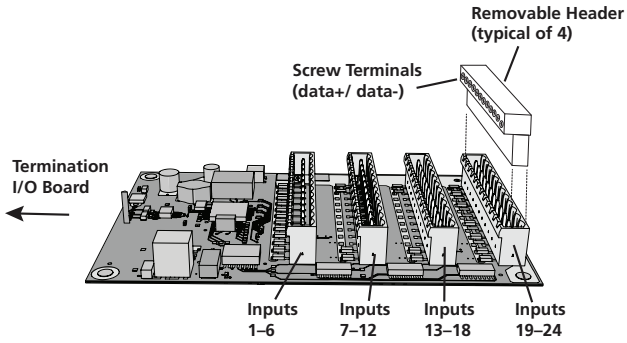
1. Turn off power to the relay panel.
2. Remove the four screws securing the front panel to the ERP-FT.
3. Fold down the User Interface panel, taking care to leave all wire harnesses connected. This panel has two tabs that, when inserted, provide additional support for the fold-down panel.
4. Align the option card to the mounting studs located to the left of the User Interface.
5. Use the four screws provided to secure the option card to the mounting studs.





Connect Wiring

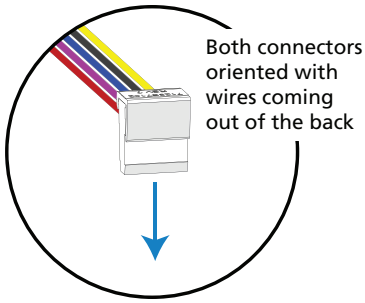
The contact input card provides four bus connections for termination of up to 24 individual dry contact inputs. A screw connector is provided for each input and accepts 0.5–4 mm^2 (18–12 AWG) Class 2 wire. Each connector is labeled to assist in relay referencing during termination.



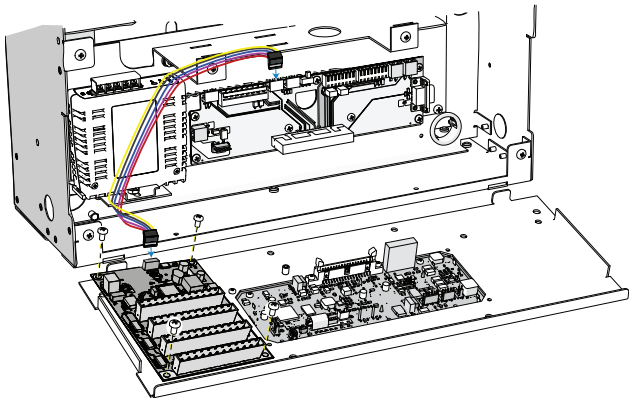
1. Pull wire from the device supplying the contact closure into the Elaho Relay Panel, per the wire entry plan. See *Cable Routing and Conduit Access on page 12*.
2. Strip the insulation from each wire pair back 6 mm (1/4 in).
3. Remove the pluggable screw connector header on the Contact Input board.
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.
   - Data wires in the set are polarity independent.
   - Connectors are labeled for termination reference.
5. Tighten each screw terminal until the wire is held snug.

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.

Connect the Wire Harness



1. Connect one end of the provided wire harness to the five-pin connector on the option card. The harness end should be oriented with the wires coming out of the back.
2. Connect the opposite end of the wire harness to the connector on the termination board, to the left of the Primary/Secondary switch. The harness end should be oriented with the wires coming out of the back.
3. Set the Primary/Secondary switch as necessary. See *Primary/Secondary Switch (ERP48-FT Only)*.
4. Fold the User Interface panel up into place, taking care not to pinch any wires or cables.
5. Secure the panel using the four screws previously removed.



