ETC Installation Guide

EchoDIN Power Control Processor Mk2

Overview

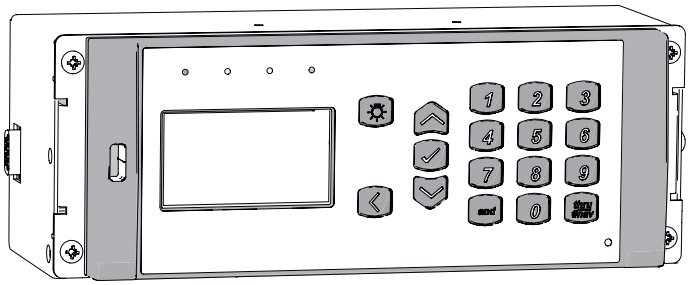
The Power Control Processor Mk2 is the DIN rail mounted user interface for an EchoDIN system. It features up and down arrows for menu navigation, a numeric keypad for direct selection, an easy to read graphical LCD and connections for relay control, Ethernet port on the bottom, USB port on the front left side, and control option cards.

Note: *For EchoDIN, make sure that the PCP-Mk2 has v4.1.0 or later software. For more information on updating software, see the* Power Control Processor Mk2 Configuration Manual *or the most recent software release note.*

Note: *For installation by skilled personnel only.*

Note: *For indoor installation only. The EchoDIN-PCP-Mk2 can be installed in any grounded NEMA style box. ETC recommends using a box with a locking door to reduce electrostatic interference.*

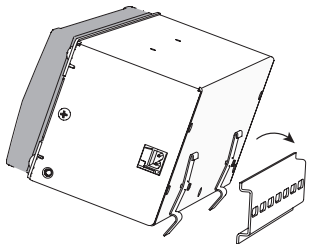
For additional information on programming the EchoDIN-PCP-Mk2, see the Power Control Processor Mk2 Configuration Manual. All ETC documentation is available for free download at etcconnect.com.



Note: *It is best to install the Power Control Processor Mk2 after rough-in, load, and control terminations are complete to reduce the likelihood of damage to the controller.*

Install the Controller

1. Hook top lip of DIN rail mounting clips over the top edge of the DIN rail in the relay panel.
2. Rock the PCP-Mk2 downward and push firmly until the lower portion of the clips are secured behind the lower edge of the DIN rail.



