

DRd Rack Enclosure Installation Manual

Revision C

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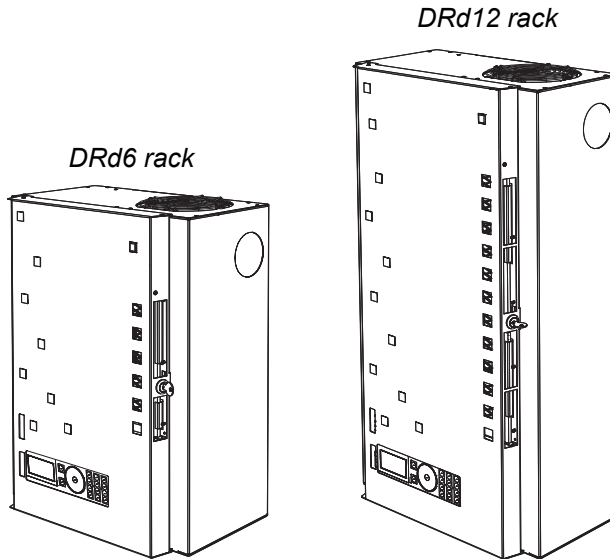
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Introduction

Welcome to the installation manual for Unison® DRd rack enclosures. This manual contains the procedures for safe and efficient installation of your DRd rack enclosure and related rack terminations.

Use this manual in conjunction with the *Unison Auxiliary Rack Enclosure Installation Manual* when your DRd rack is to be installed with an adjoining auxiliary rack enclosure.



DRd Series Rack Enclosures

Series	Voltage	Notes
DRd6-12-120 DRd6-12-240 DRd6-12-230 DRd6-12-277	120/208 VAC 240/415 VAC 230/400 VAC CE Neutral Disconnect 277/480 VAC	6 module rack enclosure for up to 12 circuits.
DRd12-24-120 DRd12-24-240 DRd12-24-230 DRd12-24-277	120/208 VAC 240/415 VAC 230/400 VAC CE Neutral Disconnect 277/480 VAC	12 module rack enclosure for up to 24 circuits.
DRd12-48-120 DRd12-48-240 DRd12-48-277	120/208 VAC 240/415 VAC 277/480 VAC	Two 12 module rack enclosures for up to 48 circuits. DRd12-48 racks are cross-bussed using the AX12X series main lug or main breaker enclosure.

Warnings and Notice Conventions

These symbols are used throughout this installation manual to alert you to danger or important information:



Note: *Notes are helpful hints or 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 death by electric shock.*

Contacting ETC

For questions about Unison system delivery, contact ETC Systems Group. For general information, your most convenient resources are the references provided in this manual. To search more widely try the ETC web site at www.etconnect.com.

For technical questions about Unison systems, contact ETC Technical Services directly at one of the offices listed below. Emergency service is available from all ETC offices outside of normal business hours. When calling for assistance, please have the following information handy:

- Your location and job name.
- A complete list of ETC equipment.
- A complete list of other installed products and components connected to the system you are troubleshooting.
- DMX control source, if any.

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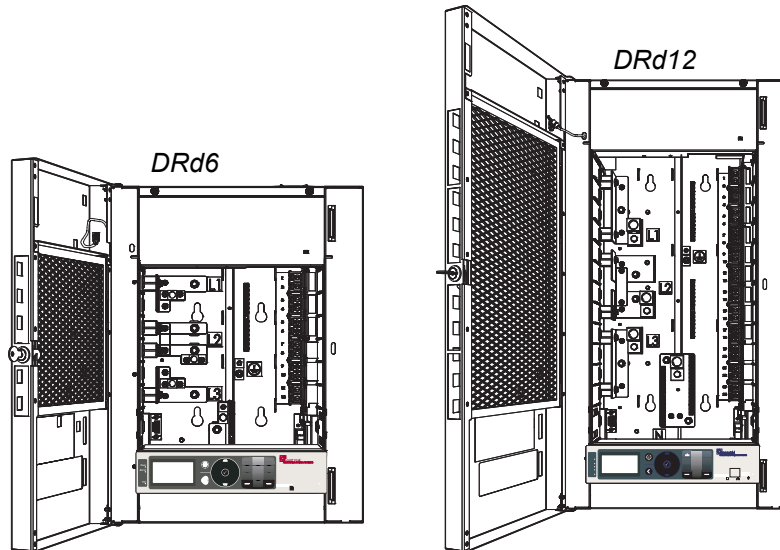
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DRd Rack Components

Unison DRd racks are available in 6 or 12 module enclosures and are available for an input voltage range of 85-300 VAC, 47-63 Hz. Racks are pre-wired and supplied with three phase, 4 wire and ground, main lugs which are easily converted for split phase, 3 wire and ground, operation without the need for additional materials.



DRd racks are available in 12, 24 and 48 circuit configurations.



Note:

In 48-circuit configurations, two DRd12-24 rack enclosures are cross-bussed to an AX12X series main lug or main circuit breaker auxiliary rack enclosure. A single Architectural Control Processor (SmartLink ACP or Paradigm ACP) provides control for both racks.

DRd rack enclosures are supplied pre-wired for the specified voltage for your installation. All rack enclosures operate at specified voltages within a frequency range of 47-63 Hz. Phases within the rack enclosure may be bused together provided the maximum supplied current does not exceed that of a three phase connection.

- 100 / 200 VAC, 47-63 Hz, 1Ø
- 100 / 173 VAC, 47-63 Hz, 3Ø
- 120 / 208 VAC, 47-63 Hz, 3Ø
- 120 / 240 VAC, 47-63 Hz, 1Ø
- 127 / 220 VAC, 47-63 Hz, 3Ø
- 230 / 400 VAC, 47-63 Hz, 3Ø CE with Neutral Disconnect
- 240 / 415 VAC, 47-63 Hz, 3Ø
- 277 / 480 VAC, 47-63 Hz, 3Ø
- Supports universal dimmer modules, fluorescent dimmer modules, constant circuit breaker modules, relay modules, and reverse phase dimmer modules. Reference [“Modules Specification”](#), [page 56](#) for a complete list of compatible modules.
- The DRd rack is controlled from either the SmartLink® Architectural Control Processor (S-ACP) or the Paradigm™ Architectural Control Processor (P-ACP).

- The use of a station power module provides power and control for architectural control stations.
 - Use a SmartLink station power module (S-SPM) in a DRd rack enclosure to provide power for up to 16 SmartLink architectural control stations when used with the SmartLink ACP.
 - Use a Paradigm station power module (P-SPM) in a DRd rack enclosure to provide power for up to 32 Unison architectural control stations when used with the Paradigm ACP.
- The fluorescent option board (DRd-FLO) provides up to 24 outputs for control of 4-wire (0-10 Vdc) fluorescent ballasts (up to 12 on a DRd6).
- The digital addressable lighting interface (DALI) option kit (DRd-DALI) controls 24 loops of 64 DALI compatible fluorescent ballasts in a broadcast mode.
- The Unison battery pack option kit (UBPO) provides power back-up to the Architectural Control Processor in the rack for a period up to 90 minutes.
- The Unison ride through option kit (URTO) provides power to the Architectural Control Processor in the rack for a limited time (up to 10 seconds) during brief power outages or drop outs.
- All empty module spaces in a DRd rack enclosure must be filled with airflow module (AFM) or blank modules (DRd-BM) for proper rack cooling.
- The DRd pedestal (DRd-PED) is a floor mounting stand for the DRd rack enclosure.

Chapter 1

Prepare for Installation

Unpack and Inspect

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

- Step 1: Check the shipping container for physical damage.
- Step 2: If you find damage, document it to help with a claim against your shipper.
- Step 3: Unpack your order and check the contents against the packing list to be sure your order is complete.
- Step 4: If you discover a problem, call the ETC Systems Group the closest office of purchase. [See “Contacting ETC” on page 2.](#)

Main Circuit Breaker Protection

Before you begin installing the Unison® rack enclosure, make sure you have installed a main circuit breaker cabinet or other readily accessible input power disconnect device. In certain bussed and cross-bussed systems, this disconnect device may be the Unison AX series auxiliary rack with a main circuit breaker.



WARNING: *Rack enclosures installed without an accessible power disconnect device cannot be serviced or operated safely. Follow all local codes and restrictions.*

Before removing dimmer or control modules for service, de-energize main feed to dimmer rack and follow appropriate Lockout/Tagout procedures as described in NFPA Standard 70E. It is important to note that electrical equipment such as dimmer racks 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.

Using 90° Copper Wire

To comply with UL requirements:

Use Copper Conductors Only, the torque rating for each Non-Class 2 field-wire connector, and “Use 90°C conductors at the 75°C Ampacities”, where readily visible in the field wiring compartment; Class 2 adjacent to each Class 2, field-wiring connector.

Use only 90°C-rated copper wiring installed in accordance with all applicable local electrical codes.



CAUTION: *A two-wire circuit with separate hot and neutral conductors is required for every branch circuit that will be connected to the DRd rack enclosure. Shared neutral (multi-wire) branch circuit arrangements are not recommended for phase control dimming systems due to harmonics and potentially elevated neutral currents in a shared neutral arrangement.*

For retrofit installations where shared neutral circuits are already installed, or track lighting installations where the track has a shared neutral, consult ETC Technical Services for installation guidelines.

Maximum Current Draw of Racks

Rack Type	Phase Type	Maximum Current Draw	Suggested Breaker Rating
DRd6	Single Phase (1Ø)	120A	150A
	Three Phase (3Ø)	80A	100A
AX6	Single Phase (1Ø)	120A ¹	150A ³
	Three Phase (3Ø)	80A ¹	100A ³
DRd12	Single Phase (1Ø)	240A	300A
	Three Phase (3Ø)	160A	200A
AX12	Single Phase (1Ø)	240A ¹	300A ³
	Three Phase (3Ø)	160A ¹	200A ³
AX12X	Single Phase (1Ø)	480A ²	400A ⁴
	Three Phase (3Ø)	320A ²	400A ³



Note:

¹ Connected to DRd rack enclosure with a full complement of 20A modules.

² Connected to two DRd rack enclosures with a full complement of 20A modules.

³ Installed in a main circuit breaker (MCB) model auxiliary rack.

⁴ Wire bending space limits the feed to the AX12X-MCB rack to 400A maximum. ETC installs a 100% rated two pole breaker (or two poles from a three pole breaker) in the AX12X-MCB, for a total deliverable current of 400A in a single phase (split phase) configuration.

Short Circuit Current Rating (SCCR)

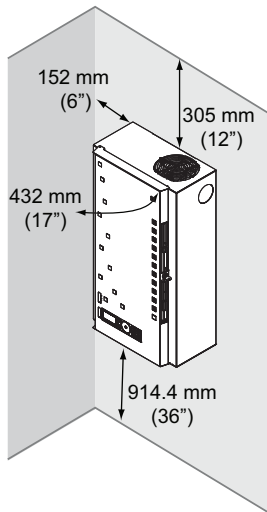
Rack Configuration	SCCR at 100-120 VAC	SCCR at 240 & 277 VAC
DRd6	22,000A	22,000A
DRd6 with AX6 rack (MCB)	100,000A	65,000A
DRd12	22,000A	22,000A
DRd12 with AX12 Main Lug rack	22,000A	22,000A
DRd12 with AX12X (cross-bussed) Main Lug rack	22,000A	22,000A
DRd12 with AX12 Main Circuit breaker	100,000A	65,000A
DRd12 with AX12X Main Circuit breaker	100,000A	65,000A

Where to Install the Rack Enclosure

Unison DRd rack enclosures are designed to be surface mounted on load bearing walls in an electrical closet or a room with restricted public access. It is recommended that you install the rack at least 36" (915mm) off the floor surface to ensure clear view of the Architectural Control Processor (S-ACP or P-ACP) for programming and operation. Alternatively, DRd racks may install to a floor standing pedestal (model DRd-Ped).

Clearance Requirements

Unison dimmer racks require 12" (305mm) top clearance for proper airflow through the cabinet. For sufficient door clearance, install the rack with at least 17" (432mm) of front clearance and a 6" (152mm) clearance to the left of the door hinge from walls or other equipment.



Note:

Additional Unison® dimming and auxiliary racks of the same size are the exception to the 6" (152mm) hinge side clearance rule. Unison racks are designed for side by side use without issue.

Rack Dimensions and Weights

Rack Type	Height		Width		Depth		Product Weight		Shipping Weight	
	inches	mm	inches	mm	inches	mm	lbs	kgs	lbs	kgs
DRd6 rack	21.8	553	17	431	10	254	37.8	17.2	42	19.0
DRd12 rack	31	787	17	431	10	254	51	23.1	55	25



Note:

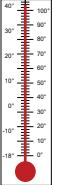
For module weight please reference [Modules Specification, page 56](#).

Installation Environment Requirements

- For your own safety, install a main circuit breaker cabinet or other readily accessible input power disconnect device in the same area as the Unison DRd rack enclosure. For cross-bussed rack installations, this device may be the auxiliary rack. Main breakers not in the same room must have a physical means to be locked off. ETC recommends adopting lockout / tagout procedures for your facility and follow appropriate Lockout/ Tagout procedures as described in NFPA Standard 70E.
- A clean (not dusty) temperature-controlled environment with an ambient temperature of 32-104°F / 0-40°C and ambient humidity of 10-90%, non-condensing.



CAUTION: *HVAC systems must at all times maintain the specified ambient temperature at the rack. Dimming systems operating within 10°F (5°C) of the upper or lower temperature limits must strictly follow installation and operation guidelines to operate reliably.*



- Restricted public access to prevent tampering.
- Soundproofing or performance area separation to muffle ventilation fan noise is recommended.
- All CE equipment is tested to EMC category B environment.

Wire Routing and Specification

When planning wire entry into the rack, notice that conduit knockouts are provided only on the sides of the unit. These knockouts are primarily used for bussing to an auxiliary rack but may also be used for load or control wiring. Signal and power wiring must be run in separate conduit per local code.

Due to the bend radii of certain size line feed wires and the location of terminations, special attention is required for line feed wire entry. Reference the rack wiring guidelines below for recommendations.



CAUTION: *Do not route line (input feed) wires through the back panel. Doing so requires bend radii that violate NEC code, UL standards and because of undue stress at the wire joint is likely to create a poor connection.*

Line and load wire used with Unison rack enclosures must be copper. Load wires may either be stranded (preferred) or solid core. The use of aluminum wire is not allowed in DRd rack enclosures.

Aluminum feed wires are supported only in the auxiliary (AX Series) rack enclosures.

100-127 VAC DRd Rack Enclosure

Wire Access Location	Wire Size			
	DRd12 Feed (max) 350 Kcmil 185mm ²	DRd6 Feed (max) 2/0-3 70mm ²	Load Wires 12 - 6AWG 2.5 - 16mm ²	Control Wires
Top of rack	acceptable	acceptable	acceptable	acceptable
Bottom of rack	acceptable	acceptable	acceptable	preferred
Left side	Do Not Use	Do Not Use	acceptable	acceptable
Right side	Do Not Use	Do Not Use	acceptable	acceptable



Note: Split phase applications require a simple field adjustment to the phase bussing. See "Modify Phase Bus for 120 VAC Split Phase Operation" on page 19.

230 VAC DRd Rack Enclosure

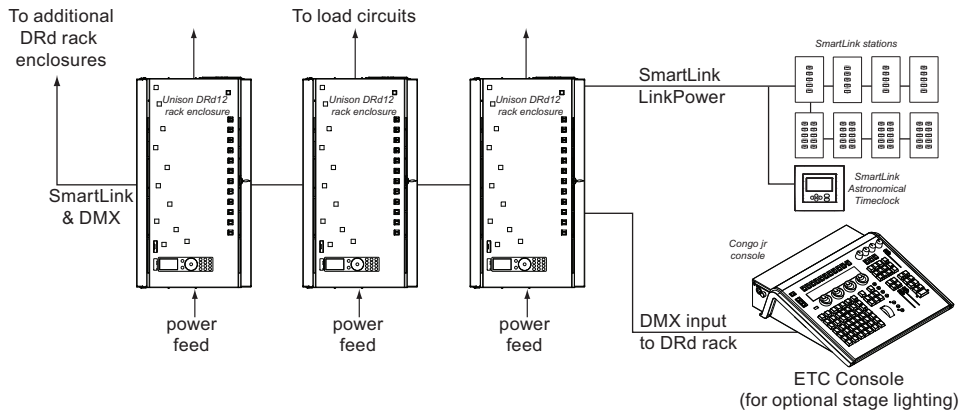
Wire Access Location	Wire Size			
	Feed (max) 350 Kcmil 185mm ²	DRd6 Feed (max) 250 Kcmil 120mm ²	Load Wires 12 - 6AWG 2.5 - 16mm ²	Control Wires
Top of rack	acceptable	acceptable	acceptable	acceptable
Bottom of rack	acceptable	acceptable	acceptable	preferred
Left side	Do Not Use	Do Not Use	acceptable	acceptable
Right side	Do Not Use	Do Not Use	acceptable	acceptable

240, 277 VAC DRd Rack Enclosure

Wire Access Location	Wire Size			
	DRd12 Feed (max) 250 Kcmil 120mm ²	DRd6 Feed (max) 2/0-3 70mm ²	Load Wires 12 - 6AWG 2.5 - 16mm ²	Control Wires
Top of rack	acceptable	acceptable	acceptable	acceptable
Bottom of rack	acceptable	acceptable	acceptable	preferred
Left side	Do Not Use	Do Not Use	acceptable	acceptable
Right side	Do Not Use	Do Not Use	acceptable	acceptable

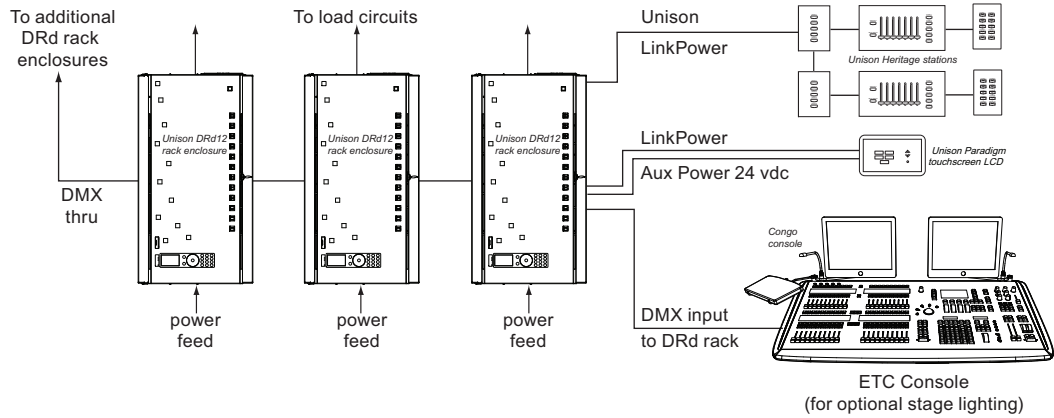
Control Specifications

The riser below is typical of a small Unison system utilizing SmartLink Architectural Control Processors (S-ACP) for control and SmartLink architectural control stations for preset recall and sequence activation. A DMX input into the DRd racks provide an additional level of system control and integrates the architectural and theatrical lighting control systems.



