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Congratulations on your purchase of the ETC Echo Relay Panel Feedthrough (ERP-FT.) Echo Relay Panels continue ETC’s tradition of providing the highest quality products for the entertainment and architectural lighting market.

Using this Manual

This manual contains procedures for field installation of the Echo Relay Panel Feedthrough, and additional relays.

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.

Warnings and Notice Conventions

These symbols are used in the manual and on the equipment to alert you to possible danger or important information.

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

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

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

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

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

This manual contains the procedures for installation of the Echo Relay Panel Feedthrough (ERP-FT).

<table>
<thead>
<tr>
<th>Model #</th>
<th>Description</th>
<th>Relay Type</th>
<th>Voltage</th>
<th>Dimension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP24-F242</td>
<td>Small panel with 24 1P relays</td>
<td>WR6161-81</td>
<td>120V, 230V, or 277V 50/60Hz</td>
<td>17.14 x 6.3 x 26.24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model#</th>
<th>Description</th>
<th>Relay Type</th>
<th>Voltage</th>
<th>Dimension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP48-FT48</td>
<td>Large panel with 48 1P relays</td>
<td>WR6161-81</td>
<td>120V, 230V, or 277V 50/60 HzHz</td>
<td>17.14 x 6.3 x 47.06</td>
</tr>
</tbody>
</table>
Option kits available for the Echo Relay Panel Feedthrough (ERP-FT) include:

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERPFT-1PRK</td>
<td>WR6161-81, 20A @ 300V AC, single pole, single space relay kit</td>
<td>field installed relay kit</td>
</tr>
<tr>
<td>ERPFT-2PRK</td>
<td>WR6166-81, 20A @ 300V AC, double pole, single space relay kit</td>
<td>field installed relay kit</td>
</tr>
<tr>
<td>ERPFT-3PRK</td>
<td>WR6172-84, 30A @ 480V AC, double pole, double space relay kit</td>
<td>field installed relay kit</td>
</tr>
<tr>
<td>ERPFT-RMK</td>
<td>19&quot; Rack Mount kit</td>
<td>requires 15 rack units of space for both the 12 and 24 relay versions. Utilize two rack mount kits for the 48.</td>
</tr>
<tr>
<td>ERPFT-VB</td>
<td>Voltage Barrier Kit</td>
<td>used to separate differing voltages and/or emergency circuits from normal circuits. Use per local code.</td>
</tr>
<tr>
<td>ERPFT-TPH</td>
<td>Tamper Proof Hardware and Tool</td>
<td>For use with SmartSwitch Relay Panel, Echo Relay Panel Feedthrough, and SmartPack Wall Mount</td>
</tr>
</tbody>
</table>

Option cards are available for field installation into the Sensor IQ. Each option adds another level of features and functions to the Sensor IQ and the installation.

For more information on a specific option card, reference the appropriate installation guide supplied with the option card.

**0-10V Dimming Control**

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

- Each of the 24 outputs are rated to control a maximum of 400mA per channel (up to 50 ballasts per channel).
- Loss of power at the Sensor IQ controller results in releasing control levels to full.
- The ERP-FT-LVD option card installs using an included wire harness.

**Note:** A single Sensor IQ supports the use of either the 0-10V output control option or a DALI option card, but not both in the same panel.
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 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 fluorescent ballasts per DALI loop.
- The ERP-FT-DALI Control card installs using an included wire harness.

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.

- The ERP-FT-CI card installs using an included wire harness.

Ethernet Interface

The Ethernet Interface (ERP-FT-NET) provides the ability to control the relay panel using the ANSI E1.11 (streaming ACN) protocol and allows feedback of current and voltage information over the network.

- The ERP-FT-NET option card mounts to the bottom of the relay panel and connects to the termination board using an included wire harness.

Ride-Thru Option

The Ride Thru Option (ERP-FT-RTO) maintains power to the Sensor IQ 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.
Help from ETC Technical Services

If you are having difficulties, your most convenient resources are the references given in this manual. To search more widely, try the ETC Web site at www.etcconnect.com. If none of these resources is sufficient, contact ETC Technical Services directly at one of the offices identified below. Emergency service is available from all ETC offices outside of normal business hours.