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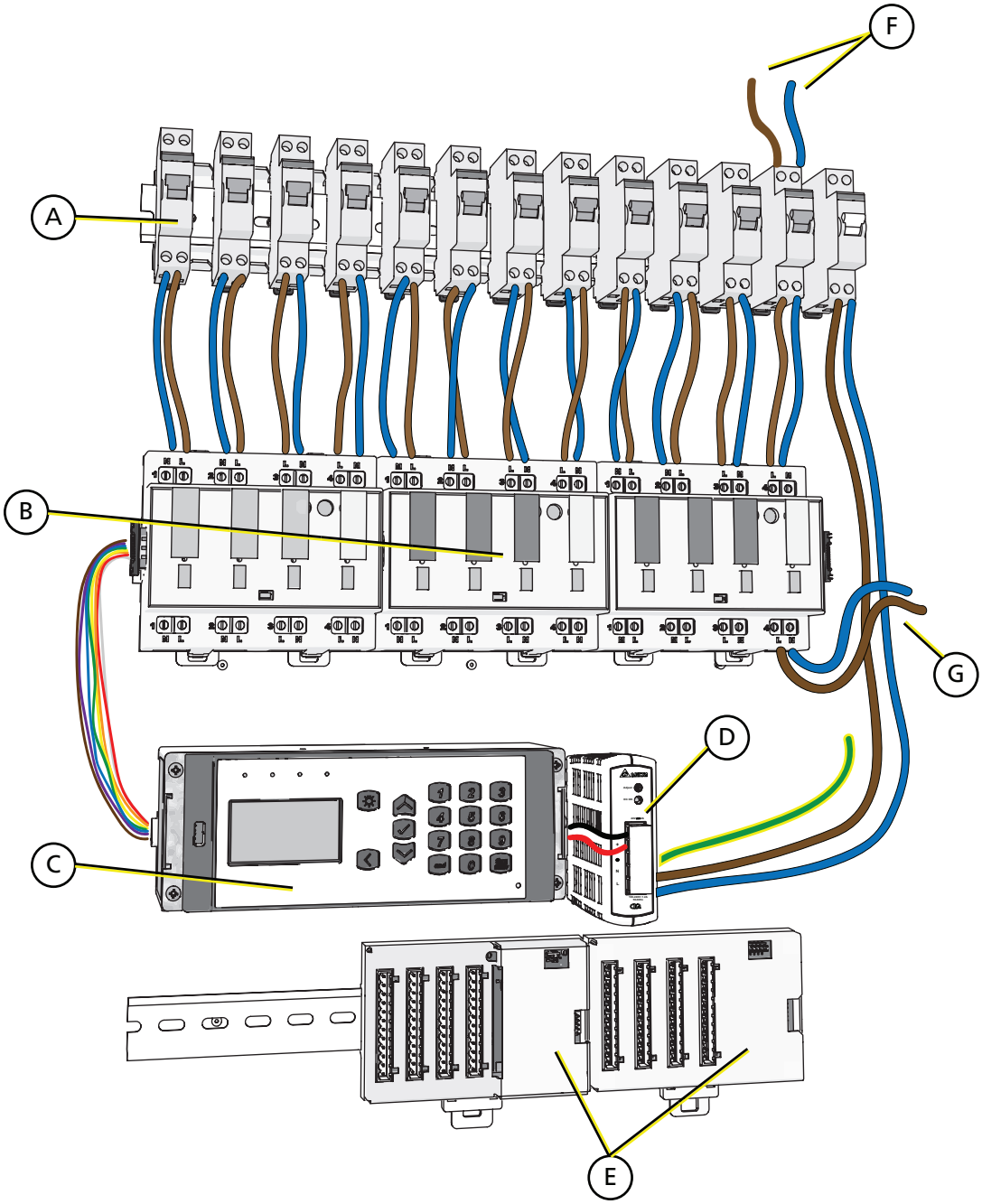
System Overview

The following graphic shows the available components for an EchoDIN system. Not all components need to be installed in a single DIN rail enclosure, but consider harness lengths and maximum data transmission distance when laying out a system. Each component is shipped with an installation manual.



	System Component	ETC Model Number	Wire Specification	Notes
A	EchoDIN breakers: one for the PCP-Mk2 and one for each relay and dimmer are required			
B	EchoDIN relay modules: three modules shown for a total of 12 relays	4x16 A Relay E-DIN-4RELAY	One ribbon cable (not included) is required between the controller and the first power block.	For use with 230 V systems only.
		2x32 A Relay		
C	EchoDIN PCP-Mk2 (User Interface)	PCP-DIN-Mk2		
D	24 VDC power supply	PS435		DIN rail mounted power supply only
E	Option cards: Contact Input Option (shown), 0-10V Option Card (shown), DALI option card (not shown).	E-DIN-CI, E-DIN-LVD, E-DIN-DALI	Harness included with kit	See *Option Cards on page 8*
F	Wiring to the power source			
G	Wiring to the load			
Not shown	RideThru Option	ERP-RTO		
Not shown	2x600 W Dimmer	E-DIN-2DIM	One ribbon cable (not included) is required between the controller and the first power block.	
Not shown	Relay and dimmer control cables	EchoDIN-CC	28 cm (11 in)	Custom lengths up to 20 m can be built upon request
Not shown	Accessory control cables	EchoDIN-OC	61 cm (2 ft)	Custom lengths up to 20 m can be built upon request

Electrical Specifications

Note: *Short circuit protection is required. EN curve "C" circuit breaker rated 16 A or less.*