Note: DRd rack enclosures are shipped with the lugs installed in a top feed orientation by default. You may change the lug orientation to a bottom feed as needed.

The riser below is typical of a Unison system utilizing Paradigm Architectural Control Processors (P-ACP) for control and Unison architectural control stations for user controls. Paradigm systems provide a DMX input into the system for larger system integration and control. A Paradigm system also utilizes Net3 networking for an additional level of system wide control.



Note: DRd rack enclosures are shipped with the lugs installed in a top feed orientation by default. You may change the lug orientation to a bottom feed as needed.

Control Wire Specification

The following table lists the recommended control wire types used in Unison DRd rack installations and the maximum length (aggregate) of wire runs allowed.

Purpose	LinkPower (Belden 8471)		Aux 24 Vdc (2)#16 AWG and larger		DMX (Belden 9729)		Category 5 / Belden 1583a	
	Feet	Meter	Feet	Meter	Feet	Meter	Feet	Meter
Total length of control wire (without repeater module)	1640	500	1500	457	1600	487	328	100
Maximum wire length (station to station)	1312	400	1312	400	1600	487	N/A	N/A
Maximum repeater distance	1640	500	1500	457	N/A	N/A	N/A	N/A

Data Types and Topologies

LinkConnect with LinkPower

LinkConnect is the station communication bus from the Architectural Control Processor to the stations. LinkConnect is based on Echelon[®] LonWorks[™] with LinkPower bidirectional protocol, and uses one pair of wires (data +, data -). You should pull an additional 14 AWG (1.5mm²) wire for grounding when not installed in grounded metal conduit.

ETC uses two types of LinkConnect networks, for SmartLink and Paradigm systems. While the wiring for LinkConnect in SmartLink and Paradigm systems are the same, the two communication and control types are not interchangeable. SmartLink products are compatible only with the SmartLink ACP, SmartLink station power module, and SmartLink architectural control stations. Paradigm products are compatible only with the Paradigm ACP, Paradigm station power modules, Unison Heritage architectural control stations, and Paradigm touchscreens.

Throughout this manual LinkConnect is referred to by the protocol it uses, LinkPower.

LinkPower is topology-free and polarity independent, you can install your LinkPower data runs in any desired combination of bus, loop, star, and home run. ETC recommends the use of Belden 8471 (or approved equal) wire. The total combined length of a LinkPower wire run cannot exceed 1,640 feet (500m) with a maximum distance of 1,312 feet (400m) between any two devices.



Note:

Repeater modules may be used to extend the Unison LinkPower station data bus an additional 1,640 feet (500m) total wire, with a maximum distance of 1,312 feet (400m) between any two devices.

Auxiliary 24 Vdc

Auxiliary power is required when you are installing powered Unison control stations. ETC recommends using two 16 AWG stranded wires for 24 Vdc auxiliary power to the control station(s). Auxiliary power is topology-free.



Note:

It is required that you terminate SmartLink / LinkPower station wiring and the auxiliary power wiring in the rack with the station power module installed.

DMX (Digital Multiplex)

DMX can address up to 512 channels of control. DMX is installed in a daisy chain topology and includes one pair of wires (data +, data -) plus an ISO ground. ETC recommends the use of Belden 9729 (or approved equal) wire with a single end of line termination (90-150Ω). For best DMX performance, twist the wires together as close to the pluggable connector as possible.

Chapter 2

Install Rack Enclosures

This chapter contains instructions for installation of the DRd rack enclosure.

This chapter contains the following sections:

- ***Mounting Individual DRd Rack Enclosures***13
- ***Mounting a DRd Rack Enclosure on a Pedestal***14
- ***Mounting Auxiliary and DRd Rack Enclosures Together***15

Mounting Individual DRd Rack Enclosures

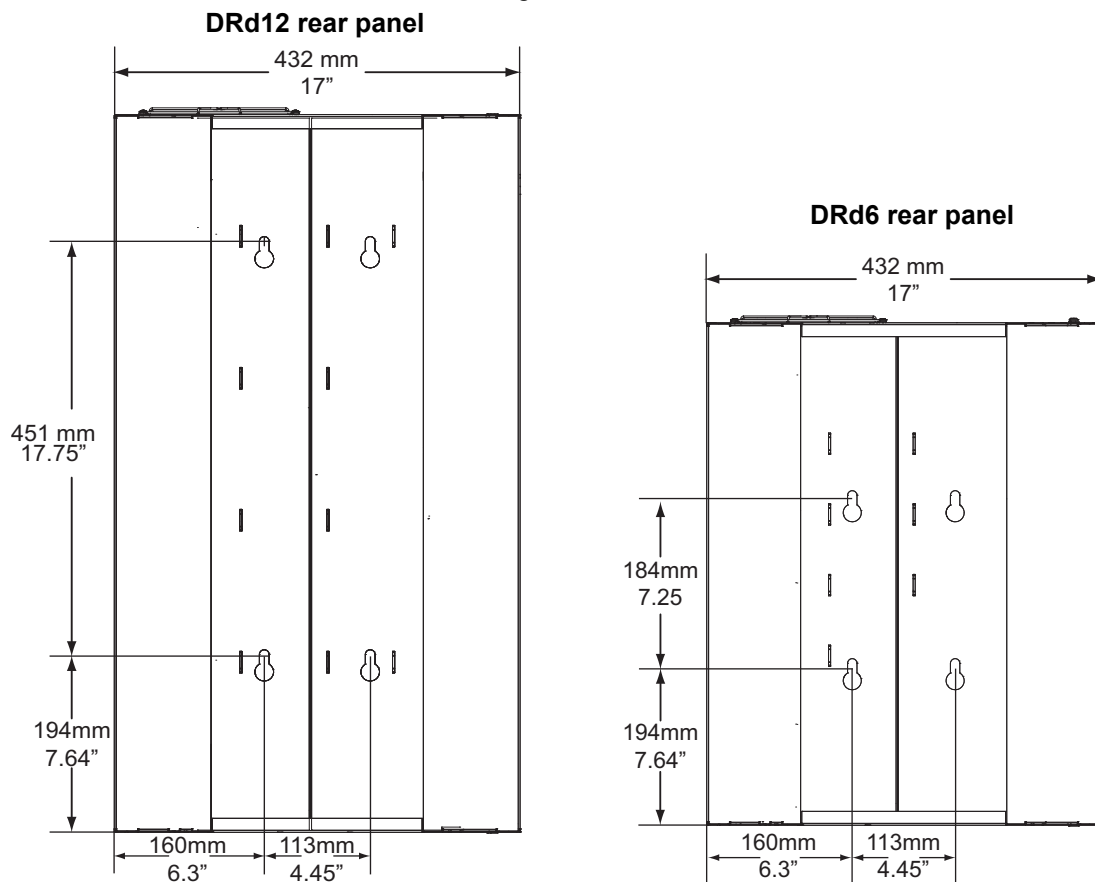
Unison DRd rack enclosures are designed to be surface mounted on load bearing walls in an electrical closet or a room with restricted public access. Alternatively the DRd rack may be mounted on a pedestal (DRd-Ped). It is recommended that rack enclosures installed on the pedestal floor stand also be secured to the wall for greater stability.

Mounting Individual Racks on a Wall

The wall must be strong enough to hold the rack fully populated with modules, conduit and wire. See [“Rack Dimensions and Weights,” on page 7](#) and [“Modules Specification,” on page 56](#).

Step 1: Determine where your rack will be installed using the weight and dimension requirements detailed in [“Where to Install the Rack Enclosure,” page 7](#).

Step 2: Use the measured slot dimensions located in the graphic below to mark the hole locations for the mounting hardware.



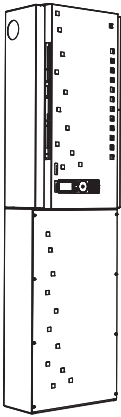
Step 3: Drill the holes and install the mounting hardware for each rack.

- Four 3/8" (M8-M10) bolts or screws 2-4" (50-100mm) long, and suitable wall plugs are suggested mounting hardware (lag bolts recommended).
- Both the surface and the mounting hardware must support the weight of the rack unit fully populated with modules.
- Expose at least 1" (25mm) of threads for mounting the rack.

Step 4: Attach the rack enclosure to the wall.

Step 5: Check that the rack is level and plumb and tighten the mounting hardware.

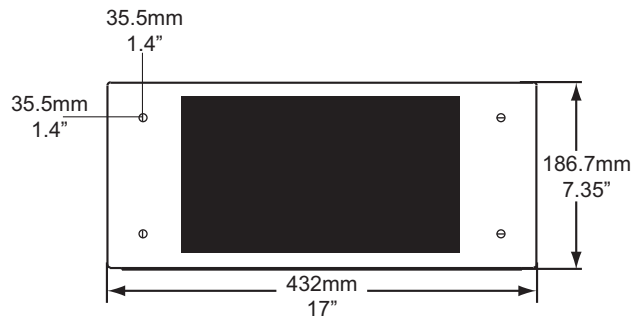
Mounting a DRd Rack Enclosure on a Pedestal



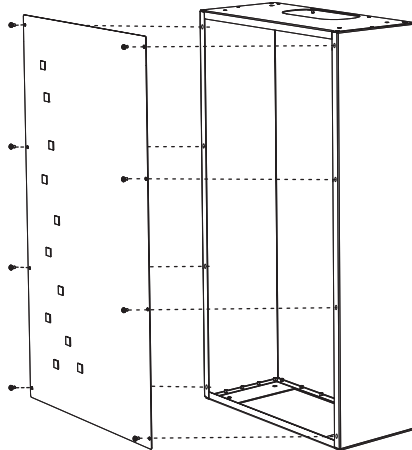
The Unison DRd rack pedestal is designed with the same footprint as the Unison dimmer rack. The acceptable conduit access in the bottom of the DRd rack overlaps the floor stand access panel for contractor wiring and installation convenience. It is recommended to secure a DRd rack installed on a pedestal to a wall for greater stability.

Step 1: Use the measured dimensions in the graphic (right) to mark the hole locations for the floor mounting hardware.

Step 2: Drill holes for floor mounting hardware.



Step 3: Remove the eight screws and washers that secure the front panel to the unit.



Step 4: Position the floor stand on floor hardware previously placed for marking the holes.

Step 5: Secure the pedestal base to the floor.

Step 6: Create conduit access in the bottom of the DRd rack. Notice the label inside the bottom of the rack indicating the recommended locations for conduit access. Do not create conduit access outside of the recommended locations.

Step 7: Position the DRd rack on the floor stand pedestal and align with the mounting holes provided.

Step 8: Bolt the rack into place.

Step 9: Reinstall the front panel to the pedestal unit, replacing all hardware removed in step 3.

Mounting Auxiliary and DRd Rack Enclosures Together

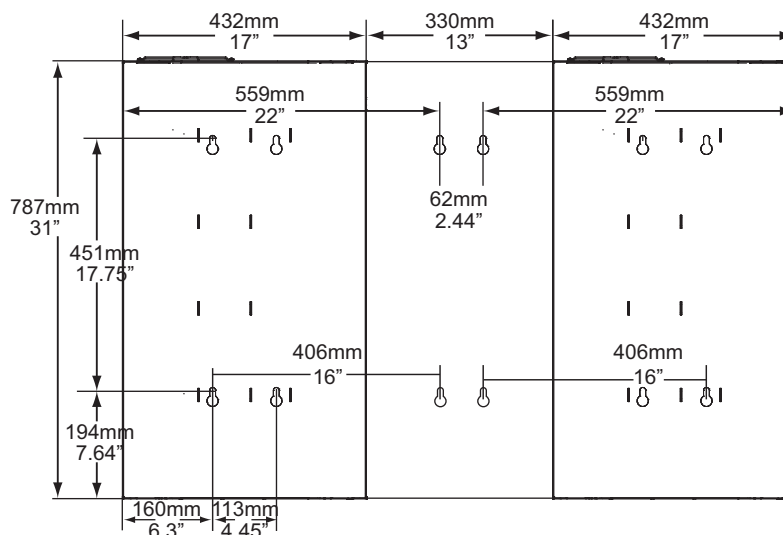
Unison DRd and AX auxiliary rack enclosures are designed to be surface mounted on load bearing walls in an electrical closet or a room with restricted public access. One DRd rack may be bussed to the AX series auxiliary rack, which may contain a main circuit breaker (MCB) or a main lug (ML) for power distribution to the adjacent DRd12 rack. Two DRd12 racks may be cross-bussed to an AX12X auxiliary rack which is designed to provide main lug or main breaker input feed termination to the adjacent DRd12 racks.

The wall must be strong enough to hold all racks fully populated with modules, conduit and wire. Reference [“Where to Install the Rack Enclosure,” page 7](#) for weight, dimension and clearance requirements.

Step 1: Determine where the enclosures will be installed using the weight and dimension requirements detailed in [“Where to Install the Rack Enclosure,” page 7](#).

Step 2: Use the measured slot dimensions located in the graphics below to mark the hole locations for the mounting hardware.

DRd12-48 rear panel view



Step 3: Drill the holes and install the mounting hardware for each rack enclosure.

- Four 3/8" (M8-M10) bolts or screws 2-4" (50-100mm) long, and suitable wall plugs are suggested mounting hardware per rack enclosure (lag bolts recommended).
- Both the surface and the mounting hardware must support the weight of the enclosures fully populated with modules.
- Expose at least 1" (25mm) of threads for mounting the rack.

Step 4: Remove the conduit knockouts from the mating side conduit plugs on the DRd and auxiliary rack enclosures before installation. Only remove the knockouts that are adjacent to another rack.

Step 5: Install the DRd rack first (follow instructions as outlined in [“Mounting Individual Racks on a Wall,” on page 13](#). Remember to install the DRd rack enclosure to either side of the auxiliary rack in cross-bussed applications.

Step 6: Align the auxiliary rack against the DRd rack enclosure and mount it to the previously installed hardware. Keyholes in the DRd and auxiliary rack enclosures are aligned with each other for mounting to Unistrut or Kindorf. With conduit holes mated, the bolt spacings are on 16" (406mm) centers (top left DRd and top left Ax rack) for installation convenience.

- Step 7: Install the ETC supplied 2 1/2" (64mm) nylon insulated chase nipple and 2 1/2" (64mm) locknut between the auxiliary and DRd rack enclosures.
- Step 8: For cross-bussed DRd12-24 rack installations, install the second DRd12-24 by following steps 4 through 7 above.
- Step 9: Check that each rack is level and plumb then tighten the mounting hardware for a secure installation.



Note:

Reference the related [Auxiliary Rack Enclosure Installation Manual](#) to complete the auxiliary rack installation and for DRd12-24 and DRd 12-48 rack input power bus wiring termination.

Follow the instructions in this manual for all other DRd rack enclosure installation procedures.

Chapter 3

Rough-in Conduit and Wiring

This chapter contains instructions for conduit and wiring installation of the DRd rack enclosure.