When calling for help, please have the following information handy:

- Model of the Relay Panel
- Type of relays used including model number and quantity
- Other components in your system including station, network equipment, other panels, etc.
- DMX control source used for system-wide control, if any.

**Americas**

ETC International
Technical Services Department
3031 Pleasant View Road
Middleton, WI 53562
800-775-4382 (USA, toll-free)
+1-608 831-4116
service@etcconnect.com

**United Kingdom**

Electronic Theatre Controls, Ltd.
Technical Services Department
26-28 Victoria Industrial Estate
Victoria Road,
London W3 6UU, UK
+44 (0)20 8896 1000
service@etceurope.com

**Asia**

ETC Asia, Ltd.
Technical Services Department
Room 1801, 18/F
Tower1, Phase 1, Enterprise Square
9 Sheung Yu Road
Kowloon Bay, Kowloon, Hong Kong
+852 2799 1220
service@etcasia.com

**Germany**

Electronic Theatre Controls, GmbH
Technical Services Department
Ohmstrasse 3
93607, Holzkirchen, Germany
+49 (80 24) 47 00-0
techserv-hoki@etcconnect.com
Chapter 1
Prepare for Installation

For proper operation of your Echo 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.
- Echo Relay Panel Feedthrough 24 is intended to be wall mounted (surface only) or installed in a standard 19” (EIA) equipment rack utilizing the 19” rack mount kit (SS-RMK). The installation location must support a fully populated panel not exceeding 22.68kg (50lbs).
- Echo Relay Panel Feedthrough 48 is intended to be wall mounted (surface only) or installed in a standard 19” (EIA) equipment rack utilizing two 19” rack mount kits. The installation location must support a fully populated panel not exceeding 45.36kg (100lbs).

### Relay Panel Dimensions

<table>
<thead>
<tr>
<th>Models</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V 24 circ</td>
<td>26.24” (66.64cm)</td>
<td>17.14” (43.53cm)</td>
<td>6.3” (16cm)</td>
</tr>
<tr>
<td>120V 48 circ</td>
<td>47.06” (119.53cm)</td>
<td>17.14” (43.53cm)</td>
<td>6.3” (16cm)</td>
</tr>
<tr>
<td>277V 24 circ</td>
<td>26.24” (66.64cm)</td>
<td>17.14” (43.53cm)</td>
<td>6.3” (16cm)</td>
</tr>
<tr>
<td>277V 48 circ</td>
<td>47.06” (119.53cm)</td>
<td>17.14” (43.53cm)</td>
<td>6.3” (16cm)</td>
</tr>
</tbody>
</table>
**Clearance**

- ERP24-FT suggested mounting 48” (1,231mm) height to bottom of the Relay Panel.
- ERP48-FT suggested mounting 24” (609.6mm) height to bottom of the Relay Panel.
- Clearance on left and right side of the panel should be 1.5” (38.46mm). Zero clearance required if mounted next to another relay or dimming rack.
- Suggested door clearance is 12” (304.8mm) from front of the panel

**Electrical Requirements**

- A dedicated circuit from the breaker panel for control electronics power.
- 120V, 50/60 Hz or 277V
- ERP24-FT requires 8A maximum current per Relay Panel
- ERP48-FT requires 15A maximum current per Relay Panel
- This equipment must be connected to a suitable safety earth/ground.
Compliance
UL 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.

Relay Specification
Echo Relay Panel Feedthrough (ERP-FT) ships standard with either 24, or 48 - 20A HID relays installed and fully pre-wired for low voltage control. Three relay types are available as standard:
• 20A single pole/single space relay (WR6161K-84)
• 20A double pole/single space relay (WR6166-84)
• 20A double pole/double space relay (WR6172-84)

As required, custom ERP-FT Panels 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.