Electrical Specifications

Rated voltage (U_n)	230 VAC L-N, 400 VAC L-L
Rated operational voltage (U_e)	230/400 VAC
Rated insulation voltage (U_i)	500 VAC
Rated impulse withstand voltage (U_{imp})	2.5 kV
Rated current of the assembly (I_{nA})	4 x 15 A (4x15 A relay module)
	2 x 2.6 A (Dimmer module)
Rated current of a circuit (I_{nc})	15 A (relay module)
	2.6 A (dimmer module)
Rated peak withstand current (I_{pk})	6 kA
Rated short-time withstand current (I_{cw})	6 kA
Rated conditional short circuit current of the assembly (I_{cc})	6 kA
Rated diversity factor (RDF)	0.8
Frequency	50/60 Hz
Pollution degree	2
Earthing system	TN-S, TN-C, TN-C-S
Degree of protection	IP10
EMC classification	Environment "B"
Construction	Open-type assembly

Connect Control Wiring

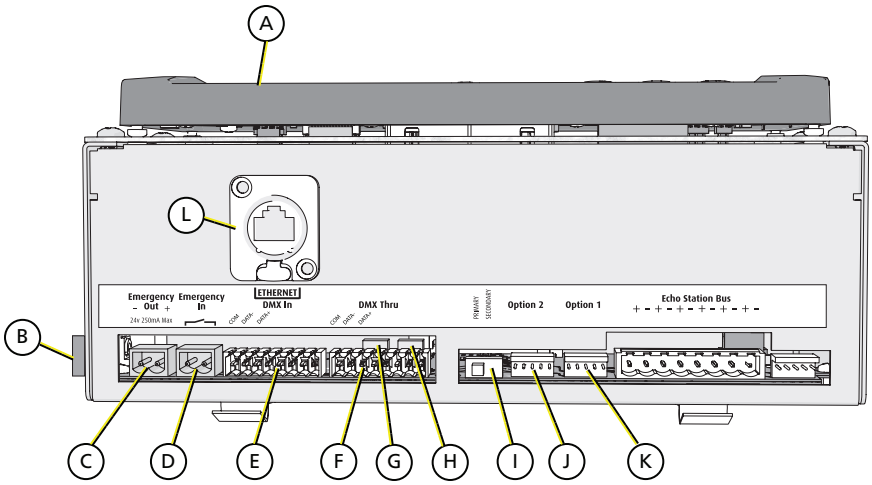
Note: *Short circuit protection is required. EN curve "C" circuit breaker rated 16 A or less.*

Data and Control Wire Specifications

Purpose	Recommended Cable	Notes
DMX In and DMX Thru	Belden 9729	Contact ETC for list of equivalents. DMX is RS485 serial and can be installed in series (i.e. daisy-chain) topology.
Ethernet	Belden 1583A (Category 5e or better)	Install per EIA/TIA 568B. Test to TSB 67 standards.
Emergency In and Out	2–1.5 mm^2 (16 AWG), twisted pair	Contact input for UL 924 emergency lighting loads
Contact Input Option Card	4–0.5 mm^2 (12–18 AWG) wire	Maximum of 24 individual dry contact inputs.
0-10V Dimming Control Option Card	4–0.25 mm^2 (12–24 AWG) wire	Maximum of 50 ballasts (100 mA) per channel
DALI Option Card	4–0.25 mm^2 (12–24 AWG) wire	Maximum of 64 ballasts per loop

ETC Installation Guide
Power Control Processor Mk2

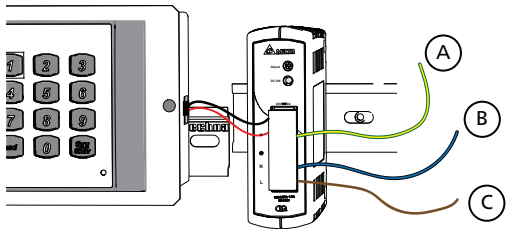
PCP-Mk2 Connections (bottom edge)



A	User Interface	G	S1 switch
B	Relay module control connection	H	S2 switch
C	Emergency Out	I	Primary/Secondary switch
D	Emergency In	J	Option 2
E	DMX In	K	Option 1
F	DMX Thru	L	Ethernet

Install the Power Supply

The wire harness with red and black wires (included) connects the PCP-Mk2 to the power supply. One end of the harness has a connector and the other has bare wires. The wires are pre-stripped to the correct length for termination.