This chapter contains the following sections:

- ***Prepare the DRd Rack***18
- ***Remove the DRd Rack Power Supply/Dimming Engine Access Panel*** 18
- ***Modify Phase Bus for 120 VAC Split Phase Operation***19
- ***Rough-in Conduit to the DRd Rack***21

Prepare the DRd Rack

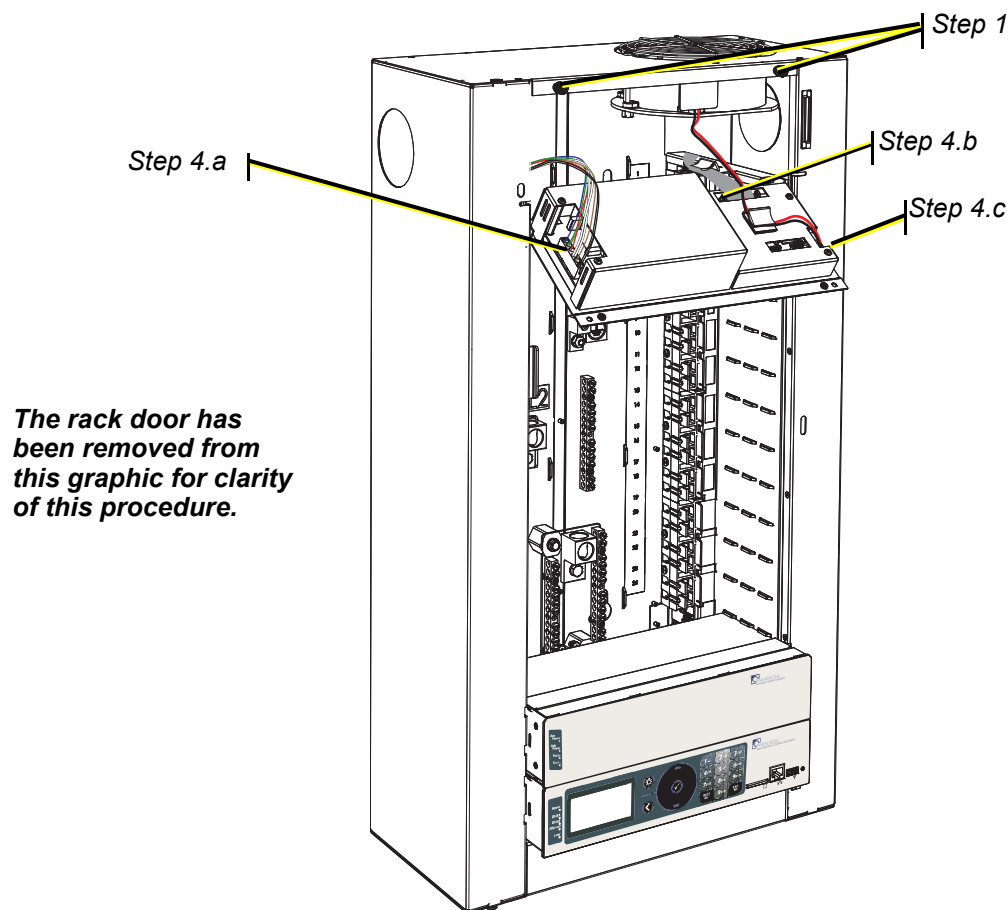
All rack terminations are accessible from the front of the rack. Reference [“Wire Routing and Specification”, page 8](#) for conduit access specifications.

Prior to conduit installation you should remove the power supply access panel for clear access to the top of the DRd rack enclosure. Reference [“Remove the DRd Rack Power Supply/Dimming Engine Access Panel”](#) below.

Take the opportunity before roughing in your conduit to change your rack for split phase operation (100/120 VAC racks only) if required. Reference [“Modify Phase Bus for 120 VAC Split Phase Operation”, page 19](#).

Remove the DRd Rack Power Supply/Dimming Engine Access Panel

Remove the power supply/dimming engine access panel to allow for better access in the top of the DRd rack enclosure while roughing in conduit and cable.



The rack door has been removed from this graphic for clarity of this procedure.

- Step 1: Loosen the two captured screws that secure the access panel.
- Step 2: Gently pull the panel straight down until the top of the access panel is clear of the enclosure.
- Step 3: Tilt the supply access panel away from the rack enclosure.
- Step 4: Disconnect the three cables that are attached to the unit.
 - a: For the cable bundle on the left side, squeeze the tabs on either side of the connector and gently pull the cable until it is free from the unit.

- b: For the ribbon cable connected on the right rear side, release the tabs on either side of the connector by sliding them opposite the connector then gently pull the cable free.
- c: For the two-wire cable on the right side, gently pull the connector straight out.

Step 5: Remove the power supply access panel.

- a: Align the panel perpendicular to the rack.
- b: Slide the panel up approximately one inch to align the guide pins on the top of the guided slots.
- c: Then pull the panel straight out.

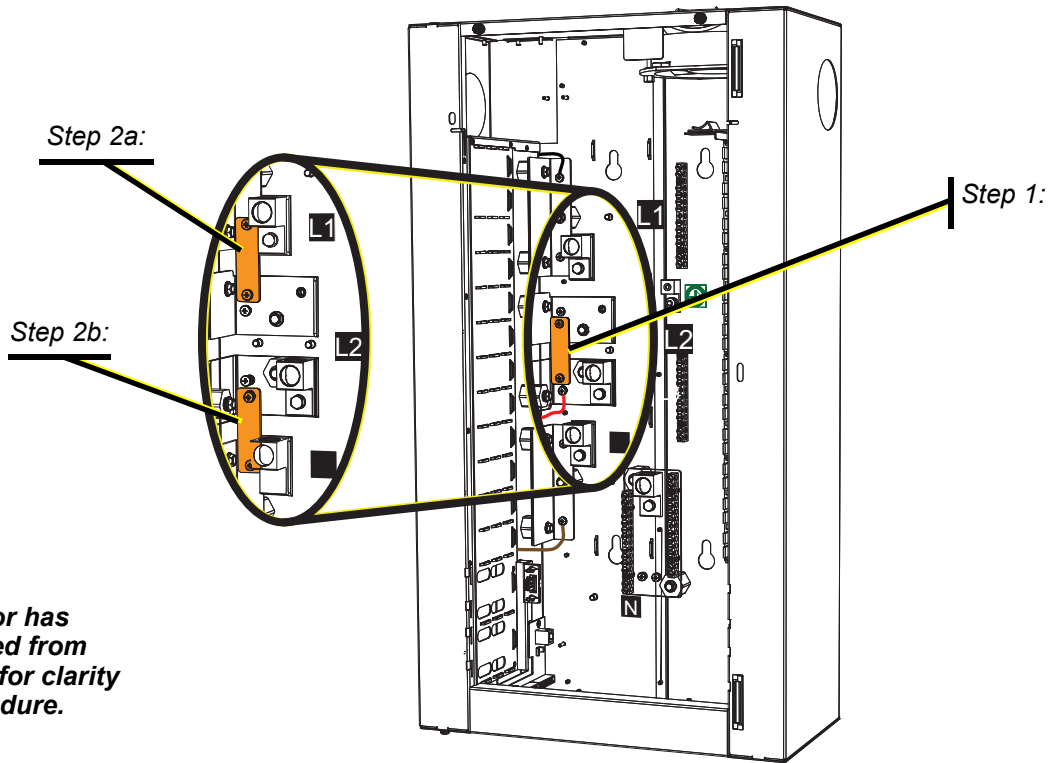


Note:

Store this access panel in a safe place until you are finished roughing in conduit and terminations. You will need to reinstall this panel when the rack enclosure is installed and all wires have been terminated.

Modify Phase Bus for 120 VAC Split Phase Operation

The DRd rack can be simply changed in the field from a three phase rack to a split phase (3 wire plus ground) rack.



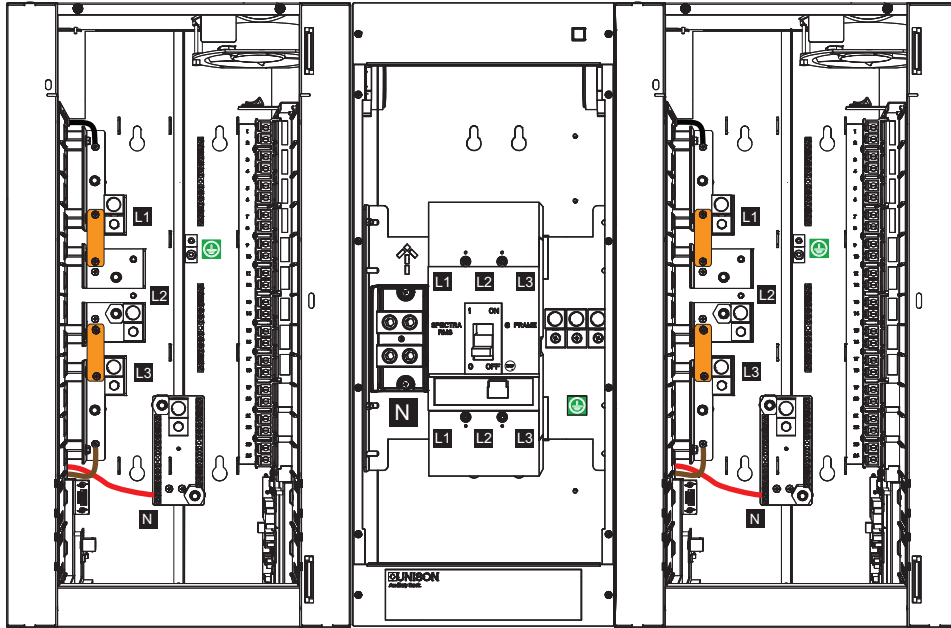
The rack door has been removed from this graphic for clarity of this procedure.

- Step 1: Notice the two copper straps (stacked) on phase L2 of the rack.
- Step 2: Change the DRd rack from 3Ø to 1Ø operation by moving the copper straps in the rack, strapping the phase bars together, (reference the graphic above to follow along).
 - a: Move one of the copper straps to connect between phase 1 (L1) and phase 2 (L2). The screws required are installed to the phase bars in the location the copper strap will be mounted.

- b: Remove the red sense wire from phase 2 (L2) and reroute it to the neutral bar.
- c: Move the second copper strap to connect between phase 2 (L2) and phase 3 (L3).

Step 3: For cross-bussed DRd12-48 installations, complete step 2 for both racks.

The rack doors have been removed from this graphic for clarity of this procedure.



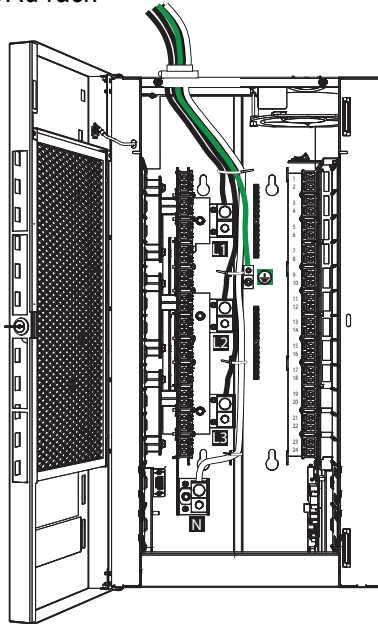
Rough-in Conduit to the DRd Rack

Line feed wires terminate on the main lugs provided.

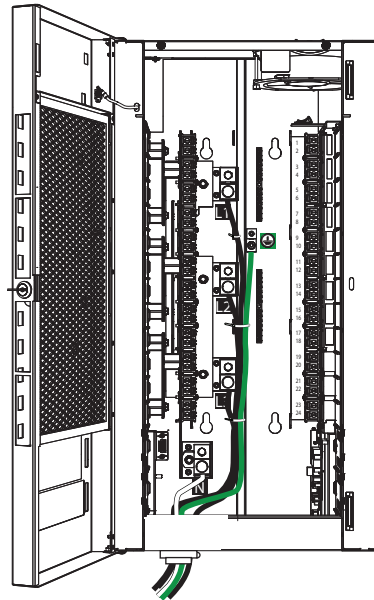
The DRd12 rack is shipped from the factory with the main lugs in a top feed orientation. The lugs can be changed to a bottom feed orientation by removing the lug mounting bolt, rotating the lug 180°, and re-mounting the lug in the opposite lug mounting PEM. This is true for all DRd12 rack models.

The DRd6 rack phase lugs are both top and bottom feed by default and don't require any change, but the neutral and ground lugs will require re-orientation for bottom feed.

Top Feed DRd rack



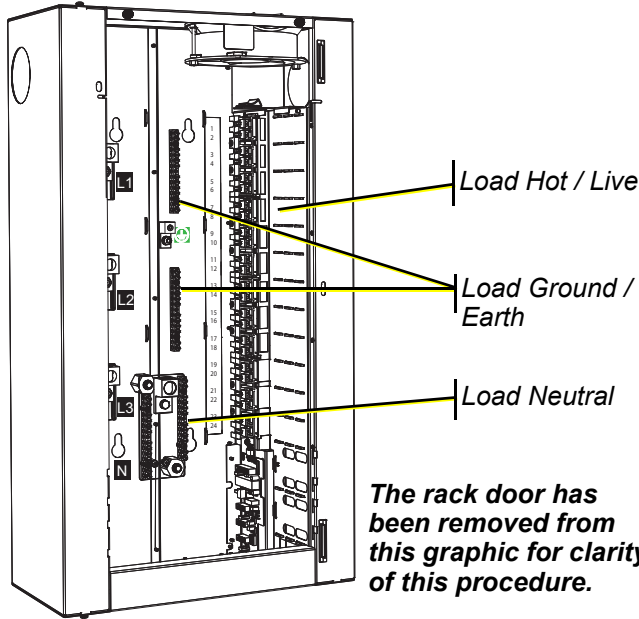
Bottom Feed DRd rack



When utilizing an auxiliary rack with the DRd rack, line feed wires from the auxiliary rack enter the DRd rack through the top side conduit knockout. For cross-bussed installations the line feed wires will be fed to the DRd rack through the conduit knockout on the adjoining side of the auxiliary rack.

Rack Type	DRd12 120 and 230 VAC		DRd12 240 and 277 VAC		DRd6 (all models)	
	6 Ft-lbs	8 Nm	11 Ft-lbs	15 Nm	6 Ft-lbs	8 Nm
Lug Mounting Bolt Torque	6 Ft-lbs	8 Nm	11 Ft-lbs	15 Nm	6 Ft-lbs	8 Nm
Wire Range	350kcmil - 1 AWG	2-6 AWG	250kcmil - 1 AWG	2-6 AWG	2/0-3 AWG	4-6 AWG
	185mm ² - 50mm ²	35mm ² - 16mm ²	120mm ² - 50mm ²	35mm ² - 16mm ²	70mm ² - 25mm ²	25mm ² - 16mm ²
Lug Wire Tightening Torque	375 in-lbs	200 in-lbs	375 in-lbs	275 in-lbs	50 in-lbs	45 in-lbs
	42.4 Nm	22.6 Nm	42.4 Nm	31 Nm	5.65 Nm	5.1 Nm

Load circuits terminate to the right side the rack enclosure.



Load wires terminate to the load lugs on the right side of the rack.

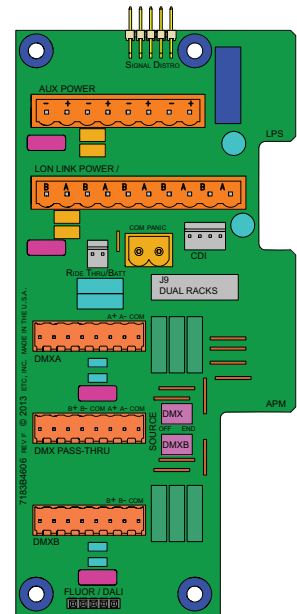
Load neutral and load ground wires terminate on the neutral and ground bus bars located on the back panel of the rack enclosure. An exception to this is made for the DRd rack with CE neutral disconnect. Neutrals are terminated to the neutral disconnect on the left side of the rack. See “230 VAC Neutral Disconnect DRd Rack” on page 27.

Control wires terminate to the right and left I/O boards in the DRd rack enclosure.

Control wires can enter the dimmer rack from the top, bottom, or either side, although ETC recommends that you pull control wires into the rack from the bottom since all control terminations are located near the bottom of the rack.

The right I/O board is shipped standard with all DRd rack enclosures and includes terminations for:

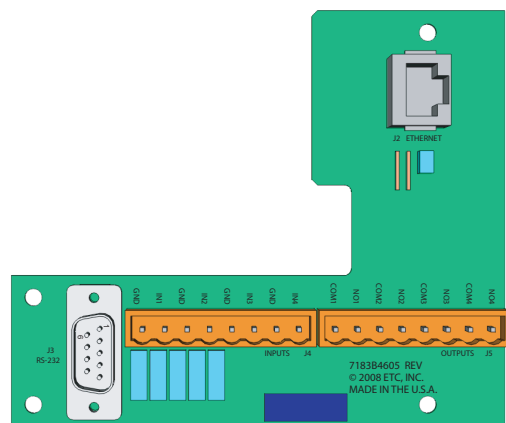
- 24 Vdc Auxiliary Power input and output connector
- LON Link Power connector
- UL 924 emergency contact input for control bypass
- Auxiliary rack (Dual Rack) cross-bussed interconnection
- (2) DMX connections and a DMX pass-through connection
- All rack option connections including DALI, FLO, Unison ride thru option (URTO) / Unison battery pack option (UBPO)



The left I/O board is required only when using a Paradigm Architectural Control Processor (P-ACP).

The left I/O includes terminations for:

- Ethernet
- RS232
- Contact closure terminations (4 input and 4 output)



Procedure

- Step 1: Plan wire entry to the rack. [See “Wire Routing and Specification” on page 8.](#)
- Step 2: Make the desired conduit access (top, bottom, left or right) from the rack. Read and comply with the label inside the rack which details the recommended access locations for conduit entry into the rack.



Note: *Do not run power and control cable in the same conduit.*

Step 3: Punch holes and install conduit fittings or insert lining materials in conduit opening.