Programming

The ERP-FT-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:

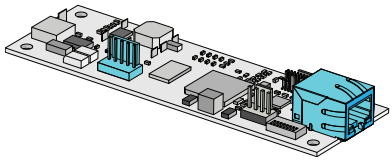
- Contact: Displays the number of contact being configured, 1–24.
- Space: Determines the space in which the selected action will happen.
- On Open: Determine the action that occurs when the contact is opened. The following options are available:
  - None: No action will be taken when the contact opens.
  - 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 will be activated in the selected space when the contact opens.
  - Output to Full: The selected output range will be driven to full when the contact opens.
  - Output to 0%: The selected output range will be driven to 0% when the contact closes.
- On Close: Determine the action that occurs when the contact is closed. The same actions are available as listed above.

For additional information on Contact Input card setup and programming, see the *Power Control Processor Configuration Manual* which is available for download at echoflexsolutions.com.

Appendix D

Ethernet Interface Option Card

Overview



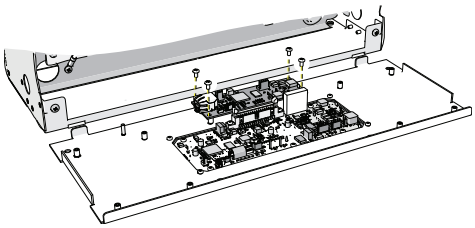
The Ethernet Option Card (ERP-FT-NET) installs into the Elaho Relay Panel Feedthrough (ERP-FT) and provides the ability to control the relay panel using the ANSI E1.11 streaming ACN (sACN) protocol.

Installation

The Ethernet Option Card ships with four screws and a wire harness for connection to the relay panel User Interface termination board.

Install the Ethernet Option Card

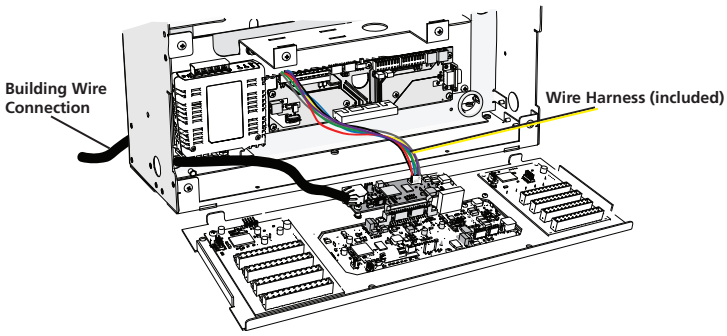
1. Align the Ethernet Option Card to the mounting studs located on the inside bottom of the relay panel, just beneath the User Interface.
2. Install one screw to each corner of the board.



Connect Wiring

The Ethernet Option Card includes a wire harness that connects from the option card to the termination board, and a Cat5 termination kit (part number 4101A2003) for connection between the sACN source or control network and the Ethernet Option Card RJ45 modular jack.

1. Connect the provided wire harness between the five pin receptacle labeled Input (J3) on the network option card and the five pin receptacle labeled NOC (J11) on the relay panel termination board.
2. Pull Category 5 (or equivalent) cable with the Cat5 termination kit installed (reference the instructions provided with the termination kit) to the Ethernet Option Card.
3. Connect the option card to the building wiring using the provided patch cable from the Cat5 termination kit.



Update Software

To ensure correct functionality, your Power Control Processor and Ethernet Interface Option Card must be running the same version of software. After the hardware installation is complete and the panel is powered up, check the software version numbers and perform a software update as needed.

1. Download the latest Elaho Power Control Processor firmware (echo_relay.efw) from etcconnect.com and save the software file to a portable USB storage device.
2. Insert the USB device into your Power Control Processor USB receptacle.
3. Navigate the menu and select File Operations > Update Firmware.
4. Select the firmware file (echo_relay.efw), and the update will begin. Wait for the firmware update to complete before removing the USB device.

For more information on updating software, see the *Power Control Processor Configuration Manual* or the most recent software release note. All Echoflex documents are available for download from echoflexsolutions.com.

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8123M2102 Rev B Released 2020-07