WR6161K-84 Single Pole HID Relay

<table>
<thead>
<tr>
<th>CSA</th>
<th>UL Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• General Use</td>
<td>20A @ 347VAC</td>
</tr>
<tr>
<td>• Ballast (Standard)</td>
<td>20A @ 347VAC</td>
</tr>
<tr>
<td>• Tungsten</td>
<td>2400W @ 120VAC</td>
</tr>
<tr>
<td>• Motor Load</td>
<td>1/2 HP @ 110-125VAC</td>
</tr>
<tr>
<td>• Short Circuit Rating</td>
<td>18,000A 277VAC</td>
</tr>
</tbody>
</table>

WR6166-84 Double Pole HID Relay

<table>
<thead>
<tr>
<th>CSA</th>
<th>UL Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• General Use</td>
<td>20A @ 347VAC</td>
</tr>
<tr>
<td>• Ballast (Standard)</td>
<td>20A @ 347VAC</td>
</tr>
<tr>
<td>• Tungsten</td>
<td>2400W @ 120VAC</td>
</tr>
<tr>
<td>• Motor Load</td>
<td>1/2 HP @ 110-125VAC</td>
</tr>
<tr>
<td>• Short Circuit Rating</td>
<td>5,000A 277VAC</td>
</tr>
<tr>
<td>Relay Ratings</td>
<td>Relay Ratings</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>• Inrush: 2000A</td>
<td>• Isolation: 5000V RMS</td>
</tr>
<tr>
<td>• Life: 60,000 cycles at full load</td>
<td>• Relay output terminals accept 1.5 - 4mm² (14-10 AWG) copper wire</td>
</tr>
</tbody>
</table>

### Verify the Contents of the Shipping Carton

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

- ERP-FT with cover(s) and locking door(s) attached with key(s).
- Relay panel interior(s) with the quantity and type of relay ordered
- DMX Preparation Kit - ETC part number 4100A1002
- Echo Relay Panel Feedthrough Installation Manual

---

### Parts and Specialty Tools Required

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

- 6-8mm (1/4” - 3/8”) bolts or screws, 50-100mm (2-4”) long, and suitable wall plugs, are suggested for Relay Panel mounting.
- Conduit punch, Conduit or bushes - 12.7mm (1/2”) diameter
- Phillips screwdriver
- Slotted screwdriver
- Jeweler’s slotted screwdriver
- Wire strippers
Cable Specification

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Cable Type / Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Control</td>
<td>120V, 230V, or 277V AC</td>
<td>A dedicated circuit is recommended. 8A for the ERP24-FT and 15A for</td>
</tr>
<tr>
<td>Processor Electronics</td>
<td>50/60Hz</td>
<td>the ERP48-FT. For installations utilizing UL 924 for emergency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lighting loads, secure a dedicated emergency circuit.</td>
</tr>
<tr>
<td>Line / Load</td>
<td>4mm² (10 AWG) maximum</td>
<td>maximum 20A @ 300V AC per relay</td>
</tr>
<tr>
<td>DMX</td>
<td>Belden 9729 (recommended)</td>
<td>or equivalent - for use with an external DMX control source (not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>included). DMX is RS485 serial and follows a daisy-chained topology.</td>
</tr>
<tr>
<td>Echo Control Stations and Sensors</td>
<td>Belden 8471 plus 1 - 2.5mm² (14 AWG) ESD drain wire recommended (drain wire not required if installed in grounded metal conduit)</td>
<td>For use with wall stations and Echo enabled panel to panel communications. Echo is FTT-10A topology-free and polarity independent.</td>
</tr>
<tr>
<td>Emergency UL 924</td>
<td>2 - 1.5mm² (16 AWG), twisted</td>
<td>Contact input for UL 924 emergency lighting loads</td>
</tr>
</tbody>
</table>

Cable Routing and Conduit Access

Echo 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.

Remove plate to punch conduit access as needed for line, load, and control electronic power wiring. It is acceptable to remove the plate permanently if the unit is mounted directly next to an adjacent Feed Through Echo Relay Panel.
Chapter 2
Installation Procedure

Install Mounting Hardware

Step 1: Remove the front cover(s) with locking doors to reveal the relay panel interior.
Step 2: Hold the Relay Panel to the desired mounting location.
Step 3: Mark the keyhole locations on the wall with a pencil.
   • ERP-FT 24 panels can install up to two-high by any width.
   • ERP-FT 48 panels are 44cm (17.35”) wide by 120.1cm (47.3”) high, including removable panels and screws.