Step 4: Be sure there are minimal air gaps. [See “Sealing Rack Air Leaks” on page 52.](#)



CAUTION: *Wire openings must have fittings, bushings, grommets or fiche paper lining material to protect the wire and cable insulation from damage by sharp metal edges, and to prevent air leaks.*

Chapter 4

Terminate Wiring

This chapter contains the following sections:

- **Connect Line Power Wiring**25
- **Connect Load Wires**28
- **Fluorescent Load Wiring**30
- **Connect Control Wiring**32

Connect Line Power Wiring



WARNING: *All rack terminations must be done with the power off. Dimmer racks installed without an accessible power disconnect device cannot be serviced or operated safely. In some instances, this device may be an auxiliary rack with a main circuit breaker. Follow all local codes and restrictions.*

Before servicing, de-energize main feed to dimmer rack and follow appropriate Lockout/Tagout procedures as described in NFPA Standard 70E. It is important to note that electrical equipment such as dimmer racks 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.



CAUTION: *Line and load wires used with the Unison DRd racks must be copper. Do not use aluminum wire.*

Connect Line Feed in an Individual DRd Rack Installation

Line feed cables are terminated on the rack's main phase lugs. It is best to route line (feeder) cables first, load neutral and ground/earth wires next, load phase and control wires last. In multiple rack installations, load neutral and ground/earth wires must terminate in the same rack as the matching load phase wires.



Note: *For DRd6 and DRd12 main lug, main breaker, and cross-bussed applications, reference the [Unison Auxiliary Series Rack Installation Manual](#).*

The bus bars are different for each rack type (DRd6 or DRd12) and each rack voltage (120, 230 or 240-277). Rack graphics are located on the next page for reference.

Step 1: Pull the line phase, neutral and ground cables to the rack through the openings (conduit or other fittings) previously prepared.

Step 2: Strip the insulation from the end of each cable and terminate them to the lugs. Reference the table below for wire stripping lengths.

- Line and neutral connections are labeled L1, L2, L3 and N. The equipment grounding/earthing lug is labeled with the universal grounding symbol for easy identification.

Rack Model	Hex Key Size / Wire Strip Length					
	Phase	Strip Length	Neutral	Strip Length	Ground/Earth	Strip Length
DRd6 120, 240, 277 VAC	3/16" / 5mm	5/8" / 16mm	3/16" / 5mm	5/8" / 16mm	3/16" / 5mm	5/8" / 16mm
DRd6 230 VAC	5/16" / 8mm	1" / 25mm	5/16" / 8mm	1" / 25mm	3/16" / 5mm	5/8" / 16mm
DRd12 240, 277 VAC	5/16" / 8mm	1" / 25mm	3/8" / 10mm	1" / 25mm	3/16" / 5mm	5/8" / 16mm
DRd12 120, 230 VAC	3/8" / 10mm	1" / 25mm	3/8" / 10mm	1" / 25mm	3/16" / 5mm	5/8" / 16mm



Note: CE racks are supplied with ANSI hex wrenches for line feed terminations.

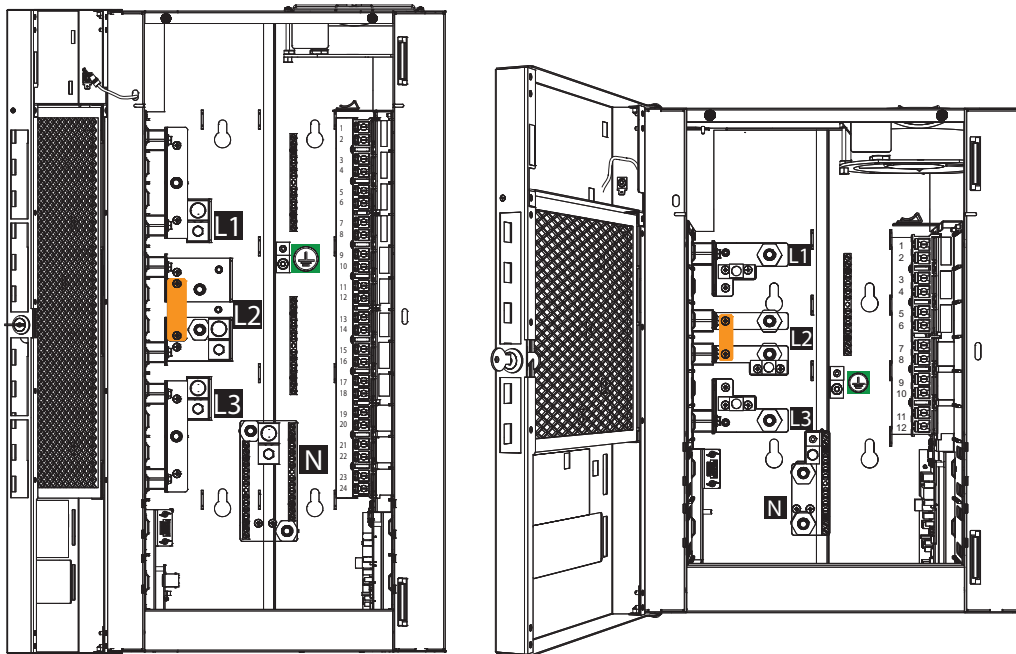
Step 3: Tighten the lugs to the correct torque based on cable size. Torque ratings are also labeled in the DRd rack enclosure for your convenience.

Rack Type	DRd12 120 and 230 VAC		DRd12 240 and 277 VAC		DRd6 (all models)	
	6 Ft-lbs	8 Nm	11 Ft-lbs	15 Nm	6 Ft-lbs	8 Nm
Lug Mounting Bolt Torque	6 Ft-lbs	8 Nm	11 Ft-lbs	15 Nm	6 Ft-lbs	8 Nm
Wire Range	350kcmil - 1 AWG	2-6 AWG	250kcmil - 1 AWG	2-6 AWG	2/0-3 AWG	4-6 AWG
	185mm ² - 50mm ²	35mm ² - 16mm ²	120mm ² - 50mm ²	35mm ² - 16mm ²	70mm ² - 25mm ²	25mm ² - 16mm ²
Lug Wire Tightening Torque	375 in-lbs	200 in-lbs	375 in-lbs	275 in-lbs	50 in-lbs	45 in-lbs
	42.4 Nm	22.6 Nm	42.4 Nm	31 Nm	5.65 Nm	5.1 Nm



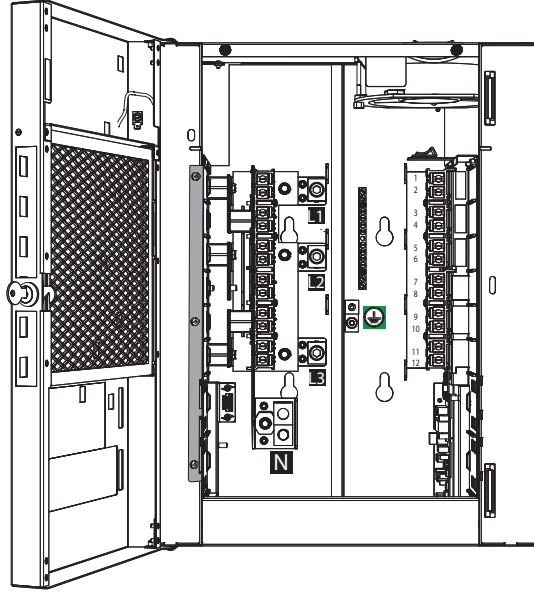
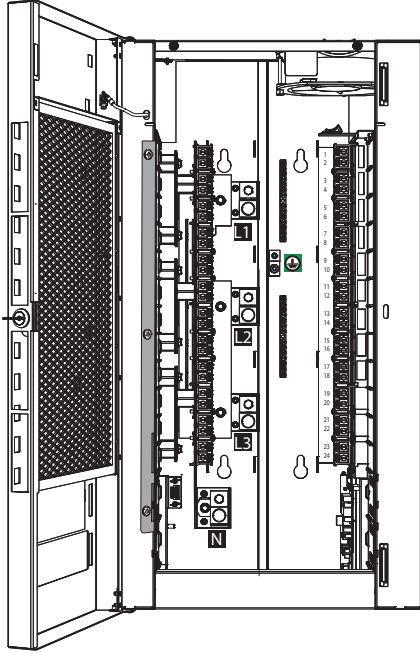
CAUTION: Dress wires neatly and avoid leaving extra wire inside the rack. Too much clutter can restrict airflow and cause rack overtemp errors.

100, 120, 127 VAC, 3Ø DRd Racks

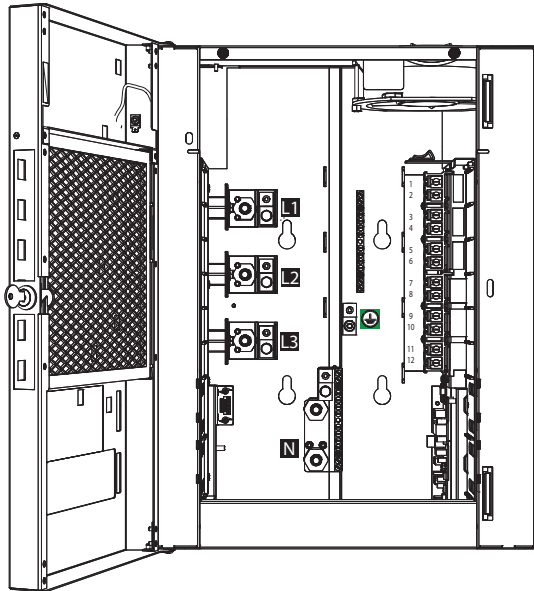
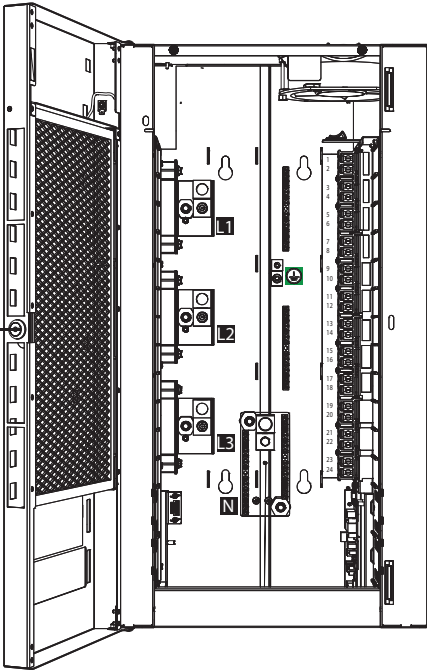


Note: For 120 VAC single phase installation you must modify the phase bus before connecting wiring. See [“Modify Phase Bus for 120 VAC Split Phase Operation”](#) on page 19.

230 VAC Neutral Disconnect DRd Rack



240, 277 VAC DRd Racks

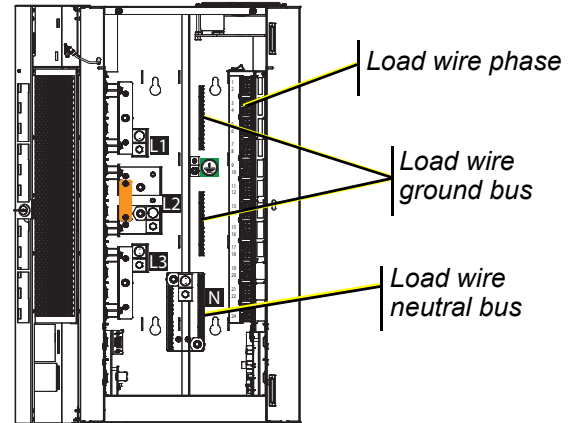


Connect Load Wires

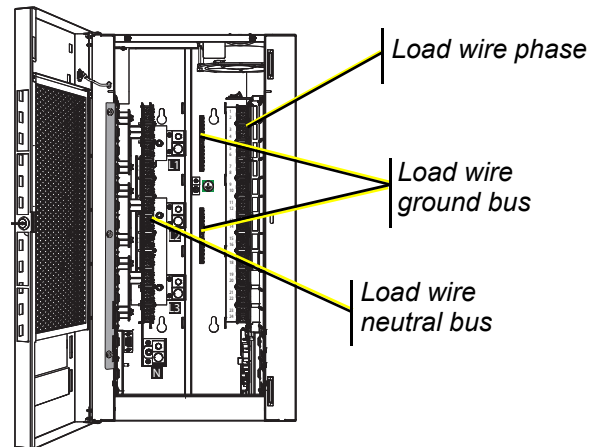
Load wires are terminated to the load lugs on the right side of the rack. In 120 VAC and 240/277 VAC DRd racks, load neutral and load ground wires are terminated to the terminal strips on the back panel of the rack. In 230 VAC rack types, load neutrals are connected to the left side of the rack, stacked on top of the input feeds to maintain a true neutral disconnect.

Phase balancing of the loads is set from within the Architectural Control Processor (ACP) “Dimmer Setup” menu. Reference the related Architectural Control Processor configuration manual for details.

120, 240, and 277 VAC DRd racks share similar load lugs.



230 VAC DRd racks have a neutral disconnect bus structure. This design places neutral lugs on the same side of the rack as the main feeds. Neutral output lugs are numbered on the filter PCB. It is important to wire hot and neutral from each load to the corresponding numbered outputs.



WARNING: Use of emergency modules (ED15AFE or ER15AFE) in CE 230V DRd rack enclosures require the neutral (N) lug in place of the neutral jumper per module.



CAUTION: A two-wire circuit with **separate hot/live and neutral conductors is required** for every branch circuit that will be connected to the Unison DRd rack. Shared neutral (multi wire) branch circuit arrangements are not recommended for phase-control dimming systems due to harmonics and potentially elevated neutral currents in a shared neutral arrangement.

For retrofit installations where shared neutral circuits are already installed, or track lighting installations where the track has a shared neutral, consult ETC Technical Services for rack installation guidelines.



Note: Plan load wiring appropriately to avoid splicing wiring in the racks. Only one load wire per load terminal.

- Step 1: Route the load wires to the DRd rack(s) through the conduit previously installed.
- Step 2: Prepare the load wires for termination:
- a: Label each wire in the set with circuit designation.
 - b: Separate load circuit wires into ground, neutral and hot/live wire bundles.

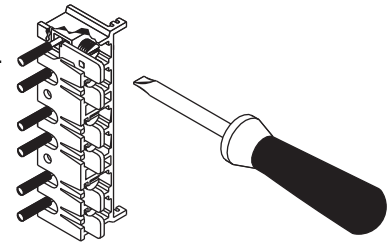


CAUTION: Dress and terminate wires neatly and avoid leaving extra wire inside the rack. Too much clutter (especially along the right side of the rack) can restrict air circulation and reduce cooling efficiency. If cabling interferes with airflow during operation, the rack may be forced to shut down due to overheating.

Load wires should not cross between racks. Instead, they should enter the rack in which they will be terminated. Hot/Live and neutral load wiring must follow the same conduit/path for each circuit.

- Step 3: Strip 5/8" (16mm) of insulation from the end of each load wire.
- Step 4: Route each load hot/live wire to its individual load output connection.

- a: Insert the wire on the back side of the lugs.
- b: Torque the lug screw to the recommended value indicated in the table below.



Connection	Cable Size		Torque			Wire Strip Length
	AWG	mm ²	lbf-in	lbf-ft	N - m	
15 - 20 amp load lugs	14 - 10	2.5 - 6	35	2.9	4.0	5/8" - 16mm
	8	10	40	3.3	4.5	
	6 - 4	16	45	3.8	5.1	
Ground bus	14 - 8	2.5 - 6	75	6.3	8.5	5/16" - 8mm
	6 - 4	16	110	9.2	12.4	
Neutral bus (excluding 230 VAC)	14 - 8	2.5 - 6	75	6.3	8.5	5/16" - 8mm
	6 - 4	16	110	9.2	12.4	
Neutral Disconnect (230 VAC only)	14 - 10	2.5 - 6	35	2.9	4.0	5/8" - 16mm
	8	10	40	3.3	4.5	
	6 - 4	16	45	3.8	5.1	

- Step 5: Strip the neutral wire to the length indicated in the table above and terminate to the neutral terminal assembly. Torque to the recommended value also indicated in the table above. For 230 VAC DRd racks, the neutral bus is located on the line input feed side of the rack.
- Step 6: Strip the ground/earth wires to the length indicated in the table above and terminate to the ground bus terminal. Torque to the recommended value also indicated in the table above.



Note: Ground connections must use all metal nuts and lock washers.

Fluorescent Load Wiring

3-wire Fluorescent

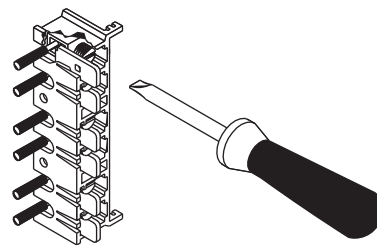
To control 3-wire fluorescent ballasts, the power circuit in the rack must be configured as a fluorescent module type (D15F, D20F, AD15F, AD20F, HD25F), which is a single density module, with a 2/3 wire fluorescent dimmer mode assignment. Reference the related Architectural Control Processor Configuration Manual (SmartLink ACP or Paradigm ACP) for instructions on changing the dimmer mode.