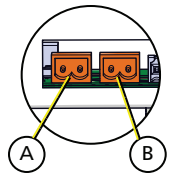


A	Earth/Ground
B	Neutral: to breaker
C	Line: to breaker

1. Pull gently to remove the clear cover on the face of the power supply.
2. Using a small Philips screwdriver, loosen the screw terminals.
3. Insert the black wire into the terminal labeled “-”. Tighten the screw to secure the wire.
4. Insert the red wire into the terminal labeled “+”. Tighten the screw to secure the wire.
5. Insert the earth/ground wire into the terminal labeled ⏚. Tighten the screw to secure the wire.
6. Insert neutral wire (typically blue) into the terminal labeled “N”. Tighten the screw to secure the wire.
7. Insert the Line wire (typically brown) into the terminal labeled “L”. Tighten the screw to secure the wire.
8. Loosen the screw terminals on the dedicated breaker.
9. Insert the loose end of the neutral wire into the terminal labeled “N”. Tighten the screw to secure the wire.
10. Insert the loose end of the line wire into the terminal labeled “L”. Tighten the screw to secure the wire.

Connect an Emergency Contact

The EchoDIN can be connected to an external emergency circuit. Emergency can be triggered by a normally open (NO) or normally closed (NC) contact input. In addition, the PCP-Mk2 offers a +24 VDC (maximum 25 mA) Emergency Out that provides a feed to a lamp or LED, indicating emergency activity.



A	Emergency In
B	Emergency Out

Connect the Emergency Input

1. Pull two 1.5 mm^2 (16 AWG) wires from your Emergency contact location to the EchoDIN through conduit.
2. Strip 5 mm (3/16 in) of insulation from the ends of each wire.
3. Remove the two pin Emergency In connector from J2 on the bottom edge of the Controller.
4. Loosen the terminal screws.
5. While maintaining the wire twist as close to the connection as possible, insert each wire into the terminals on the connector.
6. Tighten the screws firmly to secure the wires into the connector.
7. Replace the connector to the termination board.

Determine Emergency Switching

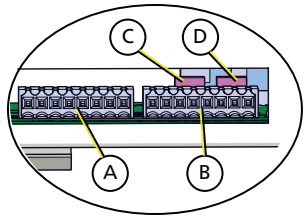
Set the Emergency switch, S2 on the termination I/O board, to indicate the Emergency Input contact closure type: Normally Open Closure (NO), Disabled (Dis), or Normally Closed Closure (NC). The default setting is NO. To change the setting, remove the front cover from the PCP-Mk2 and set the switch to the appropriate position.

Connect the Emergency Output (Optional)

1. Pull two 1.5 mm^2 (16 AWG) wires from your external emergency indication lamp to the Echo Relay Panel through conduit.
2. Strip 5 mm (3/16 in) of insulation from the ends of each wire.
3. Remove the two-pin Emergency Out connector from J3 on the termination I/O board.
4. Loosen the terminal screws.
5. Insert the and insert the negative wire into pin 1 and insert the positive wire (this carries 24 VDC, maximum current draw of 25 mA, to the lamp) into pin 2 of the terminals on the connector.
6. Tighten the screws firmly to secure the wires into the connector.
7. Replace the connector to the termination board.

Connect DMX

DMX termination instructions are included with the DMX termination kit that is included with the PCP-Mk2. The default setting for the DMX termination switch, S1 on the termination I/O board, is Off. When you complete the DMX data connections, you must set the S1 switch to On to properly terminate the DMX line.