Allow clearances as described on page 8.

Step 4: Once all marks have been made, set the Relay Panel aside.
Step 5: Install the required hardware for mounting the enclosure using the previously marked reference points as a guide.
   • ERP24-FT requires four 6-8mm (1/4” - 3/8”) bolts or screws, 50-100mm (2-4”) long and suitable wall plugs.
     - Both the surface and mounting hardware must support 22.68kg (50lbs).
     - Expose at least 25mm (1”) of threads for mounting the Relay Panel.
• **ERP48-FT** requires six 6-8mm (1/4" - 3/8") bolts or screws, 50-100mm (2-4") long and suitable wall plugs.
  - Both the surface and mounting hardware must support 45.36kg (100lbs).
  - Expose at least 25mm (1") of threads for mounting the Relay Panel.

**Mount the Relay Panel**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Mount the ERP-FT enclosure to the installed mounting bolts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Tighten the bolts securely.</td>
</tr>
<tr>
<td></td>
<td>a: Check for a plumb installation and follow all local code restrictions.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Rough-In Conduit and Cable</td>
</tr>
<tr>
<td></td>
<td>The Echo 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.</td>
</tr>
<tr>
<td></td>
<td>Step 1: Install conduit for line, load and control electronics power to the panels in the appropriate locations. See Cable Routing and Conduit Access on page 11.</td>
</tr>
<tr>
<td></td>
<td>• The Echo Relay Panel Feedthrough is available as standard with 12, 24, 36, or 48 relays installed. Size conduit appropriately for the specified wire and loads.</td>
</tr>
</tbody>
</table>

**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.

| Step 2 | Install conduit as required for low voltage control wiring. |

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

|        | • All low voltage terminations are conveniently located behind the User Interface of the panel. Two 12.7mm (1/2") knockouts are provided for low voltage control wiring. |
|        | Step 3: Pull line, load, and control electronics power wiring through conduit. |
|        | a: Individual line feeds from branch circuit breaker to relays. |
|        | b: Individual load wires from the relays to the lighting loads. |
|        | c: A dedicated circuit for control electronics power. |
|        | Step 4: Pull low voltage (control) wiring through the conduit to the I/O compartment knockouts. See Cable Routing and Conduit Access on page 11. |

**Connect Wiring**

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

**Control Electronics Power** - A discrete circuit (8A current maximum per ERP24-FT and 15A maximum current for ERP48-FT) is required to power the Power Control Processor. Terminations require only a flat head jeweler screwdriver and wire strippers.

**I/O terminations** - Easy access to all low voltage control terminations. The User Interface panel folds down to reveal connection points for DMX, Network, Contact Input, 0-10V Control, and DALI control.
Connect Line and Load Wiring

ERP-FT is shipped standard with either 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, 20A single pole relay (Aromat WR6161-81), a 20A double pole relay (Aromat WR6166-81) and a 30A 480V double pole relay (WR6172-84).

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

De-energize main feed to relay panel and follow appropriate Lockout/Tagout procedures as described in NFPA Standard 70E. It is important to note that electrical equipment such as relay panels, can present an arc flash safety hazard if improperly serviced. This is due to available large short circuit currents on the feeders of the equipment. Any work on energized equipment must comply with OSHA Electrical Safe Working Practices.

Step 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 Relay Panel then to lighting loads. The circuit panel schedule should be maintained and stored on the inside door of the Relay Panel.

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

**Step 2:** Connect “Load” to the designated relay.

| **a:** Strip 6mm (1/4") 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 ETC for assistance.

**Step 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 Control Electronics Power Wiring**

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

Control electronics input power connects in the ERP-FT on screw terminals. The transformer is rated for 120V AC at 50/60Hz.

**Step 1:** Connect line, Neutral and ground wiring on the designated screw terminals. Use the diagram below to determine where each wire lands depending on voltage.

**Step 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 page 17.
Connect power pigtail for ERP48-FT

A spiral wrapped cable is hard wired to the transformer in the top panel of the and ERP48-FT and connects to the transformer in the lower panel. This connection is made at the factory prior to shipment of standard 48 Relay Panels.