Note: *Even though two lugs are used, the configuration (as found in the Dimmer Setup menu of the ACP) refers only to the top (odd) number lug.*

- Step 1: Pull the three wire fluorescent ballast wiring into the DRd rack enclosure per the wire entry plan.
- Step 2: Strip 5/8" (16mm) of insulation from the end of each load wire.
- Step 3: Terminate the black switched hot/live wire to the top terminal in its assigned dimmer lug pair. Insert the wire between the back of the lug and the pressure plate as shown.

- a: Insert the wire on the back side of the lugs.
b: Torque the lug screw to the recommended value indicated in the table below.



Connection	Cable Size		Torque			Wire Strip Length
	AWG	mm ²	lbf-in	lbf-ft	N - m	
15 - 20 amp load lugs	14 - 10	2.5 - 6	35	2.9	4.0	5/8" - 16mm
	8	10	40	3.3	4.5	
	6 - 4	16	45	3.8	5.1	
Ground bus	14 - 8	2.5 - 6	75	6.3	8.5	5/16" - 8mm
	6 - 4	10	110	9.2	12.4	
Neutral bus (excluding 230 VAC)	14 - 8	2.5 - 6	75	6.3	8.5	5/16" - 8mm
	6 - 4	10	110	9.2	12.4	
Neutral Disconnect (230 VAC only)	14 - 10	2.5 - 6	35	2.9	4.0	5/8" - 16mm
	8	10	40	3.3	4.5	
	6 - 4	16	45	3.8	5.1	

- Step 4: Terminate the dimmed hot/live wire to the bottom terminal in its assigned dimmer lug pair. Insert the wire between the back of the lug and the pressure plate as shown in the graphic above. Torque the wire to the recommended value in the torque table above.
- Step 5: Strip the neutral wire to the length indicated in the table above and terminate to the neutral terminal assembly. Torque to the recommended value also indicated in the table above.

Step 6: Strip the ground/earth wires to the length indicated in the table above and terminate to the ground bus terminal. Torque to the recommended value also indicated in the table above.



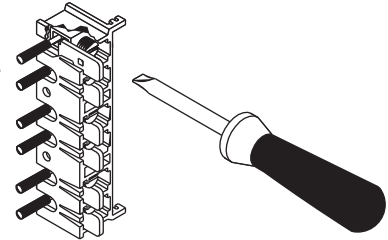
Note: *Ground connections must use all metal nuts and lock washers.*

2-wire Fluorescent

To control 2-wire fluorescent ballasts, the power circuit in the rack must be configured as a standard module type (D15, D20, AD15, AD20, ED15, ED25, HD15, HD25) with a 2/3 wire fluorescent dimmer mode assignment. Reference the related Architectural Control Processor programming guide for instruction to change dimmer mode.

- Step 1: Pull fluorescent ballast power wiring into the DRd rack enclosure per the wire entry plan.
- Step 2: Strip 5/8" (16mm) of insulation from the end of each load wire.
- Step 3: Terminate the load wire (typically black) to the assigned dimmer lug by inserting wire between the back of the lug and the pressure plate.

- a: Insert the wire on the back side of the lugs.
b: Torque the lug screw to the recommended value indicated in the table below.



Connection	Cable Size		Torque			Wire Strip Length
	AWG	mm ²	lbf-in	lbf-ft	N - m	
15 - 20 amp load lugs	14 - 10	2.5 - 6	35	2.9	4.0	5/8" - 16mm
	8	10	40	3.3	4.5	
	6 - 4	16	45	3.8	5.1	
Ground bus	14 - 8	2.5 - 6	75	6.3	8.5	5/16" - 8mm
	6 - 4	10	110	9.2	12.4	
Neutral bus (excluding 230 VAC)	14 - 8	2.5 - 6	75	6.3	8.5	5/16" - 8mm
	6 - 4	10	110	9.2	12.4	
Neutral Disconnect (230 VAC only)	14 - 10	2.5 - 6	35	2.9	4.0	5/8" - 16mm
	8	10	40	3.3	4.5	
	6 - 4	16	45	3.8	5.1	

Step 4: Strip the neutral wire to the length indicated in the table above and terminate to the neutral terminal assembly. Torque to the recommended value also indicated in the table above.

Step 5: Strip the ground/earth wires to the length indicated in the table above and terminate to the ground bus terminal. Torque to the recommended value also indicated in the table above.



Note: *Ground connections must use all metal nuts and lock washers.*

Connect Control Wiring



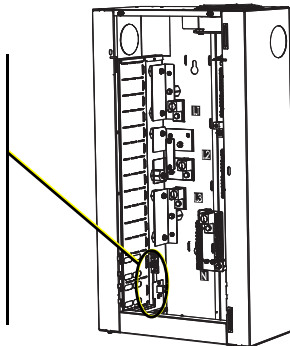
Note: All low voltage control cables must run in separate conduit from power wires.

Overview

All low voltage data and option wiring connects to pluggable connectors on the left and right input/output boards near the bottom of the DRd rack.

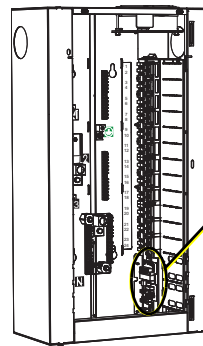
Left I/O board is available as part of the Paradigm Termination Kit which ships with the Paradigm ACP.

For use only with a Paradigm ACP.



The rack door has been removed from these graphics for clarity of the procedure.

Right I/O board - ships standard with each DRd rack enclosure.



The DRd rack ships with a right side I/O board for low voltage control connections. A left side I/O is available in the Paradigm termination kit.

- The left I/O is specific to use with the Paradigm Architectural Control Processor (P-ACP) including contact inputs and outputs, serial RS232 and Ethernet control. The left I/O board is not compatible with the SmartLink Architectural Control Processor (S-ACP).
- The right side I/O is shipped with each DRd rack and provides termination for SmartLink/LinkPower, auxiliary power, DMX in, DMX out, DMX through, and a UL 924 emergency contact input. The DRd rack supports option kits which install in the bottom of the DRd rack for extended control and operation and terminate to the right I/O board. Option modules include:
 - Fluorescent Option Board (DRd-FLO) which provides 24 outputs for control of 4-wire (0-10V dc) fluorescent ballasts. Each channel output is linked one - to - one with a rack circuit for power control.
 - Digital Addressable Lighting Interface (DRd-DALI) which provides 24 outputs for control of DALI-compatible fluorescent ballasts. Each channel output of DALI control is linked one - to - one with a rack circuit for power control (DALI Broadcast Mode).



Note: A DRd rack supports the use of either a DALI option board (DRd-DALI) or the FLO option board (DRd-FLO), but not both.

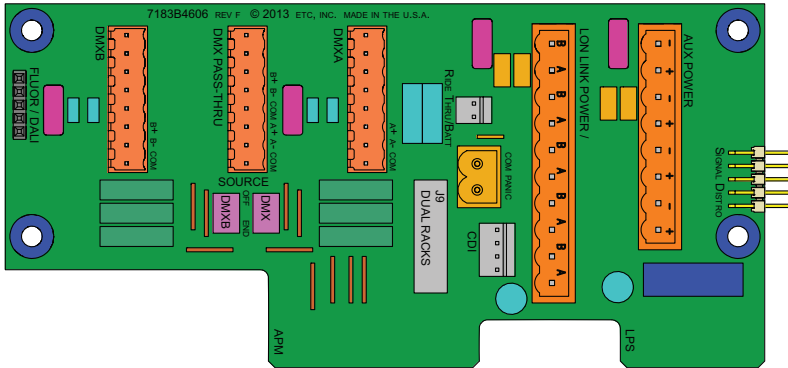
- Unison Ride Thru Option (URTO) kit provides power to the ACP during brief power outages or drop outs. The URTO sustains power to the ACP for at least 12 seconds.
- Unison Battery Pack Option (UBPO) kit sustains battery power to the ACP for up

to 90 minutes during power outages.



Note: A DRd rack supports the use of either the Unison ride thru option (URTO) or the Unison battery pack option (UBPO), but not both.

DRd Right I/O Data Terminations



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

De-energize main feed to dimmer rack and follow appropriate Lockout/Tagout procedures as described in NFPA Standard 70E. It is important to note that electrical equipment such as dimmer racks 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.



CAUTION: DMX out and LonWorks® with LinkPower features are enabled only with the use of the left I/O board and the Paradigm Architectural Control Processor (P-ACP).



Note: All low voltage control cables must run in separate conduit from power wires.

Auxiliary Power

The auxiliary power connector (labeled Aux Power) provides termination for up to 16 wires in the eight position pluggable connector. Each terminal allows up to two 16 AWG (1.5mm²) wires and provides 24Vdc power to Unison control stations when used with the Paradigm ACP. Auxiliary power is not compatible with the SmartLink ACP.



Note: It is required that you terminate SmartLink / LinkPower station wiring and the auxiliary power wiring in the rack with the Station Power Module installed.

- Step 1: Pull auxiliary control power wiring (typically 16 AWG (1.5mm²) red / black wire pair) into the DRd rack through the conduit opening previously prepared.
- Step 2: Strip 3/16" (5mm) of insulation from the ends of each wire pair.
- Step 3: Remove the auxiliary power connector from the right I/O board.
- Step 4: Loosen the terminal screws for as many auxiliary wire pairs as you are terminating.
- Step 5: Insert the black auxiliary power wire from the pair into a "-" terminal on the

connector and tighten the screw to secure the wire into the connector.

- Step 6: Insert the red auxiliary power wire from the pair into a “+” terminal on the connector and tighten the screw to secure the wire into the connector.
- Step 7: Repeat steps 5 and 6 for each auxiliary power wire pair in the rack.
- Step 8: Replace the connector on the right I/O board.

SmartLink™ / LinkPower (LON) Control Wiring

SmartLink and Unison control stations communicate with the Paradigm Architectural Control Processor using the LinkConnect station communication bus from the Architectural Control Processor to the stations. LinkConnect is based on Echelon® LonWorks® with LinkPower bidirectional protocol, and uses one pair of wires (data+, data-).

Throughout this document, LinkConnect is referred to by the protocol it uses, LinkPower.

Termination is available for up to six home runs of LinkPower (LON) data runs utilizing Belden 8471 cable (or approved equal) plus one 14 AWG (2.5mm²) ESD drain wire when the data cable is not installed in grounded metal conduit. LinkPower wiring is topology-free and polarity independent, you can install your LinkPower data runs in any desired combination of bus, star, loop, and home run (up to six home run termination points available), or any combination of these. The total combined length of LinkPower wire run cannot exceed 1,640 feet (500m), with a maximum distance of 1,313 feet (400m) between any two (un-repeated) communicating devices. Without a repeater, no device may be more than 1,313 feet (400m) away from the Architectural Control Processor.

Standard LON interoperability requires that there should be a maximum of only one repeater between any two LON devices. This means that only one repeater module, whether a Paradigm station repeater module (P-REP) or a Paradigm dual station repeater module (P-DREP), may be used per Paradigm Architectural Control Processor (P-ACP). Each individual topology-free TP/FT-10 LonWorks network can have no more than 62 LON stations with a repeater option and Paradigm Architectural Control Processor (a maximum of 64 total devices).

While the wiring for LinkConnect in SmartLink and Paradigm systems are the same, the two communication and control types are not interchangeable. SmartLink products are compatible only with the SmartLink ACP, SmartLink station power module, and SmartLink architectural control stations. Paradigm products are compatible only with the Paradigm ACP, Paradigm station power modules, Unison Heritage architectural control stations, and Paradigm touchscreens.



Note:

It is required that you terminate LinkPower station wiring and the auxiliary power wiring in the rack the station power module will be installed.

- Step 1: Pull Belden 8471 (or an equal type) control wiring and a 14AWG ground into the DRd rack through the conduit opening previously prepared.
- Step 2: Strip 3/16” (5mm) of insulation from the ends of each wire pair.
- Step 3: Remove the LON connector from the right I/O board.
- Step 4: Loosen the terminal screws for as many wire pairs you are terminating.
- Step 5: Insert each white wire (typical) from the pairs into a “B” 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 an “A” terminal, next to the previously installed “B” 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 Scotchlok™ connectors (3M® #314 insulation displacement connectors, ETC part number J4166).
- Grounded to metal conduit.
- If grounded metal conduit is not installed, connect the 14 AWG (green) ground wire to the DRd rack ground bus (the same as loads are grounded to) inside the DRd rack, and to the green/yellow striped wire connected to the control station using a Scotchlok connector. Reference the related station installation manual for details.

Step 8: Replace the connector to the right I/O board.

UL 924 Listed Panic Input

Termination is available for a UL 924 Listed dry contact input for control bypass. The two pin panic connector, labeled “PANIC”, accepts 16 AWG (1.5mm²) wire.

Step 1: Pull panic wiring into the DRd rack through the conduit opening previously prepared.

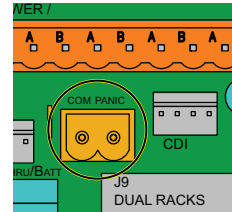
Step 2: Strip 3/16” (5mm) of insulation from the ends of each wire.

Step 3: Remove the 2 pin Panic connector from the right I/O board.

Step 4: Loosen the terminal screws.

Step 5: Insert each wire into the terminals on the connector and tighten the screws firmly to secure the wires into the connector.

Replace the connector to the right I/O board.



DMX Control Wiring

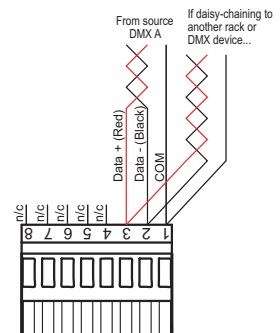
DMX wire preparation and termination will vary with the type of wire and termination kit being utilized. Please refer to the instructions supplied with the DMX termination kit for specific wire preparation.

DMX Input Wire Termination using the Screw Terminal Connector

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

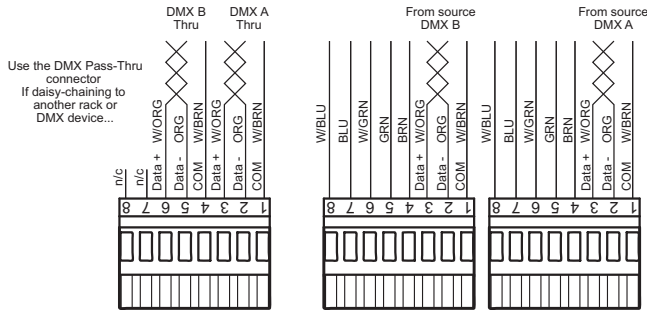
Screw terminal connectors are supplied as standard in the DMX Preparation Kit w/ Screw Connector, part number 4100A1012.

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



DMX Input Wire Termination using the Insulation Displacement Connector (IDC)

The graphic below illustrates DMX termination layout for an insulation displacement connector. This connector type is intended for use with Belden 1583A (or approved equal, such as Category 5, 5E, or 6) cable type. Be aware that cable other than Category 5 may have a different color code for its wire pairs.



Reference and follow the DMX Cable Preparation for IDC Termination instruction sheet that is shipped with the insulation displacement pluggable connector kit (part number 4100A1013).

AX12X Cross-bussed Rack Interconnection

Termination is provided for connection of a second DRd rack when installed in a cross-bussed application. This termination point is labeled “Dual Racks” on the right I/O board.

An interconnect cable is provided which connects rack 1, which is the rack with the ACP installed, to rack 2, which is the secondary rack in the cross-bussed rack system. This cable is labeled at both ends, one end indicating rack 1 and the other end indicating rack 2. You must have installed this cable to the correct rack for proper operation.

This interconnection of racks allows full control of both DRd racks from only one Architectural Control Processor (ACP). This may only be used in a cross-bussed rack application.

Reference the [Auxiliary Rack Enclosure Installation Manual](#) for instructions to accomplish this termination.

Terminate the Unison Options (URTO and UBPO)

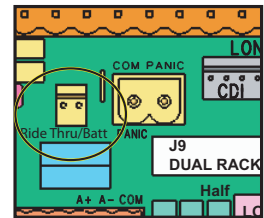


Note:

A single DRd rack supports the use of either the Unison Ride Thru Option (URTO) board or the Unison Battery Pack Option (UBPO) board, but not both in one enclosure.

Termination is available on the right I/O for the either the Unison Ride Through Option (URTO) or the Unison Battery Pack Option (UBPO). You may use only one of these option kits per DRd rack.

- Step 1: Notice the two pin connector labeled “Ride Thru / Batt” on the right I/O board.
- Step 2: Plug the option cable into the receptacle.



Terminate DMX

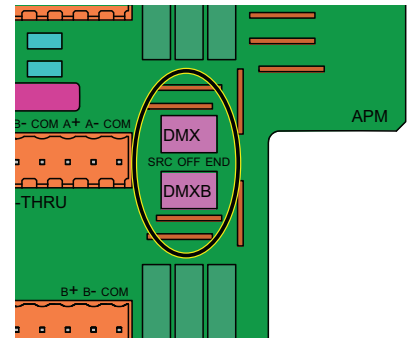
DMX requires 120Ω termination at the last DMX device in the control run. Since a DRd rack with a Paradigm module installed can utilize up to two DMX inputs (2 DMX runs) the right I/O board provides convenient termination switches for use.

Notice the two termination switches labeled DMXA and DMXB. Each switch has three termination positions:

- **Source** - reserved for RDM termination (future development).
- **Off** - no termination, DMX will pass through this device on to the next DMX device in the data run.
- **End** - termination is on. Used for the last DMX device (DRd rack) that is physically connected in the daisy-chained DMX In data run.