A	DMX In
B	DMX Thru
C	S1 switch
D	S2 switch

Note: *The RDM position on the S1 switch is not used.*

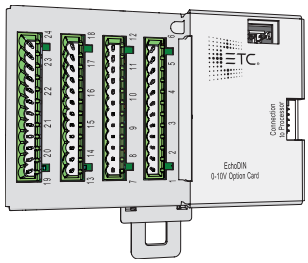
Terminate the Network Connection

The Power Control Processor Mk2 has an integrated network interface.

1. Pull Cat5 cable (or equivalent) to the panel.
2. Leave about 25 cm (10 in) in the panel for connecting and for slack for future service needs.
3. Install an RJ45 connector to the end of the cable following standard CAT5 T568B termination procedures.
4. Plug the connector into the Ethernet port on the controller. See *PCP-Mk2 Connections (bottom edge) on page 5*.
5. Use adhesive wire mounts and wire ties (or other means) to neatly secure the excess cable within the panel.

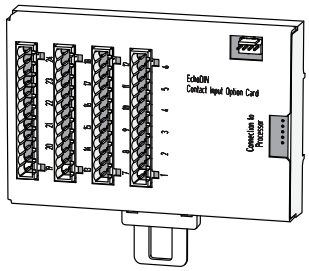
Option Cards

Each option card in the system includes a wire harness for connecting to the PCP-Mk2.



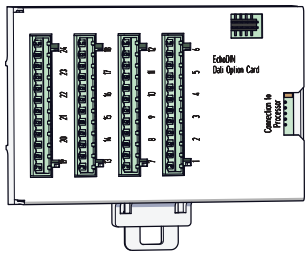
0-10V Option

The EchoDIN 0–10V Option Card (E-DIN-LVD) provides 24 outputs for control of 4-wire current-sink, 0–10 VDC controlled drivers and ballasts.



Contact Input Option

The EchoDIN Contact Input Option Card (E-DIN-CI) provides the ability to directly control relays using a momentary or maintained dry contact input.



DALI Control Option

The EchoDIN DALI Control Option card (E-DIN-DALI) controls 24 loops of 64 DALI compatible fluorescent ballasts in broadcast mode.

Install an Option Card

1. Determine the Primary/Secondary switch setting. See *Primary/Secondary Switch on the facing page*.
2. Install the option card in the enclosure. See *Install the Option Card to DIN rail on page 10*.
3. Connect wiring to the option card. See *Connect Wiring to an Option Card on page 10*.
    - For a Contact Option Card, make sure to program the card. See *Program the Contact Input Card on page 14*.

To remove an option card from Din rail for service or inspection, see *Remove an Option Card from DIN rail on page 14*.

Primary/Secondary Switch

When using a combination of two option cards in an EchoDIN controller, you must position the Primary/Secondary switch prior to startup. The Primary/Secondary switch controls which set of circuits responds to each option card.

Option Card 1 will always control positions 1-24. If the Primary/Secondary switch is in the "Primary" position, Option Card 2 will also control positions 1-24. If the Primary/Secondary switch is in the "Secondary" position, Option Card 2 will control positions 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 (positions 1–24)	-	Primary/Secondary
-	0-10V (positions 1–24)	Primary
-	0-10V (positions 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 (positions 1–24)	0-10V (positions 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:

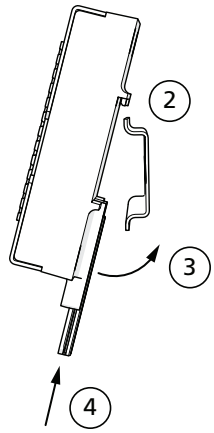
Option Card 1	Option Card 2	Primary/Secondary Switch Position
0-10V (positions 1–24)	Contact Input (positions 1–24)	Primary
Contact Input (positions 1–24)	0-10V (positions 1–24)	Primary
Contact Input (positions 1–24)	0-10V (positions 25–48)	Secondary
DALI (positions 1–24)	Contact Input (positions 1–24)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

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

Install the Option Card to DIN rail

Note: *Install option kits after load and control terminations are complete to reduce the likelihood of damage to the option card.*

1. Pull the locking clip out until it is fully extended.
2. Hook the top lip of the DIN rail mounting clip over the top edge of the DIN rail in the DIN rail enclosure.
3. Rock the option card downward so it is pressed flat against the DIN rail.
4. Push the locking clip up into place securing the option card onto the DIN rail.