When non-standard ERP48-FT units are shipped from the factory this connection must be completed by the installing contractor. The power pigtail is hard wired to the transformer in the top panel. Reference the graphic below for indication of cable routing and connection of the free end of the power pigtail.

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

AC Input
120V, 230V or 277V
AC 50/60Hz
Install Option Cards

Each option card is packaged separately and comes with its own installation instructions.

Option card installation location

Primary/Secondary switch

When using two of either the 0-10V or DALI control option cards in an ERP48-FT you will need to position the primary secondary prior to startup. The primary secondary switch controls which set of relays responds to which option card.

- When using two different option cards, move the switch to position 1.
- When using two of the same option cards, move the switch to position 2.

With the switch in position one, each card will control the circuits assigned to it, up to 24 circuits.

With the switch in position two, the card connected to the “option 1” connector will control circuits 1-24. The card connected to “option 2” connector will control circuits 25-48.

<table>
<thead>
<tr>
<th>Option Card 1</th>
<th>Option Card 2</th>
<th>Primary/Secondary Switch Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10V (outputs 1-24)</td>
<td>0-10V (outputs 25-48)</td>
<td>Secondary</td>
</tr>
<tr>
<td>DALI (outputs 1-24)</td>
<td>DALI (outputs 25-48)</td>
<td>Secondary</td>
</tr>
<tr>
<td>0-10V (outputs 1-24)</td>
<td>Contact Input</td>
<td>Primary</td>
</tr>
<tr>
<td>DALI (outputs 1-24)</td>
<td>Contact Input</td>
<td>Primary</td>
</tr>
</tbody>
</table>
## Connect data wiring

### Data and Control Wire Specification

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Recommended Cable</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMX In and DMX Pass-Thru (J8 and J9)</td>
<td>Belden 9729</td>
<td>or equivalent (contact ETC for list of equivalents). DMX is RS485 serial and can be installed in series (i.e. daisy-chain) topology.</td>
</tr>
<tr>
<td>ERP-FT-NET (J4)</td>
<td>Belden 1583A (Category 5e or better)</td>
<td>Install per EIA/TIA 568B. Test to TSB 67 standards.</td>
</tr>
<tr>
<td>Emergency In and Out UL 924 emergency Contact Input (J2 and J3)</td>
<td>2 - 1.5mm² (16 AWG), twisted pair</td>
<td>Contact input for UL 924 emergency lighting loads.</td>
</tr>
<tr>
<td>EchoConnect station bus (J6)</td>
<td>Belden 8471 (or equivalent) plus one 14 AWG (2.5mm²) ESD ground wire</td>
<td>Topology-free. The total length of all signal wiring cannot exceed 1,640 feet (500m).</td>
</tr>
<tr>
<td>0-10V Dimming Control (J5)</td>
<td>12-24 AWG (4-.25mm²) Class 1 wire</td>
<td>maximum of 50 ballasts (400mA) per channel</td>
</tr>
<tr>
<td>DALI (J5)</td>
<td>12-24 AWG (4-.25mm²) Class 1 wire</td>
<td>maximum of 64 ballasts per loop</td>
</tr>
</tbody>
</table>

![Diagram of the data wiring connections](image)
DMX Control Wiring and Termination

DMX wire preparation will vary with the type of wire and termination kit being utilized. 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 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 Echo Relay 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 5 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 Pass-Thru 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 relay panel termination board. Data termination eliminates reflections at the end of the DMX data run.

Connect Emergency Contact

The Echo Relay Panel Feedthrough can connect to an external emergency circuit. Emergency can be triggered by a normally open or normally closed contact input. In addition, the relay panel optionally offers a +24Vdc (maximum 25mA) Emergency Out that provides a feed to a lamp or LED, indicating emergency activity.
**Connect Emergency Input**

Step 1: Pull two 16 AWG (1.5mm²) wires from your Emergency contact location to the Echo Relay Panel through conduit. See Cable Routing and Conduit Access on page 14.

Step 2: Strip 3/16” (5mm) of insulation from the ends of each wire.

Step 3: Remove the two pin Emergency Input connector from J2 on the termination I/O board.