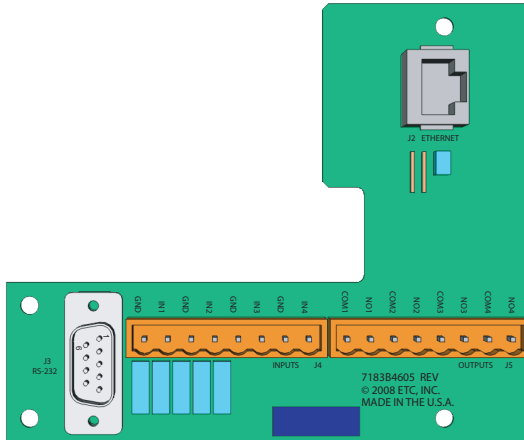
When a Paradigm processor is used in an Unison DRd rack enclosure, port B will be configured as an output and cannot be changed. port A is configured as either a DMX input or output. When used as an output the DMX termination should always be set to “Off”.

When a SmartLink processor is utilized in the Unison DRd rack enclosure, port A is automatically configured to be a DMX input and cannot be changed, port B is not used.



DRd Left I/O Data Termination

The left I/O board is not included with the DRd rack when shipped from the factory. Instead, this board is provided in the Paradigm DRd termination kit (model # P-DRd-TK). The left I/O board should be installed by the installing contractor or field technician. Follow the instructions provided with the left I/O board for installation and wire termination.



Note:

Data terminations to the left I/O board are specific to use with the Paradigm Architectural Control Processor (P-ACP) and are not compatible with an installed SmartLink Architectural Control Processor (S-ACP).

The left I/O board supports the Paradigm Architectural Control Processor data terminations including:

- RS-232 on a male 9 pin (D style) connector
- Ethernet on a RJ-45 female connector
- Contact closure input terminations on a 8 pin pluggable connector.
 - Terminations available for 4 inputs and 4 common wires.
- Contact closure output terminations on a 8 pin pluggable connector.
 - Terminations available for 4 normally open relay outputs and 4 common wires.

Connect to Serial RS-232

Integrators or users of advanced systems can interface with the Unison system through the RS-232 connector on the left I/O board. This connection provides an interface with external devices capable of sending or receiving RS-232. This connection can also receive serial commands from a transmitter and provide rack and system status when queried.



Note:

The RS-232 cable (not supplied) should follow common RS-232 pinout for a DB9 receptacle (pin 2 is RS-232 Rx, pin 3 is RS-232 Tx, and pin 5 is ground).

Connect to Ethernet RJ-45

Network interface to the DRd rack is made through the RJ-45 connector (labeled Ethernet) located on the left I/O board.



Note:

All Ethernet terminations must follow IEEE 802.3 and be terminated to the T568B standard.

Connect to Contact Inputs and Contact Outputs

The left I/O provides a convenient interface (inputs and outputs) to external devices via contact closure on removable pluggable connectors. Up to four contact inputs are available and can be configured for either maintained or momentary operation as setup in the Paradigm Architectural Control Processor. Reference the [Paradigm Architectural Control Processor Programming Guide](#) for details on configuration. Up to four contact outputs are available and are preset for normally open operation.



Note:

Typical contact I/O wiring is color coded as follows: contact 1 - brown, contact 2 - orange, contact 3 - yellow, contact 4 - green. All commons and ground voltages are typically black or red.

Terminate Contact Inputs

- Step 1: Remove the contact inputs removable screw terminal connector located on the left I/O board. Each connector is labeled for installation convenience.
- Step 2: Loosen the desired number of contact input screw terminals and related ground screw terminals on the connector.
- Step 3: Insert contact closure 1 into the terminal labeled "IN1" on the connector and tighten the screw terminal.
- Step 4: Insert the related common wire for contact closure 1 into the terminal labeled "GND" on the connector and tighten the screw terminal.
- Step 5: Repeat for each contact input and ground wire pair (up to four total).

Terminate Contact Outputs

- Step 1: Remove the contact outputs removable screw terminal connector located on the left I/O board. Each connector is labeled for installation convenience.
- Step 2: Loosen the desired number of contact output (normal open) screw terminals and related ground screw terminals on the connector.
- Step 3: Insert contact output 1 into the terminal labeled "NO1" on the connector and tighten the screw terminal.
- Step 4: Insert the related common wire for contact output 1 into the terminal labeled "COM1" on the connector and tighten the screw terminal.
- Step 5: Repeat for each contact output and common wire (up to four total).

Chapter 5

Install Rack Options

- ***DALI Option Kit*** 41
- ***Fluorescent Option Kit*** 44
- ***Ride Thru Option Kit*** 46
- ***Battery Pack Option Kit***..... 47

Install Rack Options

Unison DRd rack options include the fluorescent option kit (DRd-FLO), the digital addressable lighting interface option kit (DRd-DALI), the ride thru option kit (URTO), and the battery pack option kit (UBPO).



Note:

A single DRd rack supports the use of either the DALI Option kit or the FLO Option kit, but not both in the same rack.

In addition, a single DRd rack supports the use of either the Unison Ride Thru Option (URTO) or the Unison Battery Pack Option (UBPO), but not both in the same rack.

It is best to install these rack options after conduit rough-in and the line, load and control terminations are complete to reduce the likelihood of damage to the option boards.

DALI Option Kit

Install the DALI Option Kit

The Digital Addressable Lighting Interface option kit (DRd-DALI) controls 24 loops of 64 DALI compatible fluorescent ballasts in a broadcast mode. Each of the 24 DALI loops are linked one to one with a rack circuit for power control. For example, DALI loop 1 is controlled by DRd rack dimmer 1, DALI loop 2 is controlled by DRd rack dimmer 2, etc.

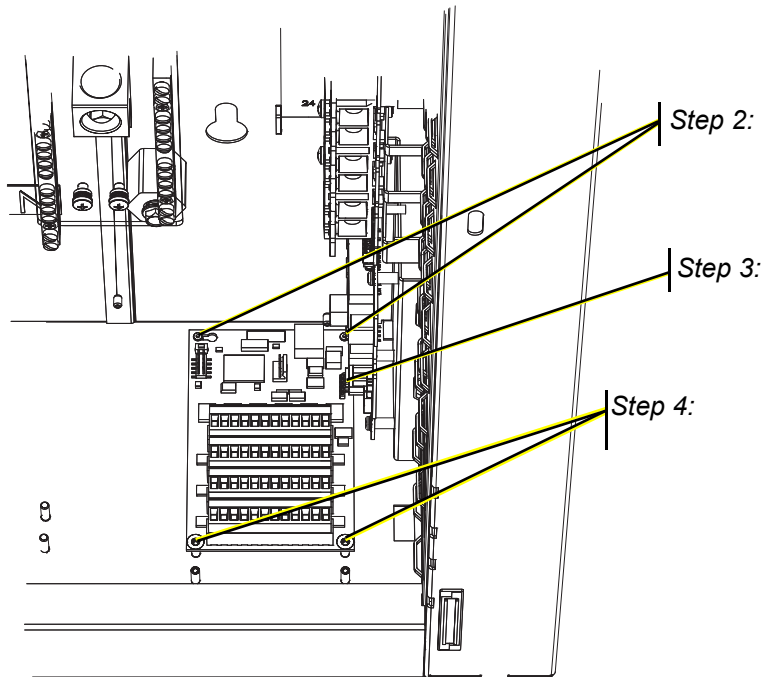
To control DALI fluorescent ballasts, the rack circuit must be populated with a dimmer module and assigned to DALI dimmer mode within the ACP software. Reference the related Architectural Control Processor programming guide for instruction to change dimmer mode.



Note:

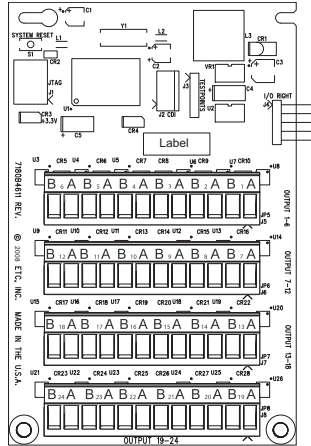
The DALI ballast is powered by an external DALI loop power supply (supplied by others). This supply is connected externally of the DRd rack. Each DALI loop requires its own power supply and possibly more than one power supply depending on the load.

The DALI option kit supports 64 DALI compatible fluorescent ballasts per DALI loop. All DALI fluorescent ballasts connected to that loop will respond at the same time and to the same level as sent by the broadcast command.



- Step 1: Align the DALI option board to the mounting studs in the bottom right side of the DRd rack.
- Notice the mounting holes on the DALI option board. One is a slotted keyhole, another is an open ended slot and the remaining two on the other end of the board are standard mounting holes used to secure the board in place.
- Step 2: Set the rear left stud through the slotted keyhole and align the open ended slot with the back right side mounting stud.
- Step 3: Gently slide the DALI board toward the right I/O board aligning the five prong connector to the receptacle on the I/O board.
- Step 4: Secure the bottom two mounting studs with the screws provided.

Connect DALI Option Wiring



Each of the four bus connectors on the option board provide termination for six DALI loops. Each bus connector is labeled for ease of loop identification and is pluggable for ease of wiring termination. Terminals accept 12-24 (4 - .25mm²) AWG Class 1 wire.

*Maximum Run Lengths for Class 1 wiring

18 AWG 1mm ²		16 AWG 1.3 mm ²		14 AWG 1.6 mm ²		12 AWG 2 mm ²		**Max. aggregate run length	
feet	meter	feet	meter	feet	meter	feet	meter	feet	meter
570	175	900	275	1,430	435	2,280	700	3000	900
<p>*Maximum Run Length - the longest distance between any device and any power supply on the DALI bus.</p> <p>**Maximum Aggregate Run Length - the longest total length of all total wiring connected to the DALI bus.</p>									

It is important to label the DALI fluorescent ballast load and control wiring sets with the circuit designation. Control wires terminate on the associated DALI board output loop terminal.

For example: If circuit 1 is configured as a D20 in DALI dimmer mode, DALI fluorescent ballast control wiring should terminate to the DALI board loop output terminals labeled "1".

Step 1: Remove the DALI bus connector for loop outputs 1-6.

Step 2: Strip each wire in the pair back 1/4 inch (6mm).

Step 3: Using a small 3,35mm or 1/8" flat blade screwdriver, loosen the terminals and insert each wire into the data "+" or data "-" terminals for the specific circuit loop. Data wires in the wire set are polarity independent.

Step 4: Tighten the terminal screw until the wire is held snugly.

Step 5: Repeat steps 1 through 4 for the remaining DALI loops through loop 6.

Step 6: Replace the DALI bus connector on the DALI board and repeat for the remaining DALI loops in the system (up to 24 loops).



Note:

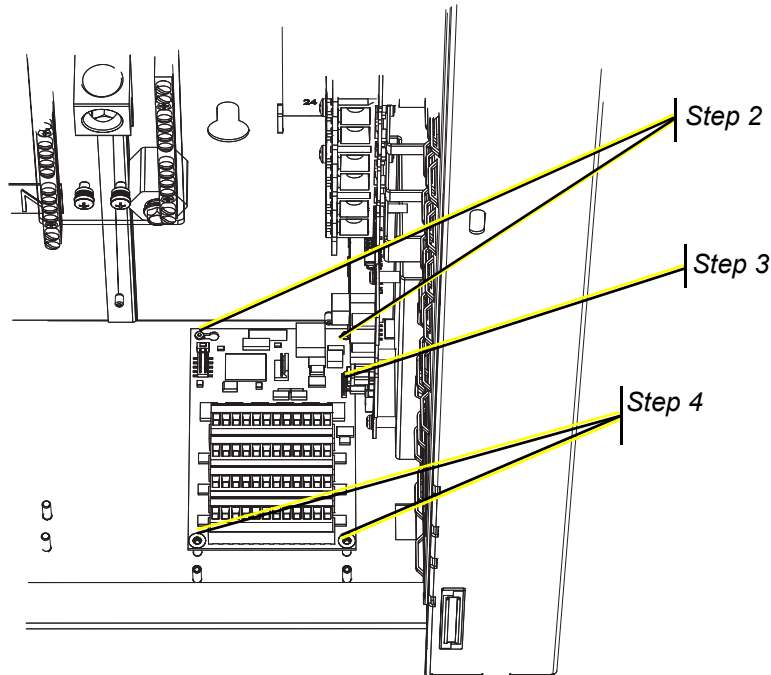
DALI wiring can be run in the same conduit as the power wiring for the same ballast.

Fluorescent Option Kit

Install the Fluorescent Option Kit

The fluorescent option (DRd-FLO) kit provides 24 outputs for control of 4-wire (0-10 Vdc) fluorescent ballasts. Each channel output is linked one - to - one with a rack circuit for power control. The FLO board is comprised of 24 individual 0 - 10 Vdc connections, each rated to control a maximum of 75 fluorescent ballasts (a maximum of 400mA per channel).

Each output connection is clearly labeled on the removable screw terminal bus connectors. The removable connectors accept 12 - 24 AWG (4 - .25mm²) Class 1 wire.



- Step 1: Align the FLO option board to the mounting studs in the bottom of the DRd rack.
- Notice the mounting holes on the FLO option board. One is a slotted keyhole, another is an open ended slot, and the remaining two on the other end of the board are standard mounting holes used to secure the board in place.
- Step 2: Set the rear left stud through the slotted keyhole and align the open ended slot with the back right side mounting stud.
- Step 3: Gently slide the FLO board toward the right I/O board aligning the five prong connector to the receptacle on the I/O board.
- Step 4: Secure the remaining two mounting holes to the pems with the screws provided.

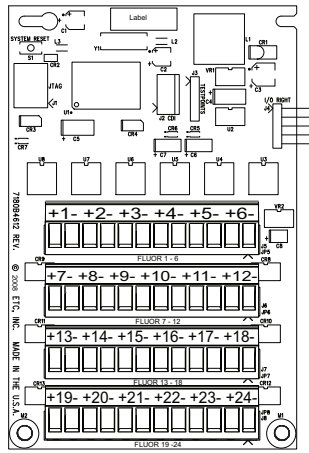
Connect Fluorescent Option Wiring



Note: Fluorescent control wiring must be routed in separate conduit from the line voltage wiring for 0-10V ballast.

To control 4-wire fluorescent ballasts, the power circuit in the rack must be a dimmer module and assigned to 4-wire fluorescent dimmer mode. Reference the related Architectural Control Processor (SmartLink or Paradigm) configuration manual for instruction to change dimmer mode.

It is important to label the 4-wire fluorescent load and control wiring sets with the circuit designation. Control wires terminate on the associated FLO option board output terminal. Example: If circuit 1 is configured as a dimmer with a 4-wire fluorescent dimmer mode, ballast control wiring would terminate to the FLO option board output terminals labeled “1”.



Each of the four bus connectors on the option board provide termination for six fluorescent outputs. Each bus connector is labeled for ease of identification and is pluggable for ease of wiring termination. Terminals accept 12-24 (4 - .25mm²) AWG Class 1 wire.

- Step 1: Pull fluorescent ballast control wiring pairs into the DRd rack enclosure per the wire entry plan.
- Step 2: Strip each wire pair back 1/4 inch (6mm).
- Step 3: Remove the bus connector for fluorescent outputs 1-6. The pluggable connector is seated tight in the receptacle. You may need to gently pry the connector free from the board using a small 3,35mm or 1/8" flat blade screwdriver.
- Step 4: Notice the connector is labeled for your reference during wire termination. Using a small 3,35mm or 1/8" flat blade screwdriver, loosen the terminals and insert each of the data “+” and data “-” wires in the wire set into the appropriate terminal.
 - 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 held snug.
- Step 5: Repeat for the remaining fluorescent outputs through output 6.
- Step 6: Replace the first bus connector to the FLO option board and repeat for the remaining fluorescent outputs in the system (up to 24 outputs).

Ride Thru Option Kit



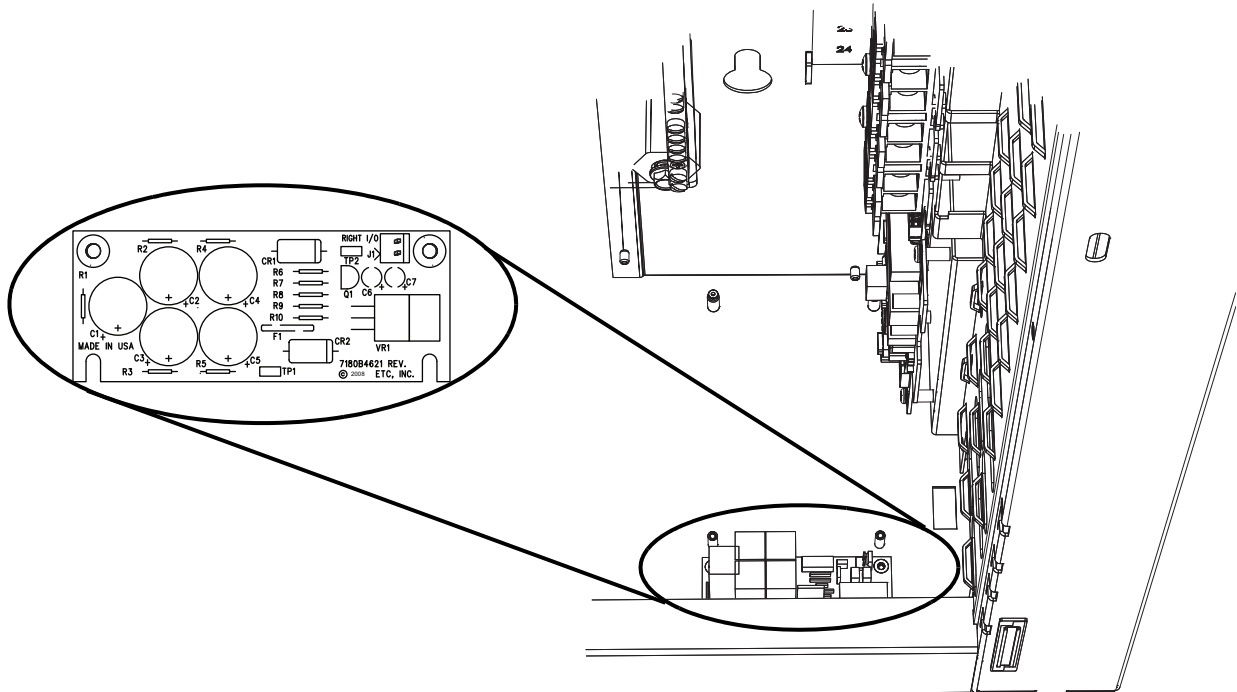
Note: A single DRd rack supports the use of either the Unison Ride Thru Option (URTO) or the Unison Battery Pack Option (UBPO), but not both in the same rack.