Connect Wiring to an Option Card

- *Connect Wiring to the 0–10V Option Card below*
- *Connect Wiring to the DALI Option Card on page 12*
- *Connect Wiring to the Contact Input Option Card on page 13*

Connect Wiring to the 0–10V Option Card

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.

Each channel output is linked with a relay circuit for power control. Linking relays to outputs is done in the User Interface of the Power Control Processor Mk2. See the *PCP-Mk2 Configuration Manual* for more information.

A single card contains four connectors with six terminations each, for a total of 24 outputs. Each of the 24 outputs are rated to control a maximum of 100 mA per channel (up to 50 ballasts).

Each output connection is clearly labeled on the cover of the option card. Each of the four header connectors accepts 4–0.25 mm^2 wire.

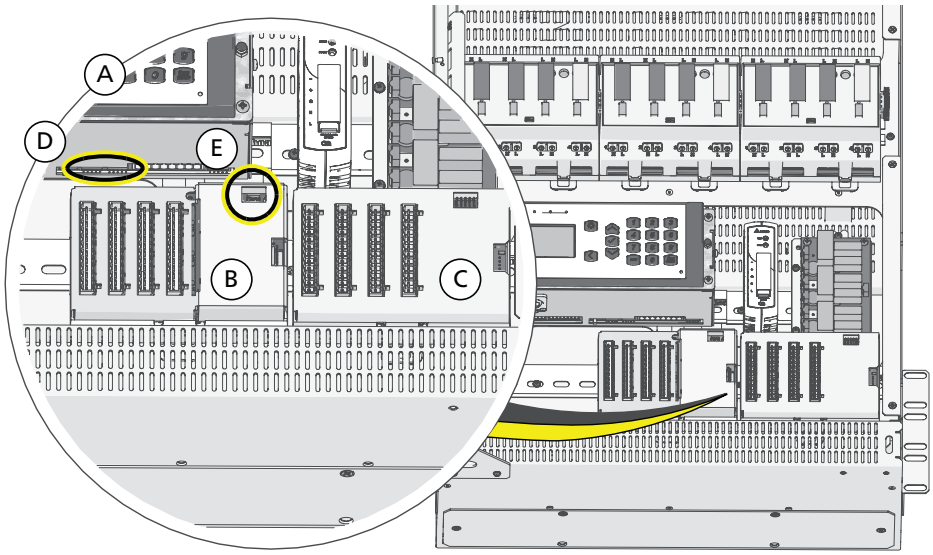
Note: *By default the associated output loop terminal number matches the relay circuit number inside the relay panel.*

*For example: If relay 1 is connected to a 4-wire dimmer ballast, the control wiring would terminate to the E-DIN-LVD option board output terminals labeled "+ 1 -". See the*Power Control Processor Mk2 Configuration Manual *for information on linking outputs to circuits.*

1. Pull the 0–10 V control wiring pairs into the DIN rail enclosure (typically gray and purple).
2. Strip the insulation from each wire pair back 6 mm.

3. Notice each connector is labeled for your wire termination reference. Using a 3 mm 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 to the power circuit.
   b. Terminate the gray (typical) control wire of the first pair into the - terminal associated to the power circuit.
   c. Tighten each screw terminal until the wire is secure.
4. Repeat steps 1–3 for the remaining outputs in the panel.
5. Noting the connector orientation, plug one end of the supplied wire harness into the five pin connector on the upper right corner of the option card.
6. Noting the connector orientation, plug the other end of the wire harness into the "Option 1" or "Option 2" connector labeled on the lower edge of the EchoDINcontroller.

Note: *It is not a requirement that system components be housed in a single DIN rail enclosure. The graphic below shows the PCP-Mk2, option cards, and power supply in the same DIN rail enclosure for clarity.*



A	PCP-Mk2	D	PCP-Mk2 option card connection
B	0–10 V option card	E	Option card connection
C	DALI option card or Contact Input option card		

See *Connect Control Wiring on page 4* for a detailed view of connections on the bottom of the PCP-Mk2.