Step 4: Loosen the terminal screws.

Step 5: While maintaining the wire twist as close to the connection as possible, insert each wire into the terminals on the connector.

Step 6: Tighten the screws firmly to secure the wires into the connector.

Step 7: Replace the connector to the termination board.

**Determine Emergency Switching**

Step 1: 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)**

Step 1: Pull two 16 AWG (1.5mm²) wires from your external emergency indication lamp to the Echo Relay Panel through conduit. See Cable Routing and Conduit Access on page 11.

Step 2: Strip 3/16” (5mm) of insulation from the ends of each wire.

Step 3: Remove the two pin Emergency Output connector from J3 on the termination I/O board.

Step 4: Loosen the terminal screws.

Step 5: Insert the negative wire into pin 1 and insert the positive wire (this carries 24Vdc, maximum current draw of 25mA, to the lamp) into pin 2 of the terminals on the connector.

Step 6: Tighten the screws firmly to secure the wires into the connector.

Step 7: Replace the connector to the termination board.

**Connect EchoConnect**

EchoConnect is the communication bus that connects the Echo Relay Panel to other Echo native products for configuration of presets, sequence, and level control between devices such as the Echo Preset Stations.

**Using Belden 8471**

Termination is available for up to four separate EchoConnect data runs and is topology-free. EchoConnect includes one pair of wires (data + and data -) plus a separate ESD ground wire. The total combined length of a EchoConnect wire run cannot exceed 1,640 feet (500m), with a maximum distance of 1,313 feet (400m) between any two devices.

For systems utilizing Echo Preset stations, ETC recommends terminating the station data run to the Echo host product 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 may interrupt communication and cause undesirable results.
Step 1: Pull Belden 8471 (or an equal type) control wiring and a 14 AWG (2.5mm²) ground into the Echo Relay Panel through conduit.

Step 2: Strip 5/16” (8mm) of insulation from the ends of each wire pair.

Step 3: Remove the EchoConnect connector (J6) from the termination I/O board.

Step 4: Loosen the terminal screws for as many wire pairs as you are terminating.

Step 5: Insert each white wire (typical) from the pairs into the “+” terminal on the connector and tighten the screws firmly to secure the wire into the connector.

Step 6: Insert each black wire (typical) from the pairs into the “-” terminal on the connector and tighten the screws firmly to secure the wire into the connector.

Step 7: The 14 AWG (2.5mm²) ground wire can terminate in one of three ways:
   • Connected between stations using WAGO Lever-Lock connectors (ETC part number J4629).
   • Grounded to metal conduit.
   • If grounded metal conduit is not installed, connect the ground wire to the Echo Relay Panel ground bus (same as the loads are grounded) and to the green/yellow striped wire connected to the Echo Preset Station using a WAGO Lever-Lock connector. Reference the related station installation instructions for details.

Step 8: Replace the EchoConnect connector to J6 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 1000’ (300m).

To terminate Category 5 cable to the Echo Relay Panel, you will need to use a Unison EchoConnect Cat5 ERP Termination Kit, ETC part# 7186A1208. For instructions on installing this kit, please reference the *Echo Relay Panel Cat5 Termination Kit Installation Guide*. ETC manuals can be downloaded at [www.etcconnect.com](http://www.etcconnect.com).

**Note:** If you are using Cat5 (or Cat5e) wiring, an external Echo Cat5 Termination Box is required. Contact ETC for ordering details. Control wiring instructions between the termination box and this Echo Relay Panel will be provided with the Cat5 Termination Box installation instructions. For restrictions while using
Chapter 3
Final Installation and Power Up

Verify Installation

- Is the Echo 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 17.
  - Are all line and load cables landed to the appropriate relay and secure? See Connect Line and Load Wiring on page 15.
  - 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 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

Step 1: Attach the ground wire with the ring terminal from the chassis to grounding stud on the User Interface panel and secure.
Step 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.
Step 3: Switch all relays to the OFF position.
Step 4: Re-attach the front cover(s) to the unit.

Power Up and Test

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

Step 1: 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 ETC Technical Services at the office nearest you. ETC contact information is located on page 5 of this document.