Install the Ride Thru Option Kit



WARNING: *Risk of Electric Shock! The Unison ride thru option board retains an electrical charge even when power to the DRd rack is off.*

The Ride Thru Option (URTO) kit provides power for the Architectural Control Processor (either SmartLink ACP or Paradigm ACP) for a minimum of 12 seconds during brief power outages or power drop outs. The Ride Thru Option board fully charges and is ready for operation within ten minutes of the DRd rack being powered.



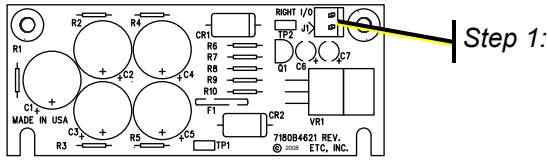
Step 1: Align the Ride Thru Option board to the mounting studs in the bottom of the DRd rack.

- Notice the mounting holes on the option board. Two are open ended slots used to place the board, and the remaining two standard mounting holes used to secure the board in place.
- Align the open ended slots to the studs and rest the other end of the board on the mounting studs.

Step 2: Secure the board to the two mounting studs with the screws provided.

Connect Ride Thru Option Wiring

The Unison Ride Thru Option board is provided with a wiring harness for connection between the board and the DRd rack right I/O board.



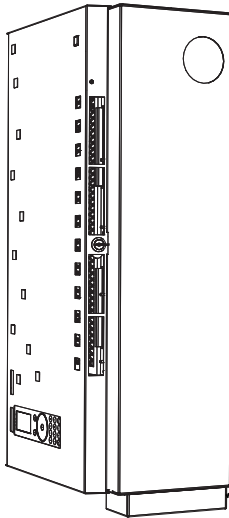
- Step 1: Connect one end of the wiring harness to the two pin receptacle on the option board.
- Step 2: Connect the other end of the wiring harness to the two pin receptacle on the DRd rack right I/O board. [See “DRd Right I/O Data Terminations” on page 33.](#)
- Secure the wiring harness to the DRd rack using the cable tie and cable tie mounts supplied with the Ride Thru Option board.

Battery Pack Option Kit



Note: *A single DRd rack supports the use of either the Unison Ride Thru Option (URTO) or the Unison Battery Pack Option (UBPO), but not both in the same rack.*

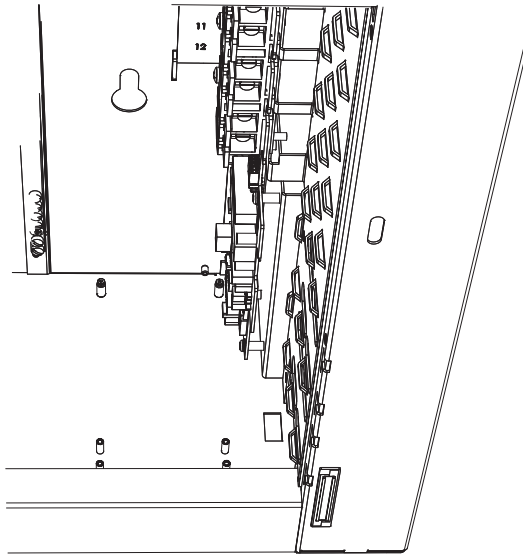
Install the Battery Pack Option Kit



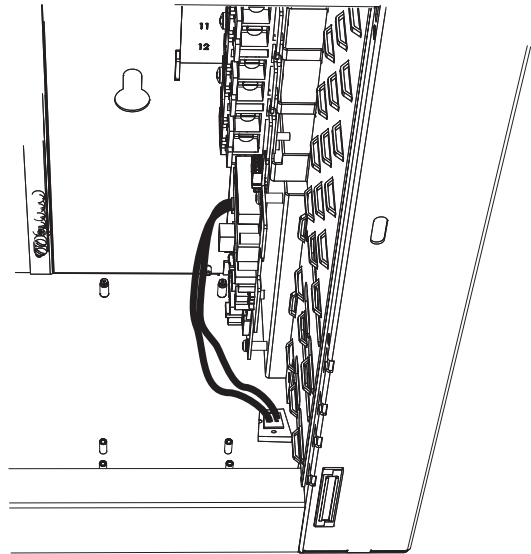
The Battery Pack Option (UBPO) kit provides sustained battery power to the Architectural Control Processor (either SmartLink ACP or Paradigm ACP) for up to 90 minutes during power outages. The self-contained battery installs on the bottom of the host DRd enclosure.

- Step 1: The Battery Pack Option board is provided with a wiring harness for connection between the battery pack and the right I/O board. Install the wiring harness and connector into the rack enclosure (the connector is keyed for proper orientation).

DRd enclosure before UBPO cable and connector installation



DRd enclosure after UBPO cable and connector installation

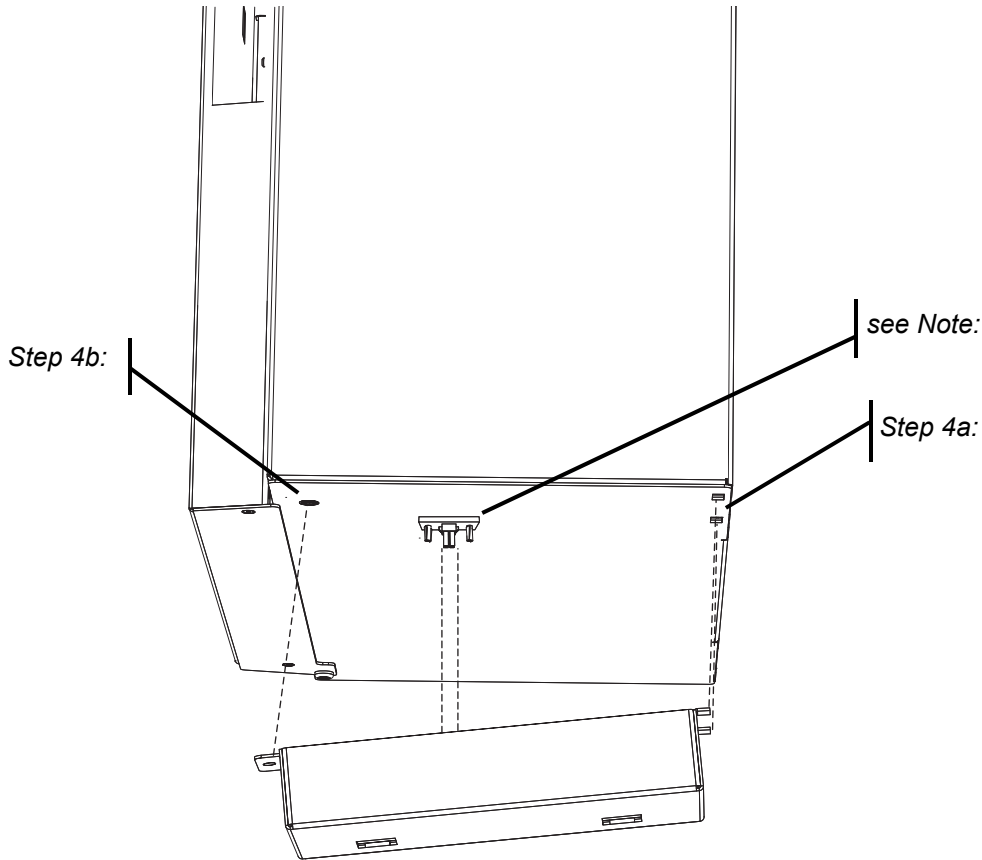


a: Insert the connector end through the opening in the bottom of the DRd rack. The connector is designed to snap into place without additional hardware, therefore slight force may be required to ensure the connector installs properly.

Step 2: Connect the two pin receptacle labeled "Ride Thru/Batt" on the DRd right I/O board. [See "DRd Right I/O Data Terminations" on page 33.](#)

Step 3: Secure the wiring harness to the DRd rack using the cable tie and cable tie mount supplied with the Battery Pack Option kit. A loose or poorly routed wiring harness could interfere with option module (DRd-FLO or DRd-DALI) installation.

Step 4: Install the battery pack on to the bottom of the rack enclosure.



a: Insert the tabs from the battery pack into the slots in the DRd rack.



Note:

As the battery is mated to the rack, the connector on the battery pack and the connector receptacle installed in step 1 also mate.

b: Secure the battery pack to the DRd rack using the screw provided.

Chapter 6

Final Installation and Power Up

This chapter contains the following sections:

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- ***Sealing Rack Air Leaks***52
- ***Final Installation***.....53
- ***Control Bypass (Test Mode)***.....54
- ***Engage Module Retention Bar***55

Checking the Rack Installation before Installing Modules

It's a good idea to look over the entire installation before installing modules or applying power to the rack.



WARNING: *Power must be turned OFF when you perform this procedure. Before service, de-energize main feed to dimmer rack and follow appropriate Lockout/Tagout procedures as described in NFPA Standard 70E. It is important to note that electrical equipment such as dimmer racks 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: Clean out dust, metal scraps or other debris from the rack interior.
- ETC recommends vacuuming the rack interior before installing modules.
- Step 2: Check for loose connections, bare wires and damaged insulation.
- Step 3: Manually spin the top cooling fan in both directions to be sure it is not obstructed.
- Step 4: Correct air leaks caused by misaligned or removed conduit panel openings or empty screw holes. For complete instructions for this procedure reference [Sealing Rack Air Leaks, page 52](#).
- Step 5: Check resistance between phases, Neutral and Earth for short circuits. With the power connector to the Power Supply/Dimming Engine still removed from the rack (this was accomplished prior to installing conduit and terminating any wires, see [Remove the DRd Rack Power Supply/Dimming Engine Access Panel, page 18](#)), and the all modules removed from the rack enclosure, including the Station Power Module, check resistance between phases, neutral and ground busses with a digital voltmeter (DVM).
- a: Phase to Phase; resistance should be 10M ohm or higher.
 - b: Phase to Earth (ground); resistance should be 10M ohm or higher.
 - c: Neutral to Earth (ground); resistance should be less than 1 ohm.
 - d: Phase to Neutral; resistance should be 10M ohm or higher.
- Step 6: Check Load Wiring. Check resistance between the load terminals and the Neutral buss.
- a: Above 1M ohm is normal when no load is connected.
 - b: Between 6-300 ohm is a reasonable reading when loads are connected.
 - c: Below 1M ohm indicates a dead short in the load wiring and an infinite reading indicates no load or an open circuit



CAUTION: *A dead short can cause module damage.*

Sealing Rack Air Leaks

After you have attached all the conduit to the rack and connected all wiring, you must seal any air leaks in the rack enclosure that was created during the installation process. ETC recommends use of urethane aerosol foam to fill air gaps in conduit fittings.

- Seal all conduit access holes.
- Completely cover all conduit openings with fiche paper and/or urethane aerosol foam or duct seal.
- Seal any air gaps caused by bent access panels.
- Fill in any gaps inside partially filled wiring conduit.
- Fill in other gaps or holes in the cabinet created during installation.
- Any rack enclosures that are installed side - by - side (bolted together) should only have minimal airflow between them.



CAUTION:

Air leaks can cause dimmer racks to overheat during operation and shut down. Air leaks can also cause a rack to shut down via an overtemp error, meaning that too little air is flowing through the front of the rack where it is needed to cool the dimmers.

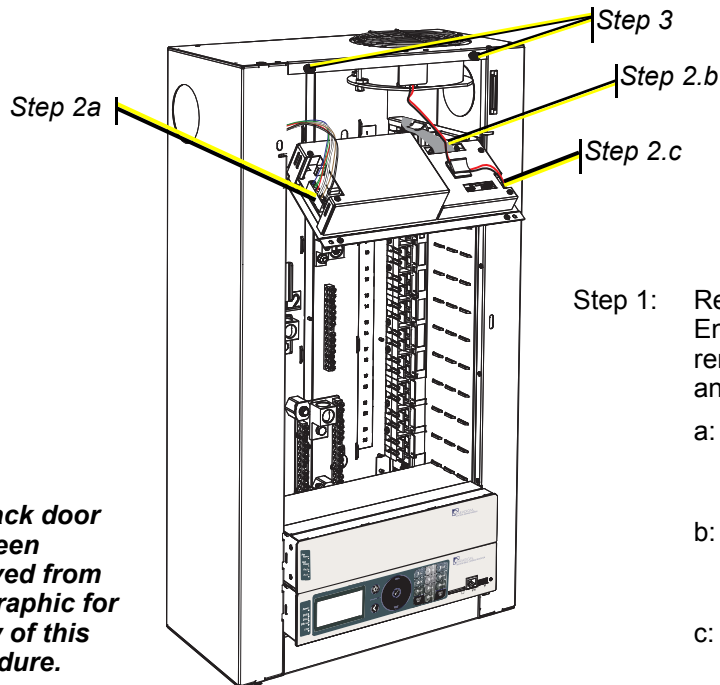
Final Installation



Note:

All 230 VAC DRd racks are shipped with a dimmer module retention bar installed. The dimmer module retention bar prohibits installed modules from being removed from the rack without the use of a tool.

Before installing modules into the rack, remove this dimmer module retention bar from the left side of the enclosure (door hinge side). Complete the final installation procedure outlined below, then [Engage Module Retention Bar](#) again. This bar is required to be installed in all 230 VAC DRd rack enclosures in order to maintain proper CE rating.



The rack door has been removed from this graphic for clarity of this procedure.

Step 1: Reinstall the Power Supply / Dimming Engine Access Panel that was removed prior to conduit installation and wire termination.

- a: Align the guide pins located on the access panel to the guided slots on the rack enclosure.
- b: Glide the access panel down, so that it rests fully into the guided slots.
- c: Tilt the supply access panel away from the rack enclosure.

Step 2: Reconnect the three cable assemblies to the unit.

- a: For the cable bundle on the left side, insert the connector into receptacle until you hear a click.
- b: For the ribbon cable on the right rear side; insert the connector into the receptacle. Press gently on both sides until it clips into place.
- c: For the two-wire cable on the right side, gently press the connector straight into the receptacle. This connection is also keyed and can only install one way.

Step 3: Rotate the access panel closed, then slide the panel up approximately one inch to align the panel to the captured screws.

Step 4: Tighten the two captured screws, securing the access panel in place.

Step 5: Install modules into the rack.

- a: Align each dimmer module with the correct module slot and firmly press into place. The face of the dimmer module should be flush with the DRd rack enclosure.
- b: Install the Station Power Module and Architectural Control Processor into their respective slots. The Architectural Control Module (either SmartLink ACP or Paradigm ACP) installs into the lowest module slot. The Station Power Module installs into the slot directly above the ACP.