Connect Wiring to the DALI Option Card

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

E-DIN-DALI can control up to 24 loops of 64 DALI-compatible ballasts.

Each output connection is clearly labeled on the cover of the option card. Each of the four header connectors accepts 4–0.25 mm^2 (12–24 AWG) wire. A screw connector is provided for each bus and is labeled for ease of identification of each output.

Programming of outputs to circuits is done through the PCP-Mk2. See the *Power Control Processor Mk2 Configuration Manual* for additional information.

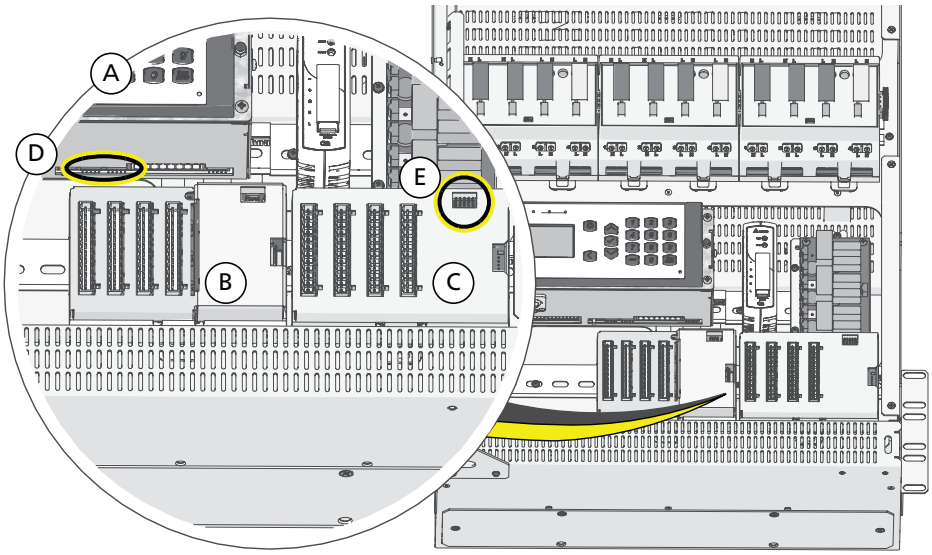
Note: *By default the associated output loop terminal number matches the relay circuit number inside the relay panel.*

*For example: If relay 1 is connected to a DALI ballast load, control wiring would terminate to the ERP-DALI option board output terminals labeled "+ 1 -". See the*Power Control Processor Mk2 Configuration Manual *for information on linking outputs to circuits.*

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

1. Pull DALI ballast control wiring pairs into the DIN rail enclosure.
2. Strip the insulation from each wire pair back 6 mm.
3. Notice each connector is labeled for your wire termination reference. Using a 3 mm 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.
4. Tighten each screw terminal until the wire is secure.
5. Repeat steps 1–4 for the remaining outputs in the panel.
   - Connect up to 24 DALI loops per system
6. Noting the connector orientation, plug one end of the supplied wire harness into the five pin connector on the upper right corner of the option card.
7. Noting the connector orientation, plug the other end of the wire harness into the "Option 1" or "Option 2" connector labeled on the lower edge of the EchoDINcontroller.

Note: *It is not a requirement that system components be housed in a single DIN rail enclosure. The graphic below shows the PCP-Mk2, option cards, and power supply in the same DIN rail enclosure for clarity.*



A	PCP-Mk2	D	PCP-Mk2 option card connection
B	0–10 V option card	E	Option card connection
C	DALI option card		

See *Connect Control Wiring on page 4* for a detailed view of connections on the bottom of the PCP-Mk2.

Connect Wiring to the Contact Input Option Card

The contact input card provides four connectors for termination of up to 24 individual dry contact inputs. A screw terminal is provided for each input and accepts 4–0.5 mm^2 wire. Each connector is labeled to assist in referencing during termination.

Note: *Control wiring must be routed in separate conduit.*

1. Pull wire from the device supplying the contact closure into the DIN rail box that houses the option card.
2. Strip the insulation from each wire pair back 6 mm.
3. Notice each connector is labeled for your wire termination reference. Using a 3 mm 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.
4. Tighten each screw terminal until the wire is secure.
5. Repeat steps 1–4 for the remaining dry contact closures.
6. Noting the connector orientation, plug one end of the supplied wire harness into the five pin connector on the upper right corner of the option card.
7. Noting the connector orientation, plug the other end of the wire harness into the "Option 1" or "Option 2" connector labeled on the lower edge of the EchoDINcontroller.

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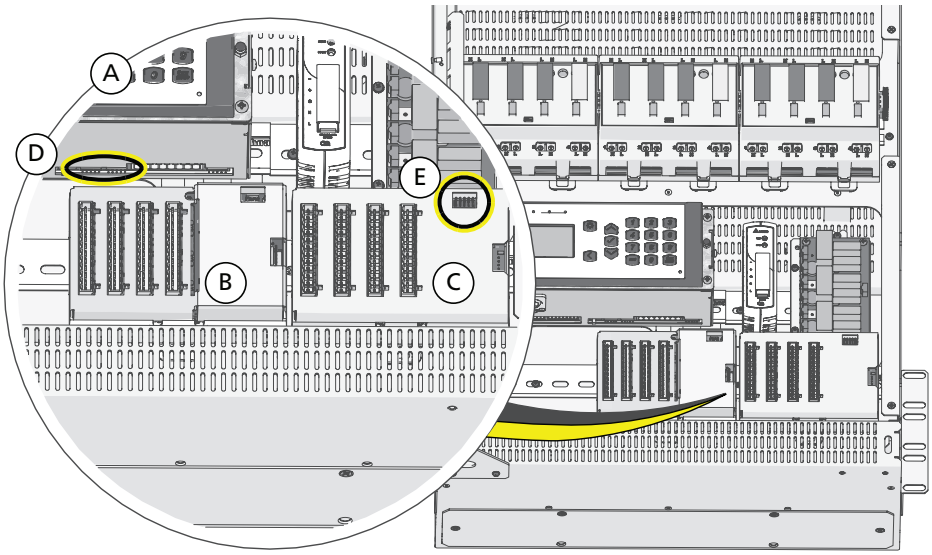

A	PCP-Mk2	D	PCP-Mk2 option card connection
B	0–10 V option card	E	Option card connection
C	Contact Input option card		

See *Connect Control Wiring on page 4* for a detailed view of connections on the bottom of the PCP-Mk2.

Program the Contact Input Card

The E-DIN-CI is programmable through the relay panel's user interface. This setting determines how each relay responds to a dry contact input signal.

1. When in the Main Menu, select Switching Setup.
2. Within the Switching Setup menu, select Relay Setup. When the Contact Input card is installed, you will have the following options within the Switching Setup menu.
   - NO: Normally Open (the default). If the contact is closed, the relay is Closed/On, if the contact is opened, the relay is Open/Off.
   - NC: Normally Closed. If the contact is opened, the relay will be Closed/On, if the contact is closed, the relay will be Open/Off.
   - Momentary: Closure of the contact toggles the state of the relay.
   - Disabled: Contact input is disabled when there is no contact input source available for the circuit.

For additional information on Contact Input card setup and programming, see the*Power Control Processor Mk2 Configuration Manual*. ETC manuals are available for free download at etcconnect.com.

Remove an Option Card from DIN rail

If you need to remove an option card for service or inspection, follow these steps:

1. Remove any headers or wires plugged into the option card.
2. Insert a flatblade screwdriver into the DIN rail locking clip and pry it downward. This releases the option card from the DIN rail.
3. Rock the option card forward and off of the DIN rail.

Compliance

For complete product documentation, including compliance documentation, visit etcconnect.com/products.