WARNING: *Never power up or operate the Unison DRd rack without all modules installed. Failure to comply exposes you to dangerously high voltages that may result in death by electrical shock.*

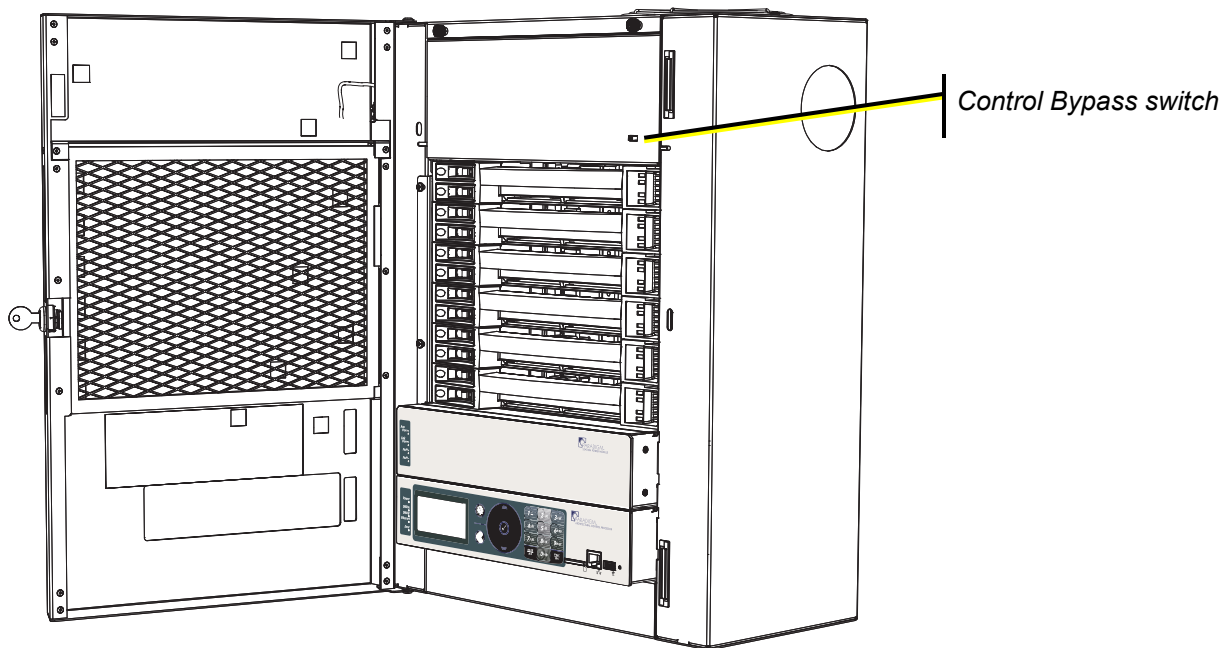


Note: *Store this access panel in a safe place until you are finished roughing in conduit and terminations. You will need to reinstall this panel when the rack enclosure is installed and all wires have been terminated.*

- Step 6: **Power up the rack.** Before installing or removing dimmer or control modules for service, de-energize main feed to dimmer rack and follow appropriate Lockout/Tagout procedures as described in NFPA Standard 70E. It is important to note that electrical equipment such as dimmer racks 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 7: Switch all module circuit breakers to the “On” position.
- Step 8: Reference the related Architectural Control Processor Programming Guide for rack configuration setup and operation.

Control Bypass (Test Mode)

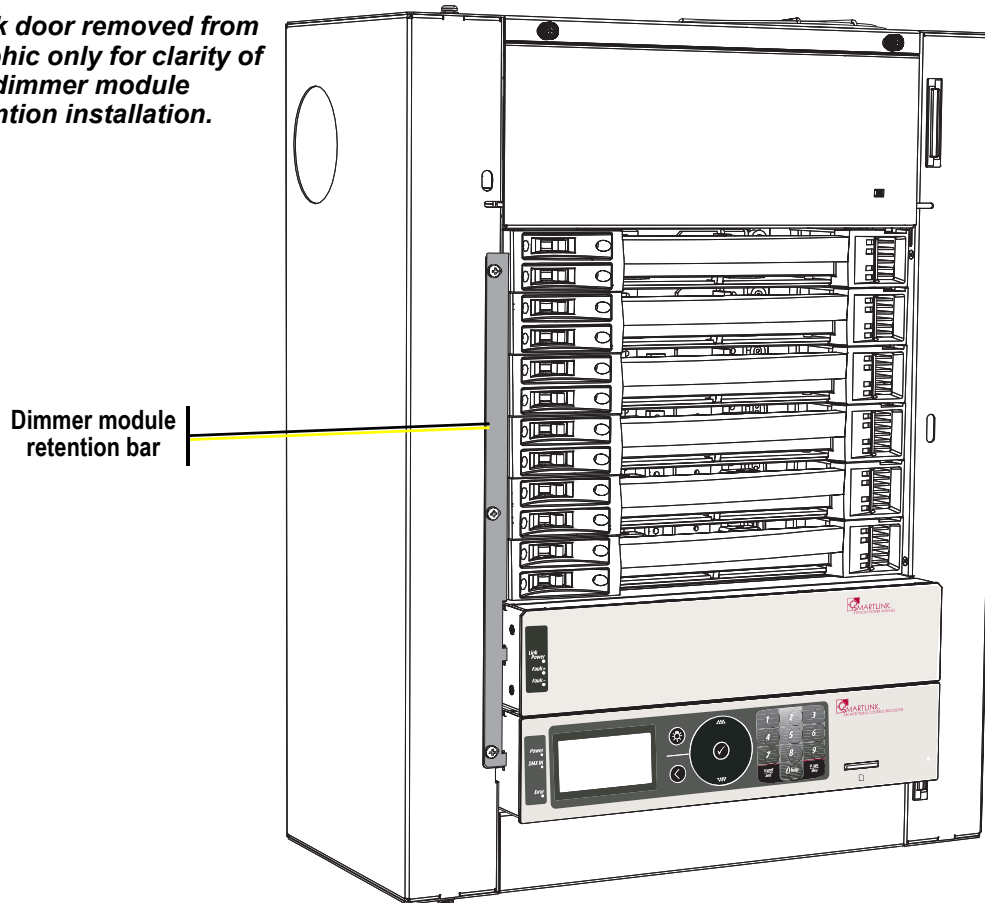
Test load circuits connected to the DRd rack enclosure by switching the “Control Bypass” switch to the “Test” position. The Control Bypass switch allows testing of lighting loads and provides temporary lighting before complete system commissioning. Return the switch to its “Normal” setting after the test is complete.



CAUTION: *Turning the Control Bypass switch to the “Test” position with all module circuit breakers “On” will bring all lighting loads to full. To select only certain lighting loads for test, switch “Off” undesired module circuit breakers in the DRd rack enclosure.*

Engage Module Retention Bar

Rack door removed from graphic only for clarity of the dimmer module retention installation.



- Step 1: Check that all required modules have been installed into the DRd rack enclosure including dimmer modules, air flow modules, station power module, and Architectural Control Processor. All module slots should be populated.
- Step 2: Loosen the screws on the retention bar.
- Step 3: Slide the retention bar to the right. Notice the retention bar has two tabs that insert into the ACP and station power module slots for retention.
- Step 4: Secure the retention bar in place using the screws provided.



Note:

The DRd rack power supply access panel is not accessible when the DRd module retention kit is installed.

Appendix A

Modules Specification

120 VAC Modules

Module Type	Description	Part Number	Module Weight (lbs/kg)
AFM	Air Flow Module	7083A1072	1.3 lbs / .59 kgs
CC15	Dual 15A Constant Circuit Breaker Module	7083A1021	2.1 lbs / 1.0 kgs
CC20	Dual 20A Constant Circuit Breaker Module	7083A1025	2.2 lbs / 1.0 kgs
D15	Dual 15A, 1.8KW, 350 μ S Dimmer Module	7083A1018	5 lbs / 2.3 kgs
D15E	Dual 15A, 1.8KW, 500 μ S Dimmer Module	7083A1019	5 lbs / 2.3 kgs
D15F	Single 15A, Fluorescent Dimmer Module	7083A1020	2.4 lbs / 1.1 kgs
D20	Dual 20A, 2.4KW, 350 μ S Dimmer Module	7083A1022	5 lbs / 2.3 kgs
D20E	Dual 20A, 2.4KW, 500 μ S Dimmer Module	7083A1023	5 lbs / 2.3 kgs
D20F	Single 20A, 2.4KW Fluorescent Dimmer Module	7083A1024	2.4 lbs / 1.1 kgs
ELV10	Reverse Phase 10A at 120 VAC, Dimmer Module	7183A1017	2.6 lbs / 1.2 kgs
R15	Dual 15A at 120 VAC Relay Module	7083A1084	2.6 lbs / 1.2 kgs
R20	Dual 20A at 120 VAC, Relay Module	7083A1085	2.6 lbs / 1.2 kgs

230 VAC Modules

AFM	Air Flow Module	7183A1050	1.3 lbs / .59 kgs
AFM	Air Flow Module	7083A1072	1.3 lbs / .59 kgs
ECC6	Dual 6A, 1.3KW, Constant Circuit Module	7183A1091	2.7 lbs / 1.2 kgs
ECC6N	Dual 6A, 1.3KW, Neutral Disconnect Constant Circuit Module	7183A1089	5 lbs / 2.3 kgs
ECC10	Dual 10A, 2.3KW Constant Circuit Module	7183A1092	5 lbs / 2.3 kgs
ECC10N	Dual 10A, 2.3KW Neutral Disconnect Constant Circuit Module	7183A1090	5 lbs / 2.3 kgs
ECC15	Dual 15A, 3KW Constant Circuit Module	7070A1046	2.7 lbs / 1.2 kgs
ECC25	Dual 25A, 5KW Constant Circuit Module	7070A1047	2.5 lbs / 1.1 kgs
ED6E	Dual 6A, 1.3KW, 400 μ S Dimmer Module	7183A1085	5 lbs / 2.3 kgs
ED6N	Dual 6A, 1.3KW, 400 μ S Dimmer Module	7070A1081	5.5 lbs / 2.5 kgs
ED6NE	Dual 6A, 1.3KW, 400 μ S Neutral Disconnect Dimmer Module	7183A1079	5 lbs / 2.3 kgs
ED10E	Dual 10A, 2.3KW, 400 μ S Dimmer Module	7083A1086	5 lbs / 2.3 kgs
ED10N	Dual 10A, 2.3KW, 400 μ S Neutral Disconnect Dimmer Module	7070A1082	5.5 lbs / 2.5 kgs
ED10NE	Dual 10A, 2.3KW, 400 μ S Neutral Disconnect Dimmer Module	7070A1080	5.5 lbs / 2.5 kgs
ED15	Dual 15A, 3KW, 225 μ S Dimmer Module	7083A1035	1.3 lbs / .59 kgs
ED15E	Dual 15A, 3KW, 400 μ S Dimmer Module	7083A1032	5 lbs / 2.3 kgs
ED15N	Dual 15A, 3KW, 225 μ S Neutral Disconnect Dimmer Module	7083A1041	5.6 lbs / 2.5 kgs
ED15NE	Dual 15A, 3KW, 400 μ S Neutral Disconnect Dimmer Module	7083A1042	5.6 lbs / 2.5 kgs
ED15R	Dual 15A, 3KW, 225 μ S RCD Module	7083A1045	5 lbs / 2.3 kgs
ED15RE	Single 15A, 3KW, 400 μ S RCD Module	7083A1046	5 lbs / 2.3 kgs
ED25	Single 25A, 400 μ S Dimmer Module	7083A1033	5.5 lbs / 2.5 kgs
ED25E	Single 25A, 5KW, 600 μ S Dimmer Module	7083A1034	5.5 lbs / 2.5 kgs
ED25NE	Single 25A, 5KW, 600 μ S, Neutral Disconnect Dimmer Module	7083A1044	5 lbs / 2.3 kgs

230 VAC Modules

AFM	Air Flow Module	7183A1050	1.3 lbs / .59 kgs
ED25N	Single 25A, 5KW, 400µS Neutral Disconnect Dimmer Module	7083A1043	5.5 lbs / 2.5 kgs
ED25R	Single 25A, 5KW, 400µS RCD Module	7083A1047	5 lbs / 2.3 kgs
ED25RE	Single 25A, 5KW, 600µS RCD Module	7083A1048	5 lbs / 2.3 kgs
ER6	Dual 6A, 1.3KW at 230 VAC, Relay Module	7183A1083	5 lbs / 2.3 kgs
ER10	Dual 10A, 2.3KW at 230 VAC, Relay Module	7083A1084	5 lbs / 2.3 kgs
ER15	Dual 15A, 3KW at 230 VAC, Relay Module	7083A1086	3.1 lbs / 1.42 kgs
ER25	Dual 25A, 5KW at 230 VAC, Relay Module	7083A1087	3.1 lbs / 1.42 kgs

240 VAC Modules

Module Type	Description	Part Number	Module Weight (lbs/kg)
AFM	Air Flow Module	7083A1072	1.3 lbs / .59 kgs
HD15	Dual 15A, 3.0KW at 240 VAC, 165µS Dimmer Module	7183A1047	5 lbs / 2.3 kgs
HD15F	Single 15A, Fluorescent Dimmer Module	7183A1056	5 lbs / 2.3 kgs
HELV5	Reverse Phase 5A at 240 VAC, Dimmer Module	7183A1055	2.4 lbs / 1.1 kgs
HR15	Dual 15A at 240 VAC, Relay Module	7183A1057	3.1 lbs / 1.42 kgs
HCC15	Dual 15A, Constant Circuit Module	7183A1058	2.6 lbs / 1.2 kgs

277 VAC Modules

Module Type	Material description	Part Number	Module Weight (lbs/kg)
AFM	Air Flow Module	7083A1072	1.3 lbs / .59 kgs
ACC15	Dual 15A at 277 VAC, Constant Circuit Breaker Module	7183A1048	2.7 lbs / 1.2 kgs
ACC20	Dual 20A at 277 VAC, Constant Circuit Breaker Module	7083A1090	2.7 lbs / 1.2 kgs
AD15	Dual 15A, 4.1KW at 277 VAC, Dimmer Module	7083A1006	5 lbs / 2.3 kgs
AD15F	Single 15A, 4.1KW at 277 VAC, Dimmer Module	7083A1008	2.4 lbs / 1.1 kgs
AD20	Dual 20A, 5.5KW at 277 VAC, Dimmer Module	7083A1007	5 lbs / 2.3 kgs
AD20F	Single 20A, 5.5KW at 277 VAC, Fluorescent Dimmer Module	7083A1009	2.4 lbs / 1.1 kgs
AELV5	Dual 5A at 277 VAC Reverse Phase Dimmer Module	7183A1028	2.6 lbs / 1.2 kgs
AR15	Dual 15A at 277 VAC Relay Module	7083A1082	2.6 lbs / 1.2 kgs
AR20	Dual 20A at 277 VAC Relay Module	7083A1083	2.6 lbs / 1.2 kgs

Appendix B

CE 230V Emergency Modules

230V CE Emergency modules are non-standard for Unison DRd 230V Rack. On the occasion that your installation requires use of these modules, refer to the information outlined below for installation.



Note: When configuring the dimmer modules at the Architectural Control Processor (SmartLink ACP or Paradigm ACP), configure as either the ED15 or the ER15 module type.

About Emergency Modules

The 230V CE Emergency modules provide two live outputs, one of which is dimmed or switched, and one of which is live whenever the breaker is turned “On”. This setup allows the modules to control battery-backed lighting, which requires both a constant and a switched or dimmed feed.

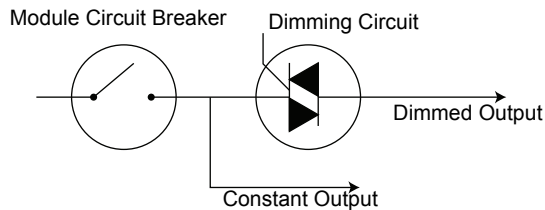


Figure 1: Emergency Module Circuit

ETC offers two varieties of Emergency Modules - ED15AFE (15A Dimmer), and ER15AFE(15A Relay), painted red for easy identification.

Wire Termination

The constant output from the module is connected to the Neutral lugs at the left of the rack. Therefore, unlike Neutral Disconnect modules, Emergency modules provide a live output at these lugs, not a neutral connection.



Note: ETC does not offer a Neutral Disconnect or RCD version of the emergency modules.

- Step 1: Locate the module slot in the rack where the Emergency module is to be fitted.
- Step 2: Terminate the outgoing dimmed line to the terminals at the right hand side of the rack.
- Step 3: Terminate the outgoing (constant feed) line to the terminals at the left side of the rack.
- Step 4: Terminate the outgoing (Earth) line to the earth bar terminals.

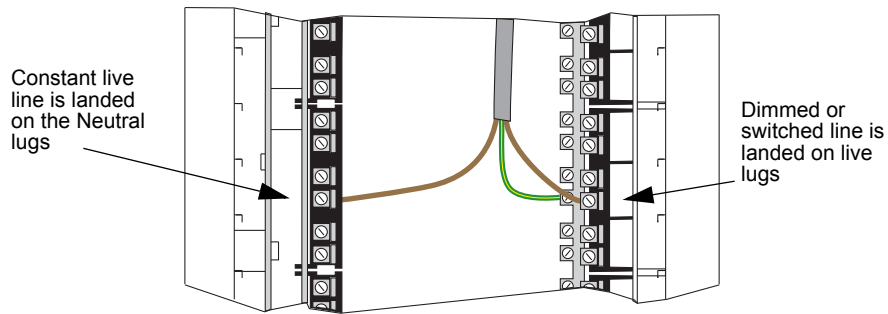


Figure 2: Emergency Module Connections

Step 5: Terminate the Neutral as described in the following section, dependant on your rack type.

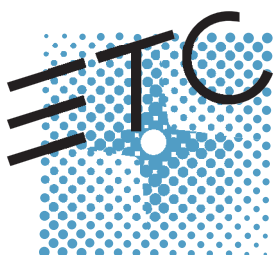
Non Neutral Disconnect Racks

For racks which have neutral jumpers fitted, the Neutral of the load, fed by the Emergency module, **should** be connected to the Neutral terminal of an adjacent module.

Neutral Disconnect Racks

In racks without neutral jumpers (Neutral Disconnect racks), the Neutral of the load **should not** be connected to another load's Neutral terminal. This can cause unwanted tripping of RCD modules.

Instead, an auxiliary Neutral terminal must be fitted to the neutral plate and the loads should be connected to the terminal. If your rack was ordered with Emergency modules from the factory, the auxiliary neutral terminal will be factory fitted. If you require an auxiliary neutral terminal for field installation, please contact ETC as shown using the details in [Contacting ETC, page 2](#).



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